



Health behaviours and degree of acceptance of disease and eating habits among patients with hypothyroidism and Hashimoto's autoimmune thyroiditis

Zachowania zdrowotne, stopień akceptacji choroby i poziom wiedzy żywieniowej osób chorych na niedoczynność tarczycy i autoimmunologiczne zapalenie tarczycy typu Hashimoto. Badanie wstępne

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Abstract

Objective. The aim of the study was assessment of health behaviours, degree of acceptance of the disease, and nutritional habits among patients with hypothyroidism and Hashimoto's autoimmune thyroiditis.

Materials and method. The study included 180 patients, conducted by the method of a diagnostic survey using the following instruments: the Questionnaire of Eating Behaviours (QEB), Health Behaviour Inventory (IZZ), and the Acceptance of Illness Scale (AIS).

Results. The examined group was characterized by a mediocre intensity of health behaviours and obtained, on average, 82.87 scores per 118 possible scores. According to the Acceptance of Illness Scale, the respondents obtained 29.49 scores per 40, which evidences a relatively high acceptance of own medical condition. The higher the quality of the respondents' diet, the higher the health behaviour index, whereas the level of nutritional knowledge had no effect on the pro-health and anti-health eating index.

Conclusions. 1. In patients with hypothyroidism and Hashimoto's autoimmune thyroiditis the undertaking of health behaviours increased with age, most strongly in the domain of health practices and positive psychological attitude. 2. The intensity of health behaviours increased with the level of acceptance of the disease, especially with respect to positive psychological attitude. 3. Patients whose eating habits were characterized by a high quality of diet index (pro-health eating index), showed intensified health behaviours. The level of nutritional knowledge among patients with hypothyroidism and Hashimoto's autoimmune thyroiditis was related neither with a high nor a low quality of diet index (pro-health and anti-health diet index).

Key words

health-related behaviours, hypothyroidism, eating habits, (Hashimoto's) thyroiditis

Streszczenie

Cel pracy. Ocena zachowań zdrowotnych, stopnia akceptacji choroby i zwyczajów żywieniowych u osób chorych na niedoczynność tarczycy i autoimmunologiczne zapalenie tarczycy typu Hashimoto.

Materiał i metody. Badaniem objęto 180 osób, przeprowadzono je metodą sondażu diagnostycznego, wykorzystując narzędzia: kwestionariusz żywieniowy QEB, Inwentarz Zachowań Zdrowotnych (IZZ) oraz Skalę Akceptacji Choroby (AIS).

Wyniki. Badana grupa charakteryzowała się przeciętnym nasileniem zachowań zdrowotnych i uzyskała średnio 82,87 pkt na 118 możliwych. W Skali Akceptacji Choroby badani uzyskali 29,49 pkt na 40, co świadczy o dość wysokiej akceptacji własnego stanu chorobowego. Im wyższa była jakość diety badanych, tym wyższy wskaźnik zachowań zdrowotnych ich cechował. Stopień akceptacji choroby koreluje dodatnio z pozytywnym nastawieniem psychicznym. Im większa akceptacja choroby, tym silniejsze pozytywne nastawienie psychiczne.

Wnioski. 1. U osób chorujących na niedoczynność tarczycy i chorobę Hashimoto wraz z wiekiem wzrasta podejmowanie zachowań zdrowotnych, najsilniej w domenie praktyk dotyczących zdrowia i pozytywnego nastawienia psychicznego. 2. W badanej grupie chorych nasilenie zachowań zdrowotnych wzrasta wraz z poziomem akceptacji choroby, zwłaszcza w zakresie pozytywnego nastawienia psychicznego. 3. Wiedza żywieniowa badanych była jedynie na dostatecznym poziomie. Nie stwierdzono zależności pomiędzy ich wiekiem, poziomem wykształcenia i miejscem zamieszkania a wiedzą żywieniową.

