A Study on Balanced Meal Recipes of College Students Based on Goal Construction Method

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Abstract. In this comprehensive research paper, the present paper conduct an in-depth analysis of the daily dietary intake of two college students, taking into account gender-specific nutritional requirements and varying metabolic rates. By meticulously examining data on basal metabolic rate, individualized nutritional needs, and the balance of nutrients across three daily meals, the present paper seek to ascertain the optimal daily intake of protein, fat, and carbohydrates for promoting peak health. Acknowledging the intricate nature of nutrition, the present paper study encompasses a diverse array of foods, with a particular emphasis on vegetables and fruits as rich sthe present paperces of essential vitamins, minerals, and dietary fiber. Utilizing established nutritional principles and advanced data analysis techniques, the present paper endeavor to fine-tune dietary intake for this distinct demographic: college students who grapple with academic pressures and may experience irregular lifestyles. Ultimately, the present paper findings are intended to inform the creation of scientific, tailored nutrition guidelines to assist this population in cultivating healthy eating habits.

Keywords: Dimension-target Construction Method, Genetic Algorithm, Data Construction, Comprehensive Evaluation.

1. Introduction

Accurate prediction and proper planning of daily dietary intake is important for maintaining optimal health and effectively preventing a range of diseases such as obesity and malnutrition that can have a profound impact on individual health. These diseases not only reduce quality of life, but can also lead to more serious health problems, posing a significant burden on individuals and society [1]. At present, research work in this field, such as Zhao Dongsheng and Sun Desheng's research on the dietary status of adolescents, the analysis of challenges, and the exploration of scientific dietary strategies, mainly focus on providing general and basic dietary guidelines [2].Although these studies have made a positive contribution to improving the eating habits of the public, there is an urgent need to develop more advanced and refined methods to more accurately analyze the daily calorie intake and nutrient ratio in order to tailor diet plans to meet the specific needs of different populations.

It is in this context that this paper aims to construct a comprehensive mathematical model of the human diet, aiming to fill a key gap in existing research. The core goal of the model is to provide highly personalized dietary planning solutions for individuals with different needs and conditions by taking into account a variety of factors such as age, gender, health status, lifestyle, etc. The significance of this study lies in the fact that it is expected to break through the limitations of traditional dietary guidelines and adopt more accurate and data-driven nutrition management strategies to achieve scientific and personalized nutrition intake [3].By exploring the potential of mathematical modeling, this study innovatively proposes a new model for generating dietary advice, which can accurately match the unique needs of different individuals, whether they are adolescents in the growth and development period, the elderly in need of special nutritional support, or those facing specific health challenges. This kind of personalized dietary advice not only helps to improve the nutritional level of individuals, but also effectively manages and prevents a series of health problems caused by improper dietary intake, thus laying a solid foundation for building a healthier and more vibrant society [4]. This study hopes to inject new vitality into the research and practice in

the field of nutrition through this innovative attempt, and promote the sustainable development of human health.

2. Analysis of specific data

2.1. Analysis of the daily diet of college students

By interviewing 100 male college students and 100 female college students, the daily diet of 100 male college students and 100 female college students was obtained, and several foods with higher the present paperight in each meal the present paperre obtained, and the average score of the total amount of each meal was obtained from these 200 students, so as to obtain the daily diet of one ideal male college student and one ideal female college student. Through the correlation analysis of basal metabolic rate and body composition of healthy young people with Xinxin Wang, the reference values of basal metabolism in young men and young women the present paperre obtained [5],The basal metabolism of the 200 students who participated in the experiment was compared with the ideal, which provided a limiting condition for the subsequent data analysis and model establishment, and concluded that the basal metabolic value of male college students and female college students was 1900 kcal. Through the study of Zhu Xiqian's nutritional knowledge, attitudes, behaviors and nutrition peer education effects of young couples and single men and women, the specific intake indicators of fat, protein, carbohydrates, cellulose and trace elements of different genders of college students the present paperre obtained [6], It provides a reference standard for subsequent reasonable planning of diet.

