

INFORMATION OF THE GENERAL POPULATION ABOUT BLOOD TYPE DIET IN THE FIELD REPUBLIC OF CROATIA

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Abstract

Blood type diet is the key which opens the door to health secrets, diseases, long life, physical vitality and emotional strength. Determines to which diseases is a person disposed, which physical activity suits him the best and which food should they eat. Blood type diet (ABO) began promoting over the last ten years. It claims to improve health and reduces the risk of disease. The aim of this research was to get insight into population awareness and knowledge about link between diet and blood types and their knowledge in general about proper nutrition. At the same time, the aim was also to encourage the respondents on thinking and testing this kind of diet.

The research was anonymously, conducted through social media trough the period of 26 April to 06 May 2021 and it is provided opportunity to the population of all age structures and qualifications to solve the survey. There were 964 respondents participating in research from the Republic of Croatia. All collected data were analyzed in the SPSS 23 statistical program from IBM. The data are presented in descriptive and graphical terms.

Big number of respondents were in all age groups which proves that this topic is unexplored, but very interesting and it encourages thinking. Results of this research also brought to the knowledge about types of diets which people usually consume, about desire and interest of the general population about testing the new ways nutrition. It is interesting that more than half respondents (53.3%) had never heard about "Blood type diet".

Research conclusion leads to connection between blood type and certain disease, and 34.1% of respondents thinks that they can improve their physical and mental health by feeding according to their blood type. Indigestion after consuming certain groceries which doesn't match their blood type recognized 80% of respondents. Also, researches showed changes that happened to people who tried feeding only by their blood type and their reactions were positive.

Key words: *Blood type, Nutrition, Diet, Physical activity.*

1. Introduction

A diet based on the ABO blood group system began to be promoted during the last ten years and claims to improve health and reduce the risk of disease, but evidence which indicates the effectiveness of diet by blood type are still not substantiated by scientific literature [1]. But somewhere there must be an explanation to why certain people lose weight when they adhere to a certain diet, and other people who use the same diet do not lose a single gram. Also, a big question that has no answer is why some people stay vital into the deep age while others do not in terms of physical and mental component of life? Blood group analysis, however, indicate that there are significant differences from person to person, from life to life and from organism to organism, every human being is unique [2]. The link between blood type and diet was started by Dr. Peter J. D'Adamo and he has written several books on the same topic so far: "Eat Right 4 Your Type" [3], "4 blood type/4 way of life" etc.

In his books, he claims and presents some evidence how a blood type determines a person's digestion, reaction to stress, mental state, metabolism and immune system. He is working to create a system based on which people could choose just that way of life that suits their needs, they could plan their daily lives with the goal of prevention or reducing stress, prolong life expectancy, avoid chronic physical and mental diseases. Also, through the planned system there would be the possibility of perfecting the diet for achieving better energy, achieving emotional balance, it would be easier to overcome diseases from which people suffer and simply feel good, fulfilled in their skin, physically and mentally. Thanks to the increase of advanced technology and the progress of the human species, it has been made possible to explore the peculiarities of each man more thoroughly [3]. Dr. Peter is thinking about links between blood types and certain diseases which were prompted by the research of his father, dr. James D'Adamo who after 1957 stayed in several large spas. Long lasting by staying with patients he noticed that a large number of them were not recovering and some patients were even in aggravation. Since blood is the body's primary source of nourishment, he concluded that the ability to determine human-to-human and disease-to-disease differences through blood must exist. His research began by determining the blood groups of his patients and he observed their reactions to various diets. After many years of work, he realized that patients with blood group A do not suit high-calorie foods, in fact, their condition even worsens after copious meals with meat, but respond very well to a diet composed of plant-based protein, soy and tofu. From the physical activities, light exercises suited them the best, relaxation exercises like yoga after which they were livelier and fuller of energy. On the opposite side patients with blood group O responded well to high-calorie diets and intense physical activities such as running, after which energy levels improved for the better. First book was published in 1980 under the title "One Man's Food" where he presented his observations. The research was continued by Dr. Peter J. D'Adamo, who noticed a connection between blood types and certain diseases in 1982. Blood type (O, A, B, AB) is a genetic imprint that identifies each person just as well as DNA. If the individualized properties of the blood group in the form of diet and manner are applied to living, in a natural way it is possible to improve the quality of life, reach the ideal weight and slow down the aging process. The key to the meaning of each blood type is found in the evolution of the human genus - blood group O is the oldest, blood group A developed with the advent of agrarian society, blood group B appeared in the migration of peoples to the north, blood group AB is the most modern, the result mixing different blood groups [2].