Słowa kluczowe

zachowania zdrowotne, niedoczynność tarczycy, zwyczaje żywieniowe, autoimmunologiczne zapalenie tarczycy typu Hashimoto

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INTRODUCTION

It is estimated that disorders related with the thyroid gland concern approx. 22% of Polish society [1]. An evident form of hypothyroidism is diagnosed in 0.1–2%, whereas sub-clinical hypothyroidism may concern approx. 15% of the population of females [2]. The most frequently observed disorder is hypothyroidism as a consequence of chronic Hashimoto's autoimmune thyroiditis [3]. Hashimoto's disease concerns approx. 1–6% of the population, while hypothyroidism – approx. 7–10 % of the population aged up to 60, and 20% of those aged over 60. The majority of autoimmune thyroid diseases is diagnosed among patients aged 45–60. Morbidity in females is 10–20 times higher than among males [1]. Among the factors which may be conducive to the development of immune disorders concerning the thyroid gland, apart from genetic predispositions, environmental factors, the occurrence of other immune disorders, and nutritional factors are also mentioned. Thyroid hormones exert an effect on a number of functions of the body; therefore, the symptoms of the disease form a larger group. The symptoms most frequently reported by patients include: drowsiness, fatigue, low mood, weight gain, and frequent sensation of cold.

Increasingly more attention is paid to the health behaviours and life style of patients with hypothyroidism and Hashimoto's disease. An important factor among health behaviours, among others, concerns diet and the maintenance of proper nutritional habits. According to studies, an appropriately balanced diet results in a considerable decrease in the feeling of fatigue which often occurs in patients [4]. Maintenance of health promoting life style leads to caring for health. Studies show that the current state of nutritional knowledge concerning diet in Hashimoto's thyroiditis is far from satisfactory, and should be expanded [5]. Autoimmune thyroid disease may also lead to a considerable deterioration of health-related quality of life in the area of physical, psychological, and social functioning; therefore, it is very important to recognize knowledge concerning acceptance of the disease by patients [6]. Patients who to a greater degree accept their disease more often follow medical recommendations.

OBJECTIVE

The aim of the study was assessment of the health behaviours, degree of acceptance of the illness, level of nutritional knowledge and eating habits in patients with hypothyroidism and Hashimoto's autoimmune thyroiditis.

MATERIALS AND METHOD

The study was conducted in March 2019. The research material was data obtained from 180 patients with hypothyroidism and/or Hashimoto's disease. The respondents completed an anonymous online questionnaire (CAWI – Computer Assisted Web Interviews). Participation in the study was voluntary, and included 180 patients with hypothyroidism and/or Hashimoto's disease. The respondents completed an anonymous Internet questionnaire. The socio-demographic characteristics of the study group are presented below.

The majority of respondents (67.8%) had higher education, followed by a clearly smaller group of those with secondary education (28.9%), and the smallest percentage of respondents who reported vocational or junior high school education (1.7%). Considering the small number of respondents with vocational or junior high school education, while analyzing the relationship between education level and AIS, IZZ and QEB, the respondents with junior high school, vocational, and secondary school education were combined into one group named 'lack of higher education'. In the presented study, 4 per 5 respondents (80%) were urban inhabitants. Only every fifth respondent (20%) lived in a rural area. The respondents were aged 18–66; mean age 33.11 years (SD = 9.84). 50% of the respondents were aged over 32, and the other 50% aged under 32. The vast majority of the respondents were ill with Hashimoto's disease (79.4%), the rest with hypothyroidism (20%).

The study was carried out by the method of a diagnostic survey using the following research instruments:

Health Behaviour Inventory (IZZ). An inventory developed by Z. Juczyński which is currently used to assess the intensity of health behaviours. It consists of 24 items which specify health-related behaviours. These behaviours are divided into 4 categories: correct eating habits, prophylactic behaviours, positive psychological attitude, and health practices. The respondent specifies how often within the last year he/she performed activities related with health, using a 5-point scale: 1 – almost never, 2 – rarely, 3 – sometimes, 4 – frequently, 5 – almost always, and may obtain 24–120 scores. The overall result is then converted into stens, where: 1–4 stens means low, 5–6 mediocre, and 7–10 – high intensity of health behaviours [4].

Acceptance of Illness Scale (AIS). A scale devised by B. J. Felton, T. A. Revenson and G. A. Hinrichsen. In the presented study, the Polish version was used as adapted by Zygfryd Juczyński [4]). The questionnaire allows measurement of the extent to which a patient accepts own illness. It contains 8 statements, which allow evaluation of difficulties and limitations caused by the disease. In each statement the respondent determines to what extent or not he/she accepts the current state of the illness, according to a 5-degree scale: 1-I definitely agree to 5-I definitely disagree. The respondent can obtain 8–40 scores. The higher the result, the better the acceptance of the illness and a positive attitude towards own state of health, whereas a low result evidences lack of acceptance of the illness, feeling negative emotions and discomfort in relation with the disease.