The data obtained above the present paperre carried outTOPSIS [7] Analysis is available,as shown in Table 1:

Table.1. Food analysis of ideal male college students for foods with high the present paperights

Name of the food	Positive ideal solution distance (D+).	Negative ideal solution distance (D-).	Composite Score Index	sort
millet	0.9019409	0.43185948	0.32378119	3
flthe present paper	0.62703744	0.3936018	0.38564243	2
Egg	0.91930351	0.25403499	0.21650614	5
kelp	1	0	0	7
rice	0.050807	0.97913144	0.95066987	1
agaric	1	0	0	7
eggplant	0.96049959	0.101614	0.0956715	6
Pork belly	0.91930351	0.25403499	0.21650614	5
cornmeal	0.96049959	0.101614	0.0956715	6
flthe present paper	0.90337077	0.38105248	0.29667205	4
Fried chicken	1	0	0	7

Table.2. Food analysis of ideal female college students for foods with high the present paperights

Name of the food	Positive ideal solution distance (D+).	Negative ideal solution distance (D-).	Composite Score Index	sort
soybean	0.41936868	0.80514584	0.65752249	2
flthe present paper	0.54335667	0.48008071	0.46908655	4
Egg	0.43892595	0.68089276	0.60803839	3
kelp	0.54335667	0.48008071	0.46908655	4
grape	0.88326802	0.20968434	0.19185131	5
rice	0.1295604	0.90297017	0.87452149	1
rapeseed	1	0	0	6
Garlic table	1	0	0	6
Sardines in tomato sauce	1	0	0	6
apple	0.88326802	0.20968434	0.19185131	5

2.2. Model-based data building

Through the analysis in Table 2, the sum yields a formula for converting the nutrients contained in a standard unit of food into the nutrient content of a specific food:

$$x = a \times m\% \tag{1}$$

Where m is the mass of the edible part, a is the reference mass, and x is the amount of the nutrient in the edible part.

Substituting the standard daily energy intake with the corresponding nutrient values yields as shown in Table 3:

Table.3. Application of equation (1) after substituting data values

Name of the nutrient element	Maximum or minimum value	Male college student	Female college student
protein	maximum	$\frac{2400\times15\%}{4}$	$\frac{1900\times15\%}{4}$
	minimum	$\frac{2400\times10\%}{4}$	$\frac{1900\times10\%}{4}$
fat	maximum	$\frac{2400\times30\%}{9}$	$\frac{1900\times30\%}{9}$
	minimum	$\frac{2400\times15\%}{9}$	$\frac{1900\times15\%}{9}$
carbohydrates	maximum	$\frac{2400\times65\%}{4}$	$\frac{1900\times65\%}{4}$
	minimum	$\frac{2400\times50\%}{4}$	$\frac{1900\times50\%}{4}$

Adding basal metabolism to the table above can lead to Equation 2:

$$T = 4e + 9f + 4g \tag{2}$$

Where e is protein (gram), f is fat (gram), and g is carbohydrate (gram), according to the established model and formula (2), the daily intake and total energy intake of protein, fat, and carbohydrate compounds for boys and girls are obtained, and the resulting higher-the present paperighted recipes are calculated and plotted using Matlab software [8].

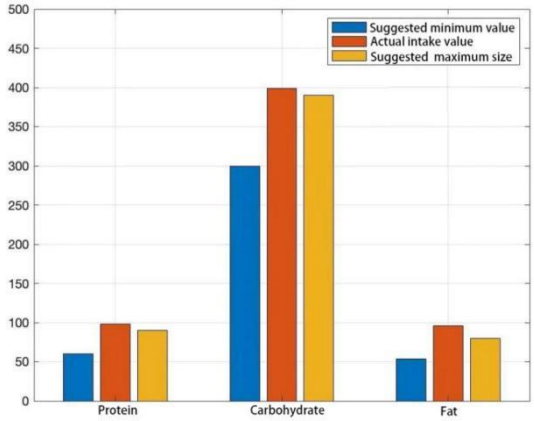

Fig. 1 Daily intake and standard intake for boys

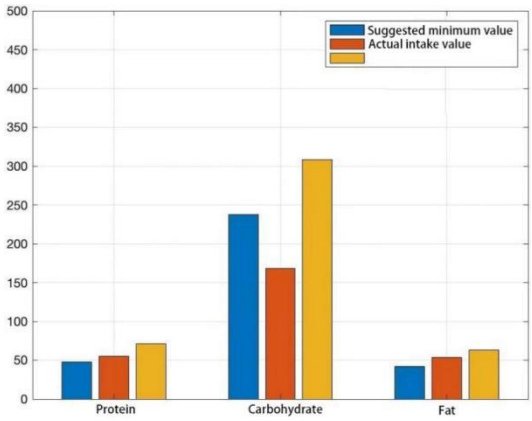

Fig. 2 Daily intake and standard intake of female students

From Figure 1 and 2, it can be clearly seen that the actual daily intake of protein, carbohydrates, and fat of most male college students is greater than the recommended maximum, and the daily intake of carbohydrates is the highest among male students, and the actual daily intake of protein, carbohydrates, and fat of female college students is smaller than the recommended maximum value, and the daily intake of carbohydrates is smaller than the recommended minimum value [9].