The research was conducted on the general population and focused on general information and population knowledge about their blood type, about diet and physical activity. The aim of this paper was to gain insight into how many people even know or have ever heard of nutrition by blood type and how much they know about their own blood type.

2. Materials and Methods

The research was conducted from April 26th 2021 to May 6th 2021. The population from Croatia was surveyed which consisted of people of all ages. The data has been collected through the survey which 946 participants filled out. Survey consisted of 16 questions with multiple responses and short answers. The questionnaire consisted of demographic questions, questions about the diet, physical activity and blood type, questions about personality and connection between blood type and diseases.

Survey questions were made clear and unambiguous, and respondents volunteered and anonymously filled out the survey. The results are processed by computer SPSS program.

3. Results and Discussion

From the total amount of 964 subjects, 855 were women (88.7%) and 109 were men (11.3%). The most of respondents were aged 26 - 40 years (39.1%), then < 25 years (31.6%), 41 - 55 years (24.7%) and > 56 years (4.6%). Respondents by place of residence were 51.5% from rural and 48.4% from urban area. The majority participants have high school qualifications (56.8%) and the majority were employees (67.1%), then students (21.5%). The habits of consuming any kind of diet and attachment to physical activity is shown in Table 1.

Table 1. Dietary and physical habits

Questions	Answers	
	Yes	No
Practicing a diet	108 (11.2%)	856 (88.8%)
Practicing physical activity	654 (67.8%)	297 (30.8%)

Most respondents who practice some type of diet cite a diet such as keto diet, carbohydrate-free diet, vegetarianism, LCHF diet, UN diet, autophagy, gluten-free diet, 8-hour diet, 10% diet and ADA diet. The physical activity that suits them the best was: walking (61.5%), after that hiking (8.4%), then team sports (6.3%), gym (7.9%), swimming (5.1%), and running (3.7%). Answers to the questions of whether they have ever encountered the concept of nutrition by blood type were "Yes" in 408 respondents (42.3%), "No" in 517 respondents (53.6%) and "I Don't Know" in 39 respondents (4%). When asked if they think a blood type diet is scientifically proven, them 673 answered "I

Don't Know" (69.8%), 154 respondents answered "Yes" (16%) and 137 respondents answered "No" (14.2%).

One of the methods that nature has given to the immune system are antigens, these are markers that are located at stations and are owned by every living thing on this planet. The most important antigen in the human body is precisely the one that determines the blood type, and each blood group has its own antigen built from a special chemical structure. Each blood group is based on antigen 0 (zero) to which a special sugar chain is then added and thus other blood groups are formed; blood group A is obtained by adding sugar N-acetyl-galactosamine, blood group B is formed by adding the sugar D-galactosamine to antigen 0, while blood group AB is formed by adding both blood group A and B sugars (N-acetyl galactosamine + D-galactosamine) to antigen 0 [3]. In the early 20th century, Karl Landsteiner, an Austrian scientist noticed differences in erythrocytes from person to person. There was a process of agglutination that occurs when the antigen is mixed with the corresponding antibody - isoagglutinin. Landsteiner remarked that the erythrocytes of individuals were agglutinated with the serum of other individuals. Thanks to him, it is known today why some people can donate blood to each other and why others cannot. It has been proven that a certain type of food agglutinates red blood cells, which means that a certain food can be harmful to the erythrocytes of one blood group, while it may be useful for another blood type [4]. To the question of whether you believe that by eating according to your blood type you could improve your physical and mental health there were 329 answers "Yes" (34.1%), 79 answers "No" (8.2%) and 545 answers "I don't know" (56.5%). A brief explanation of the previous answer followed and the answers were diverse. Some respondents answered that they believe that diet by blood type is scientifically proven and that it is possible to achieve physical and mental changes with that kind of diet. While other respondents answered that blood type has nothing to do with diet and that they don't believe in it. To the question of whether they think that the diet by blood type can be consumed daily or exclusively as a way to lose weight, the answers are shown in Table 2.