Questionnaire of Eating Behaviour (QEB). A questionnaire designed for studies concerning eating behaviours and opinions on food and nutrition, developed in 2013 by the Team for Behavioural Conditioning of Nutrition, Committee for Human Nutrition Science at the Polish Academy of Sciences, under the direction of J. Gawęcki. The questionnaire contains items concerning the respondents' eating habits, frequency of consumption of food products, opinions pertaining to food and nutrition, as well as nutritional knowledge and its sources. The frequency of consumption was calculated in compliance with (in brackets): never (0), 1–3 times a month (0.06), once a week (0.14), several times a week (0.5), once a day (1), several times a day (2). The questionnaire also

enables calculation of the diet quality index, the so-called 'pro-health diet index', which refers to the frequency of consumption of food considered as beneficial for health, and the 'anti-health diet index', which refers to the frequency of consumption of food which exerts an unfavourable effect on health. These indices are calculated by summing-up the frequency of consumption (times/day) of individual groups of products. The higher the value, the higher the diet quality index. The section contains items concerning food and nutrition and consists of 25 statements. The respondent's replies are interpreted as true or false. Each correct answer is 1 score. The QEB additionally allows investigation of the level of nutritional knowledge. The score from 25–17 scores means a good level of nutritional knowledge, 16–9 scores – sufficient, and 8–0 scores – insufficient [5]. In the presented study, 16 items of the questionnaire were used, and 4 own questions related with nutrition and hypothyroidism.

Statistical analysis. The analysis was performed using software IBM SPSS Statistics. The relationships between variables were investigated using the t-Student test and Pearson's r correlation coefficient. T-Student test for independent groups was applied in order to test whether a statistically significant difference occurs between 2 groups with respect to the quotient variables. Pearson's r correlation coefficient was used to test if statistically significant correlations occur between the quotient variables. Statistically significant results on the level of $p < 0.01$ were marked as **; statistically significant results on the level of $p < 0.05$ were marked *.

RESULTS

Table 1. Descriptive statistics of Health Behaviour Inventory among respondents

IZZ [scores]	Min.	Max.	\bar{x}	Me	SD
Correct eating habits	9	30	21.83	22.00	4.28
Prophylactic behaviours	13	30	21.46	21.00	3.88
Positive psychological attitude	6	30	19.71	20.00	4.91
Health practices	8	30	19.87	20.00	4.28
Overall health behaviours	48	118	82.87	84.00	14.37

Table 2. Individual categories of health behaviours of Health Behaviour Inventory among respondents

IZZ [scores]	Low intensity of health behaviours		Mediocre intensity of health behaviours		High intensity of health behaviours	
	STEN 1–4		STEN 5–6		STEN 7–10	
	N	%	N	%	N	%
Correct eating habits	57	31.67	54	30	69	38.33
Prophylactic behaviours	58	32.22	63	35	59	32.78
Positive psychological attitude	55	30.56	70	38.89	55	30.56
Health practices	53	29.44	73	40.56	54	30
Overall health behaviours	57	31.67	68	37.78	55	30.56

Health behaviours may be generally interpreted as mediocre – the respondents obtained 48–118 scores. A half

of the respondents obtained results higher the 84, and a half – lower. Standard deviation evidences a generally moderate differentiation of health behaviours in the study group. Analogous statistics were also calculated separately for all 4 dimensions of health behaviour (Tabs. 1, 2).

Table 3. Descriptive statistics of the Acceptance of Illness Scale

AIS [scores]					
Min.	Max.	\bar{x}	Me	SD	
8	40	29.49	32.00	8.54	

According to the Acceptance of Illness Scale the respondents obtained results from 8–40; mean result – 29.49, which may be interpreted as a relatively high level of acceptance of the disease. A half of respondents obtained results higher than 32, and a half – lower than 32. Standard deviation evidences a moderate differentiation of the acceptance of illness in the examined group (Tab. 3).