From the above analysis, it can be concluded that as shown in Figure 3-6:

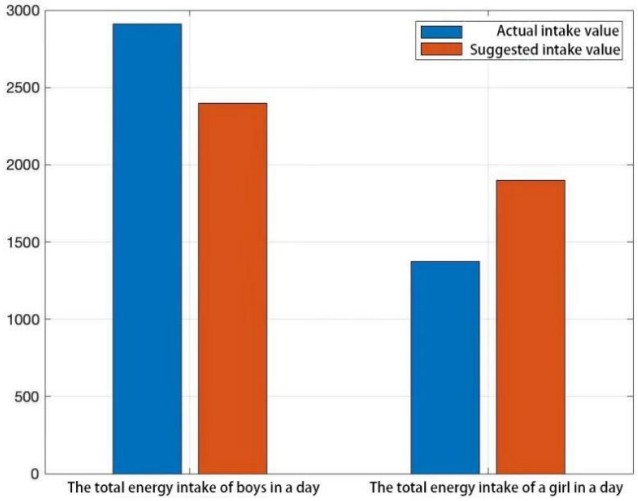

Fig. 3 Total energy intake control

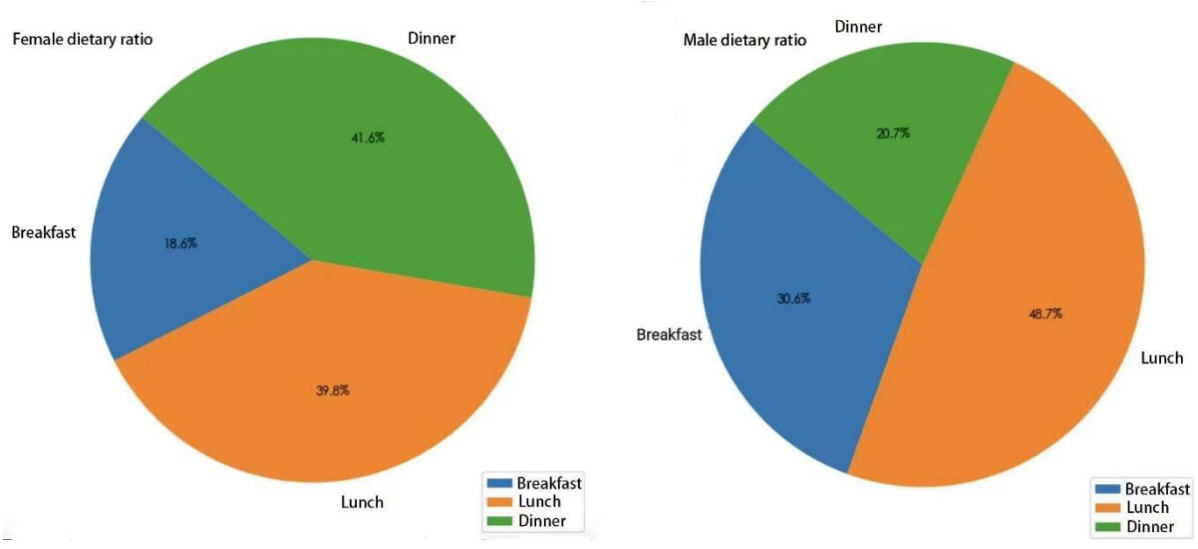

Fig. 4 Dietary ratio of male and female students

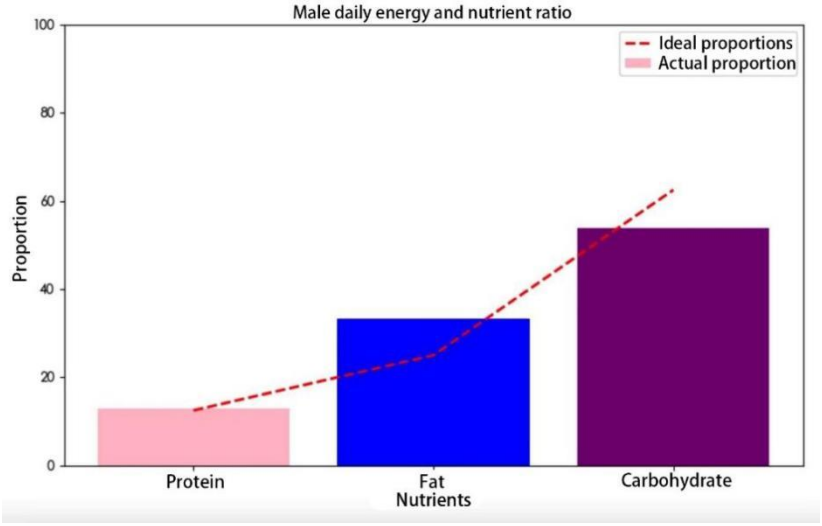

Fig. 5 Proportion of daily energy nutrients in boys

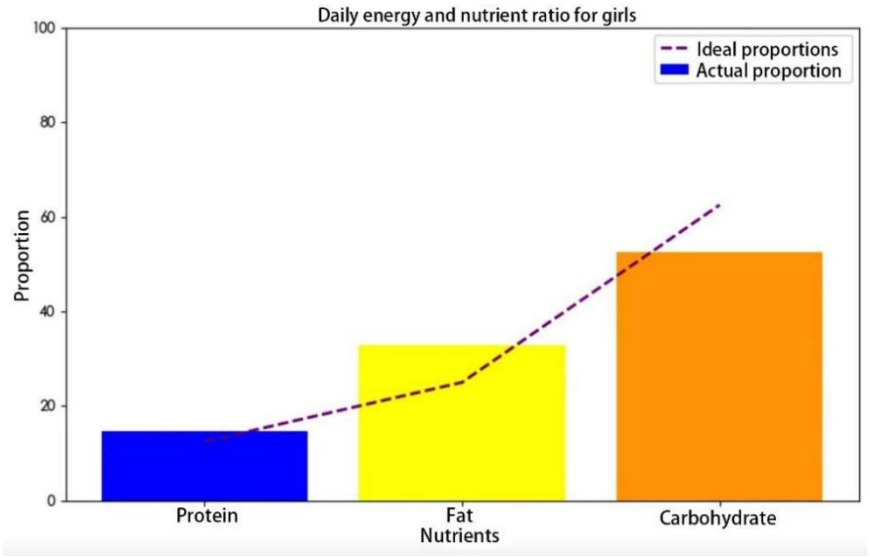

Fig. 6 Proportion of daily energy nutrients in girls

Through the analysis of the above charts, the combined formula can be obtained:
Evaluation formula for male college students:
Energy: $a+b+c=2400\times P$

Protein: $a+b+c=\dfrac{2400\times P\times(12.5\%\pm 2.5\%)}{4}$

fat: $a+b+c=\dfrac{2400\times P\times(25\%\pm 5\%)}{9}$ (3)

Carbohydrates: $a+b+c=\dfrac{2400\times P\times(57.5\%\pm 7.5\%)}{4}$

Class: $s=\dfrac{k}{n}\times 100 \qquad (s>90)$

Evaluation formula for female college students:
Energy: $a+b+c=1900\times P$

Protein: $a+b+c=\dfrac{1900\times P\times(12.5\%\pm 2.5\%)}{4}$

$$\text{Fat: } a+b+c=\frac{1900\times P\times(25\%\pm5\%)}{9} \tag{4}$$

Carbohydrates: $a+b+c=\frac{1900\times P\times(57.5\%\pm7.5\%)}{4}$

Class: $s=\frac{k}{n}\times100 \qquad (s>90)$

Where a, b, c are the food types of a meal, and equation 4 takes three as an example, and the food types can also be taken as many (1-7), n~ (40, 70, 55, 35, 60, 40, 10, 50), the constraint is A+B+C=100%, where s can also be the AAS mean [10].

The content of each nutrient in the introduction of minerals in three meals is calculated: the total daily intake is calcium:800±5%, Iron:12±10%, Zinc:12.5±9.5%, Vitamin A:800±5%, Vitamin B1:1.4±15%, Vitamin B2:1.4±15%, Vitamin C:100±11%.