Table 2. Mode of practicing blood type diet

Mode	Number (%)
On a daily basis	401 (41.6%)
Only as a way to lose weight	19 (2%)
Combined	428 (44.4%)
Not good at all	54 (5.6%)
I don't know	25 (2.6%)

A moderate amount of physical activity can greatly reduce the overall response to stress. Many factors interact to determine the level of exercise tolerance from person to person. Some of the factors are proper nutrition, proper hydration, proper and regular rest,

fitness level, stress level in life, but also blood type. On the other hand, excessive level of physical activity leads to elevated levels of stress hormones in the blood, but after the training, almost always most people produce less stress hormones [5]. When asked if they noticed any difficulties after consuming certain foods (bloating, cramps), 80.8% (779) respondents answered positive. Lectins are special proteins that have a strong possibility of agglutination. So lectins stick very easily to any part of the human body. When a human eat foods in which there are lectins that are not compatible with that person's blood type antigen, these lectins very easily and quickly attack an organ or organ system and begin to agglutinate blood cells on it [6]. The vast majority of lectins in the diet are not seriously harmful to health, but they can cause several problems; bloating, changes in digestion, joint and muscle pain, hormone disorder, skin damage, fatigue. Of course, you should not be afraid of every food that is consumed, they are just as hard to get around completely, but it is crucial to avoid those lectins which do not correspond to blood type [7]. To the question of whether diet by blood group can reduce the intensity of chronic disease and concomitant therapy, 38.5% (371) respondents answered positive, while 55.5% (535) respondents do not know answer to that question. When asked if they believe that each blood type is associated with a particular disease, 41.2% (397) answered „Yes“, 50% (482) answered „No“ and 3.4% (33) answered „I Don't Know“. Number of respondents by blood type is shown in Table 3.

Table 3. Number of respondents by blood type

Blood type (answer)	Number (%)
A	304 (31.5%)
B	154 (16%)
0	91 (9.4%)
AB	296 (30.7%)
(I don't know)	119 (12.3%)

Questions and answers related to blood type 0 are shown in Tables 4, 5 and 6.

Table 4. Which food do not suit your blood type 0

Product/Ingredient	Number (%)
Cow's milk	168 (56.8%) - correct answer
Olive oil	26 (8.8%)
Almonds	32 (10.8%)
Mangel	26 (8.8%)
Beef	44 (14.9%)

Table 5. Which food suits your blood type 0

Product	Number (%)
Lamb	59 (13.9%) - correct answer
Cucumbers	65 (22%)
Sugar	19 (6.4%)
Watermelon	103 (34.8%)
Bacon	50 (16.9%)

Table 6. Which characteristic best describes your blood type 0

Characteristic	Number (%)
Openness	164 (55.4%) - correct answer
Communicativeness	140 (47.3%) - correct answer
Anxiety	58 (19.6%)
Creativity	103 (34.8%)
Relaxation	69 (23.3%)
Self-confidence	83 (28%) – correct answer