Table 4. Descriptive statistics of pro-health and anti-health diet indices among the respondents

QEB [scores]	Min.	Max.	\bar{x}	Me	SD
Anti-health diet index	0.75	24.88	9.11	8.13	5.52
Pro-health diet index	2.25	54.00	25.92	25.81	10.64

The pro-health and anti-health diet indices were calculated in compliance with the QEB key, converting the results into the range 0–100 (the higher the result, the more pro-health or more anti-health diet). With respect to the anti-diet index, the respondents obtained from 0.75–24.88 scores, mean 9.11. A half of respondents obtained results higher than 8.13, and a half – lower. Standard deviation evidences a high differentiation of respondents according to anti-health diet. With respect to a pro-health diet, the respondents obtained from 2.25–54 cores, mean – 25.92. A half of them obtained results higher than 25.81, and a half – lower. Standard deviation evidences moderate differentiation of respondents according to anti-health diet. However, it may be observed that they obtained considerably higher results concerning a pro-health diet, compared to anti-health diet (Tab. 4).

Table 5. Descriptive statistics of the Level of nutritional knowledge among the respondents

QEB [scores]	Min.	Max.	\bar{x}	Me	SD
Level of nutritional knowledge	5	20	12.53	13.00	2.89

The level of nutritional knowledge was calculated based on 16 items from the QEB questionnaire, and 4 questions of own authorship. A correct answer was ascribed 1 score in each of the 20 questions; thus, the respondents could obtain results within the range 0–20 – the higher the result, the higher the level of knowledge. In practice, the respondents obtained results within the range 5–20 – mean 12.53, which may be interpreted as a sufficient level of knowledge. A half of the respondents obtained results higher than 13, and a half – lower. Standard deviation evidences a low differentiation of respondents according to the level of nutritional knowledge (Tab. 5).

Table 6. Level of nutritional knowledge, Acceptance of Illness Inventory, Health Behaviour Inventory, and respondents' age

Questionnaire		Age	
		r	p
QEB	Level of nutritional knowledge	0.091	0.223
AIS	Acceptance of Illness Scale	0.102	0.173
	Correct eating habits	0.148	0.047*
	Prophylactic behaviours	0.068	0.363
IZZ	Positive psychological attitude	0.156	0.036*
	Health practices	0.175	0.019*
	Overall health behaviour	0.168	0.024*

No statistically significant linear correlation was found between age and the level of nutritional knowledge, and level of acceptance of illness. The study showed that the higher the age, the higher the index of overall behaviour. Considering health behaviours, only prophylactic behaviour did not positively correlate with age. The higher the respondents' age, the higher the indices with respect to correct nutritional habits, positive psychological attitude, and health practices (Tab. 6).

No statistically significant difference was found between respondents with higher education and those without higher education, according to the acceptance of illness. Also, no statistically significant difference was observed between respondents with higher education and those without higher education, according to overall health behaviour, nor any of the dimensions of health behaviours. Only with respect to eating habits the difference was close to statistical significance – a clearly lower result was noted among respondents without

higher education. While analyzing the level of nutritional knowledge, no statistically significant difference was found between respondents with higher education and those without higher education (Tab. 7).

No statistically significant difference was observed between respondents from rural and urban areas with respect to acceptance of illness. Urban inhabitants obtained a significantly higher index of overall health behaviour, compared to respondents living in rural areas (Tab. 2). Considering individual dimensions of health behaviours, significant differences concerned only health practices, whereas results close to significance were noted concerning correct eating habits and prophylactic behaviours. No statistically significant difference was observed between rural and urban inhabitants, according to the level of nutritional knowledge (Tab. 8).

Table 9. Acceptance of Illness Scale and Health Behaviour Inventory

Health Behaviour Inventory	Acceptance of Illness Scale	
	r	p
Correct nutritional habits	0.141	0.059
Prophylactic behaviours	0.013	0.858
Positive psychological attitude	0.147	0.049*
Health practices	0.146	0.051
Health behaviours in general	0.139	0.062

The degree of acceptance of the illness positively correlated with positive psychological attitude. The greater the acceptance of illness, the more positive the psychological attitude. In addition, linear, positive relationships between

Table 7. Acceptance of Illness Scale, Health Behaviour Inventory, Level of Nutritional Knowledge, and respondents' education level