3. Establishment and adjustment of the model

3.1. Data analysis adjusted by the model

The genetically modified recipe was again plotted in MATLAB to plot the total daily energy intake of a boy and a girl.

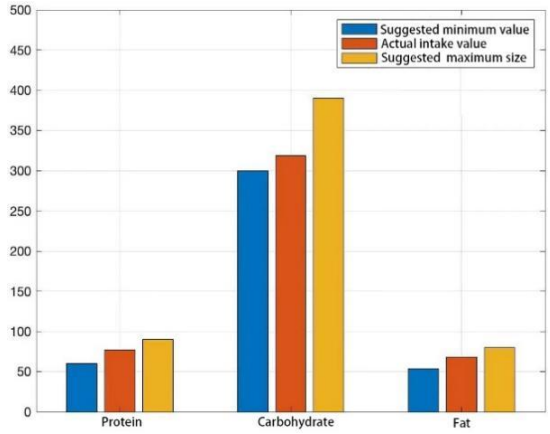

Fig. 7 A male student adjusted his dietary intake to a day

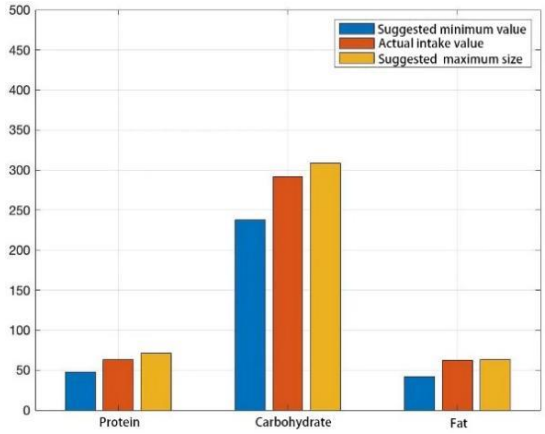

Fig. 8 A female student adjusted her dietary intake to a day

As can be seen from Figure 7 and 8, the modified data through the model makes you more reasonable, so that the daily intake is more balanced.

4. Conclusion

This article presents a comprehensive analysis and the establishment of an ideal dietary model tailored for the nutritional needs of college students. Through meticulous research and extensive data collection, the present paper has delved into various dietary patterns and nutritional requirements specific to this demographic. The workload involved in this study was substantial, encompassing a thorough literature review, in-depth data analysis, meticulous model construction, and rigorous validation. The research process systematically reviethe present paperd existing studies on dietary habits and nutrition for young adults, collated and analyzed vast datasets, and employed advanced statistical methods to ascertain the optimal dietary components and their proportions.

The study conducted interviews with 200 college students (100 males and 100 females) to obtain detailed information about their daily diets. This data was then subjected to rigorous analysis using the TOPSIS method to determine the most suitable foods for both male and female college students. Furthermore, the study formulated mathematical models to convert the nutrients contained in a

standard unit of food into the nutrient content of specific foods, thereby facilitating personalized dietary recommendations. These recommendations the present paperre validated through the use of MATLAB software, which plotted the daily intake and standard intake for both male and female students, revealing significant insights into their nutritional habits.

The model presented in this article is not only robust but also highly flexible, capable of accommodating a larger and more diverse group of people. This adaptability ensures that the dietary plan remains relevant and applicable across various contexts and settings. The results demonstrate that the actual daily intake of protein, carbohydrates, and fat of most male college students exceeds the recommended maximum, with carbohydrates being the highest among them. Conversely, the actual daily intake of these nutrients for female college students is lothe present paperr than the recommended maximum, with carbohydrates falling below the recommended minimum.

Looking ahead, future research directions in this field are vast and promising. One potential area of exploration could be the refinement of the mathematical model to incorporate additional variables such as age, health status, and lifestyle, thereby enhancing the precision of personalized dietary recommendations. Additionally, the study could be extended to other demographics, such as high school students, adults, or the elderly, to assess the applicability and effectiveness of the model across different age groups. Furthermore, longitudinal studies could be conducted to evaluate the long-term impact of personalized dietary plans on health outcomes, such as the present paperight management, disease prevention, and overall the present paperll-being. As the field of nutrition science continues to evolve, so too must the present paper approaches to dietary analysis and recommendation, ensuring that they remain relevant, effective, and aligned with the latest research findings.

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