People with blood type 0 have different characteristics from people with blood type A or B, in fact they are more susceptible to disease, they should eat different foods and exercise in special, different ways. Blood group 0 originates from genotype 00, it is present in 34% population in Croatia, and 45% in European population. People with this blood type are extroverts, confident, patient, logical, practical, determined, living in the present and coping well with the role of the leader [2]. 0 means aged. The appearance of the Cro-Magnons around 40,000 BC raised the human race to the top of the food chain. After a very short time, the Cro-Magnons stopped being afraid of animals and thus the population increased. The driving force was meat proteins and in this period the characteristics of blood group 0 came to full expression. The migration of the human race began, up to about 10,000 BC, they inhabited all the important lands on the planet and thus spread their blood type widely. The main factor of weight gain in blood group 0 is gluten. If it is reduced or completely removed, for example in consumption of cereals, bread, legumes, lentils and beans, then it is already a great progress and a great start to continue on. Foods that promote weight gain in people with blood type 0 are wheat gluten which interferes with the work of insulin and also slows down metabolism and there is corn that has an identical effect. Beans slow down the rate of burning calories. Lentils disrupt the proper metabolism of food, while cabbage, kale and cauliflower disrupt thyroid hormones [3].

Questions and answers related to blood type A are shown in Table 7, 8 and 9.

Table 7. Which food do not suit your blood type A

Product	Number (%)
Chicken	70 (23%)
Butter	70 (23%) - correct answer
Yoghurt	63 (20.7%)
Oatmeal	65 (21.4%)
Broccoli	36 (11.8%)

Table 8. Which food suit your blood type A

Product	Number (%)
Potato	69 (22.7%)
Blueberry	137 (45.1%) - correct answer
White flour	9 (3%)
Ice cream	17 (5.6%)
Beef	72 (23.7%)

Table 9. Which characteristic best describe your blood type A

Characteristic	Number (%)
Anxiety	52 (17.1%) - correct answer
Intellectuality	65 (21.4%) - correct answer
Perfectionism	94 (30.9%) - correct answer
Openness	103 (33.9%)
Empathy	181 (59.5%)
Confidentiality	77 (25.3%)

This blood type is the second most common in the world after the blood type 0. But it is the most common in Croatia with 42% of population having blood type A. People with this blood type are introverts, creatives, perfectionists, restrained, calm, prone to anxiety, sensitive to the needs of others [2]. A means Agrarian. Blood type A appeared in Asia between 25,000 and 15,000 BC as a reaction to the conditions of the new environment. This blood type was born with mutations in the digestive and immune systems that enable the acceptance and resorption of cereals and thus the blood group A gene is transferred outside Asia. People with this blood type thrive on a vegetarian diet, it is important to eat foods that are more natural, fresh, washed and properly grown. [3] Poor digestion and dairy products that disrupt insulin secretion, also contain a high percentage of fat that is largely deposited in people with blood type A. Foods that stimulate weight gain are meat that is difficult to digest, thus slowing down metabolism and settling in form of fat and dairy products and wheat which prevent the action of insulin and burning calories. [8]

Questions and answers related to blood type B are shown in Tables 10, 11 and 12.

Blood group B originates from genotype BB or B0, and in the Croatia it is found in 18% of population. People with this blood type are strong, agile, they are able to resist the dangerous diseases, a characteristic of the modern age. If they get sick from these diseases, they have the greatest chance of recovery. People who have blood type B are free-spirited, independent, organized, self-sufficient, emotional, flexible, spontaneous, subjective, creative and original. [2] B means balanced. Blood group B developed between 10,000 and 3,500 BC. on tall areas of the Himalayas. The Mongols flooded Asia with their domestic animal culture, so they practiced the diet consisted of meat and dairy products. Two blood groups B developed, one agrarian in the south and east and a nomadic warlike society in the north and west [3]. Several foods contain heavy lectins that cause weight gain in people with blood type B. Peanuts, corn, buckwheat, lentils and sesame, these foods cause fatigue, hypoglycemia and fluid retention in the body [9].