Questionnaire		Education				t-Student test	
		lack of higher education		higher education		t	p
		\bar{x}	SD	\bar{x}	SD		
AIS	Acceptance of Illness Scale	28.17	9.16	30.11	8.19	-1.431	0.154
	Correct eating habits	20.97	4.75	22.25	4.00	-1.888	0.061
	Prophylactic behaviours	21.57	4.28	21.41	3.70	0.256	0.798
IZZ	Positive psychological attitude	19.29	6.15	19.90	4.22	-0.775	0.439
	Health practices	20.29	4.76	19.67	4.04	0.909	0.365
	Overall health behaviour	82.12	17.12	83.23	12.92	-0.483	0.630
QEB	Level of nutritional knowledge	12.84	2.86	12.38	2.90	1.016	0.311

Table 8. Acceptance of Illness Scale, Health Behaviour Inventory, Level of Nutritional Knowledge, and respondents' place of residence

Questionnaire		Place of residence				t-Student test	
		rural		urban		t	p
		\bar{x}	SD	\bar{x}	SD		
AIS	Acceptance of Illness Scale	28.19	8.31	29.81	8.59	-1.017	0.310
	Correct eating habits	20.67	4.52	22.13	4.19	-1.840	0.067
	Prophylactic behaviours	20.50	4.09	21.70	3.81	-1.668	0.097
IZZ	Positive psychological attitude	18.67	4.99	19.97	4.88	-1.422	0.157
	Health practices	18.00	4.11	20.34	4.21	-2.999	0.003**
	Overall health behaviour	77.83	14.85	84.13	14.02	-2.383	0.018*
QEB	Level of nutritional knowledge	13.03	2.69	12.04	2.93	1.163	0.234

acceptance of illness, and correct nutritional habits, healthy practices, and health behaviours in general were close to statistical significance (Tab. 9).

DISCUSSION

Thyroid diseases are a large group of chronic disorders affecting approx. 22% of the Polish population. Hypothyroidism concerns 7–10% of the population of females aged up to 60, and 20% of those aged over 60. Hashimoto's disease, the consequence of which is most often hypothyroidism, affects approx. 6% of the population of females aged between 45–60; therefore, thyroid diseases definitely more often concern females than males [1, 3]. This is reflected in our study where an equally dominant majority of respondents were females (177 answers per 180 respondents). Hypothyroidism, on the background other than autoimmune, was declared by 20.6% of respondents, while Hashimoto's disease by 79.4%. Opposite to the above-quoted population data, the respondents' mean age was 32. At present, the mean age of patients suffering from hypothyroidism has considerably decreased which may be related with greater awareness of the need for performing routine prophylactic check-up examinations among young people, resulting in more frequent detection of thyroid function disorders at a young age.

In the presented study, analysis of health behaviours using the Health Behaviour Inventory demonstrated that the respondents obtained the highest result with respect to prophylactic actions – 22.14. Wajrak and Włoszczak-Szubzda, after performing an analysis of differences between locus of health control and health behaviours, found that the stronger the effect of others, the more intensified the health practices among the respondents [6]. Therefore, it may be presumed that not only the desire to improve health or the degree to which the patients accept the disease exert an effect on the undertaking of health-related actions, but this may also be an effect of the environment, e.g. succumbing to the fashion of being 'fit' and the desire to achieve a silhouette commonly considered as attractive. The researchers also observed that the higher the quality of life, the weaker the prophylactic behaviours and the stronger the health practices.

In the presented study it was found that the higher the respondents' age, the higher the health behaviour index ($p=0.024$). Similarly, Muszalik et al. confirmed that older persons were characterized by a higher level of health behaviours, compared to the middle-aged in the population of adults [7]. Together with age, patients attach more importance to their health and the quality of life; additionally, they are more highly educated. It is an interesting fact that the current study did not confirm the hypothesis that respondents with higher education are characterized by a higher health behaviour index, compared to those without education or a lower level of education. Only in the case of correct eating habits the difference was close to statistical significance ($p=0.061$), and a clearly higher result was noted among respondents with a higher education. On the one hand, this may be related with access to the Internet and the possibility to expand knowledge without the need for further education, or the fast pace of life of people who are educated and probably work for many hours, which may be translated into their nutritional choices and health behaviours. On the contrary, in their study Muszalik et al.

observed that the level of health practices was significantly higher in persons with higher education than among the remainder [7]. Similarly, in a study by Krzyżanowska et al., education determined correct eating behaviours, the higher the respondents' education level, the greater the intensity of correct nutritional behaviours [8].