Table 10. Which food do not suit your blood type B

Product	Number (%)
Veal	43 (27.9)
Hake	15 (9.7%)
Lens	41 (26.6%) - correct answer
Cauliflower	29 (18.8%)
Pineapple	26 (16.9%)

Table 11. Which food suit your blood type B

Product	Number (%)
Mineral water	18 (11.7%)
Brown sugar	4 (2.6%)
Grapes	30 (19.5%) - correct answer
Chicken	89 (57.8%)
Pork	13 (8.4%)

Table 12. Which characteristic best describe your blood type B

Characteristi	Number (%)
Relaxation	29 (18.8%)
Empaty	87 (56.5%) - correct answer
Creativity	46 (29.9%) - correct answer
Kindness	76 (49.4%) - correct answer
Communicativeness	66 (42.9%)
Selfishness	5 (3.2%)

Questions and answers related to blood type AB are shown in Tables 13, 14 and 15.

Table 13. Which food do not suit your blood type AB

Product	Number (%)
Chicken	19 (20.9%) - correct answer
Lamb	32 (35.2%)
Yoghurt	18 (19.8%)
Walnuts	12 (13.2%)
Cucumbers	10 (11%)

Table 14. Which food suit your blood type AB

Product	Number (%)
Pineapple	34 (37.4%) - correct answer
Bean	10 (11%)
Buckwheat	21 (23.1%)
Wild animals	5 (5.5%)
Veal	21 (23.1%)

Table 15. Which characteristic best describe your blood type AB

Characteristic	Number (%)
Friendly disposition	51 (56%) - correct answer
Confidentiality	31 (34.1%) - correct answer
Passion	21 (23.1%) - correct answer
Anxiety	17 (18.7%)
Creativity	30 (33%)
Empaty	38 (41.8%)

The rarest blood group in the Croatia with only 6% of population having it, as well as in the whole world. It is less than 1000 years old and has a very complex blood type. Because of the different antigen, it has some properties of blood group A, some of blood group B or can be found with characteristics of both blood groups. Foods that do not correspond to blood groups A and B in the majority cases do not correspond to blood group AB, but some lectins that have a bad effect on previous blood groups in this can actually work well or neutrally due to the dual antigens A and B which reduce their

harmful effects [3]. AB means modern. Blood type AB is rare and was formed by mixing Caucasian population of blood group A and Mongolian population of blood group B. Persons of this blood groups are sensitive, distant, passive, introverts and extroverts, intuitive, passionate and confidential [2].

4. Conclusions

- Starting from scratch and taking into account the number of respondents, in addition to the large number of respondents, to appear in all age groups which immediately shows that this topic is unexplored, but definitely interesting and encourages people to reflect. Although we live in a modern time when looks are very important and therefore health, the vast majority of people still do not apply any type of diet, namely 88.8%, while the rest, 11.2% applies a diet and most often cites a diet such as LCHF, keto diet, Mediterranean, gluten-free diet and 8 hour diet.

- Of course, with proper nutrition, more physical activity is expected, so the most popular is walking, more precisely 61.5% of respondents chose walking as the most common type of physical activity, followed by running, gym and swimming.

- When asked if they have ever encountered the term "Blood Type Nutrition", more than half, more precisely 53.6% of respondents answered no. So this topic is still big unknown which immediately leads to the question of whether this diet is scientifically proven, in reality no, but almost 70% of respondents do not even know what to answer to this question, only 14.2% think so that this diet is not scientifically proven. They can't give a concrete answer to their belief that by eating according to their blood type, they would be able to improve their physical and mental health and prevent chronic disease.

- When some respondents think that blood type has nothing to do with diet, on the other hand they are actually interested in the connection and would like to learn more about it, which indicates that respondents still notice some changes in themselves and their body after consuming certain foods as 80% of them answered yes, they feel bloated, cramps and tired. The people with blood group A were again the highest

(31.5%) as in the previous short study, they are followed by people with blood group O (30.7%), then B (16%) and blood type AB (9.4%), while 12% of respondents do not even know which is their blood type.

5. References

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