The place of residence statistically significantly correlated with a higher index of the respondents' health behaviours ($p=0.018$). Similarly, a study by Schneider-Matyk et al. showed that patients with cardiovascular diseases living in urban areas obtained higher values on the health behaviour index, compared to rural inhabitants [9]. Krzyżanowska et al. also observed that a higher health behaviour index was noted among respondents who lived in urban areas [8].

Analysis of the relationship between the degree of acceptance of illness and health behaviours confirmed the assumption that the higher the level of acceptance of the disease, the higher the health behaviour index. The respondents declared a relatively high level of acceptance of illness. The result obtained is probably related with the fact that hypothyroidism and Hashimoto's disease are chronic disorders which most often do not significantly affect the quality of life. Similarly, Kurpas et al. proved that more than a half of respondents suffering from diabetes accept their illness to a high degree [10]. Wajrak et al. carried out an interesting study aimed at evaluation of the relationship between the locus of control and health behaviours of patients with thyroid disorders. The researchers explained that persons with an internal locus of control more willingly undertook actions aimed at the preservation or improvement of their health. In turn, persons with an external locus of control showed a tendency towards considering this as an effect of coincidence, among others. The majority of respondents were characterized by an internal locus of control [6].

According to Krzyżanowska et al., females accept their illness to a higher degree than males. The duration of the disease exerts an effect on its acceptance, respondents who had been ill for the shortest period of time more easily accepted the illness than those who had been ill for more than 2–3 years [8].

No correlation was observed between age, education level, place of residence, and the degree of acceptance of the illness. A similar lack of the relationship was also observed in other studies, e.g. among persons with psychiatric disorders or epilepsy [11, 12]. The lack of such a correlation indicated a special complexity of the factors which affect the degree of acceptance of the illness. It may be presumed that it is necessary to undertake extensive social campaigns and increase access to psychological consultations in order to elevate the level of acceptance of the illness in all social groups.

In the presented study, while analyzing the level of nutritional knowledge, it was observed that this has no effect on the pro-health and anti-health diet indices. This is surprising; however, similar cases may be found in the literature. Son et al., conducted a study aimed at comparison of eating behaviours, nutritional knowledge, and the level of stress between Korean and Chinese schoolgirls attending secondary schools. The group of Korean schoolgirls, despite a significantly higher level of nutritional knowledge compared to the Chinese schoolgirls, demonstrated significantly worse eating behaviours, compared to the group from China. This indicated the need for the introduction of nutritional

education programmes which would help to translate the acquired knowledge into practical eating behaviours [13]. In turn, in a study by Sorbal and Palacz-Wróbel, the level of knowledge concerning proper nutrition among the majority of females suffering from thyroid diseases was low, and requires further education. Eating habits of the majority of females were inconsistent with the principles of correct nutrition, which had an unfavourable effect on their wellbeing [14]. Similarly, Sadowska and Stawka, while evaluating the mode of nutrition of patients with Hashimoto's disease, observed that improper nutritional behaviours most probably resulted from the lack of nutritional knowledge, because it was found that the majority of respondents were not interested in the principles of nutrition recommended in hypothyroidism; they also did not obtain information concerning the necessity for the introduction of changes in nutrition from a physician [15].

Taking into account the fact that hypothyroidism and Hashimoto's disease involve an increasingly larger part of society, also at a young age, there is a need to educate patients with thyroid disorders at each stage of education and life, concerning the proper mode of nutrition and its effect on health. Properly applied pharmacotherapy, as well as the mode of nutrition, have a considerable effect on the effective process of the treatment of patients with thyroid diseases, about which they should be informed already at the stage of a visit to a doctor. These actions may result in patients' positive attitude towards the illness and undertaking health behaviours.

CONCLUSIONS

1. In patients suffering from hypothyroidism and Hashimoto's disease, together with age, an increase is noted in the undertaking of health behaviours, most strongly in the domains of health practices and positive psychological attitude.
2. In the group of patients examined, the intensity of health behaviours increased with the level of acceptance of the illness, especially with respect to a positive psychological attitude.
3. Persons whose eating habits are characterized by a high diet quality index (pro-health diet index), show intensified health behaviours.
4. The level of nutritional knowledge among patients with hypothyroidism and Hashimoto's disease is not related with either a high or low diet quality index (pro-health and anti-health diet indices).

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