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# FOOD BEHAVIOUR AND ATTITUDE TOWARDS NUTRITIONAL KNOWLEDGE IN FEMALE FITNESS INSTRUCTORS AND FEMALE FITNESS PARTICIPANTS

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## ABSTRACT

**Background.** Fitness has recently become a very popular form of physical activity among women. Since more and more fitness clubs are founded, more and more women take up the job of a fitness instructor or participate in fitness classes. Therefore, the studies on female fitness instructors and participants are of great relevance.

**Objective.** The objective of this study was to compare food behaviour and attitude towards nutritional knowledge in fitness instructors and fitness participants.

**Material and methods.** The studied population comprised 200 women, including 100 fitness instructors and 100 fitness participants from fitness clubs in Poznań and the vicinity. The studied women filled in questionnaires on food behaviour and attitude towards nutritional knowledge. Statistical analysis was carried out by means of the IBM SPSS Statistics 19 computer programme.

**Results.** Statistically significant differences were observed in the studied women's age, education, the period of working as a fitness instructor or attending fitness classes and the frequency of teaching fitness classes or attending fitness classes, as well as avoiding poultry. Fitness instructors were older than fitness participants and a higher percentage of them had higher education. The period of working as a fitness instructor was almost twice as long as the period of attending fitness classes. The highest percentage of fitness instructors taught fitness classes more than four times a week, while the highest percentage of fitness participants attended fitness classes three times a week. More fitness participants than fitness instructors avoided poultry.

**Conclusions.** Unfavourable food behaviour observed in the studied women, both fitness instructors and fitness participants, may increase the risk of diet-related diseases. The observed inadequacies in the studied women's food behaviour, along with their conviction that their diets were adequate and that their nutritional knowledge was sufficient, suggest the necessity to implement education programme to popularise basic dietary recommendations.

**Key words:** *food behaviour, fitness, fitness instructors, fitness participants, physical activity, women, nutritional knowledge*

## STRESZCZENIE

**Wprowadzenie.** W ostatnich latach fitness stał się bardzo popularną formą aktywności fizycznej wśród kobiet. Powstaje coraz więcej klubów fitness i w związku z tym coraz więcej kobiet podejmuje pracę instruktorek fitness oraz uczestniczy w zajęciach fitness. Dlatego badania zachowań żywieniowych tych grup osób są niezwykle ważne.

**Cel.** Celem pracy było porównanie zachowań żywieniowych i stosunku do wiedzy żywieniowej instruktorek fitness i uczestniczek zajęć fitness.

**Materiał i metody.** Badaniami objęto 200 kobiet, w tym 100 instruktorek fitness i 100 uczestniczek zajęć fitness z klubów fitness w Poznaniu i okolicach. Posłużono się kwestionariuszem ankiety zawierającym pytania dotyczące charakterystyki badanych kobiet, spożywania posiłków, zwyczajów żywieniowych, częstotliwości spożycia wybranych produktów, unikania produktów spożywczych i potraw, jak również samooceny swojej diety i stosunku do wiedzy żywieniowej. Statystyczną analizę wyników przeprowadzono przy pomocy programu komputerowego IBM SPSS Statistics 19.

**Wyniki.** Stwierdzono statystycznie istotne zróżnicowanie odpowiedzi badanych kobiet na pytania dotyczące ich wieku, wykształcenia, okresu uczestnictwa w zajęciach fitness lub prowadzenia zajęć fitness, częstotliwości uczestniczenia w zajęciach fitness lub prowadzenia zajęć fitness, a także unikania drobiu. Instruktorki fitness były starsze niż uczestniczki i większy odsetek z nich miał wyższe wykształcenie. Okres prowadzenia zajęć fitness przez instruktorki był prawie dwa

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razy dłuższy niż okres uczestnictwa w zajęciach fitness. Największy odsetek instruktorek fitness prowadził zajęcia częściej niż cztery razy w tygodniu, podczas gdy największy odsetek uczestniczek zajęć fitness uczęszczał na te zajęcia trzy razy w tygodniu. Większy odsetek uczestniczek zajęć fitness niż instruktorek fitness unikał drobiu.
**Wnioski.** Niekorzystne zachowania żywieniowe zaobserwowane w grupie badanych kobiet, zarówno instruktorek fitness, jak i uczestniczek zajęć fitness, mogą zwiększyć ryzyko chorób dietozależnych. Zaobserwowane błędy żywieniowe badanych kobiet, wraz z ich przekonaniem o tym, że ich dieta jest odpowiednia, a wiedza żywieniowa wystarczająca, wskazuje na konieczność wprowadzenia programu edukacyjnego, aby upowszechnić wiedzę na temat podstawowych zaleceń żywieniowych.

**Słowa kluczowe:** *zachowania żywieniowe, fitness, instruktorki fitness, uczestniczki zajęć fitness, aktywność fizyczna, kobiety, wiedza żywieniowa*

## INTRODUCTION

Women's involvement in regular physical activity is a key factor in preventing diet-related diseases and maintaining good health throughout the lifespan [5]. It is also well-documented that physical activity brings psychological benefits, such as reduction of depressive symptoms, anxiety and stress, and enhancement of moods [3, 15, 30]. Fitness has recently become a very popular form of physical activity, especially among women [25, 32]. Since more and more fitness clubs are founded [24, 32], more and more women take up the job of a fitness instructor or participate in fitness classes. Therefore, the studies on female fitness instructors and participants are of great relevance.

So far, the studies on these groups of females most often focused on vocal problems [eg.: 13, 20, 35], issues connected with women's focus on body appearance [eg.: 12, 28, 29] and eating disorders [eg.: 14, 22, 26, 29]. Another important issue which should be investigated in this group of females is food behaviour and attitude towards nutritional knowledge. Adequate food behaviour is a crucial factor for preventing diet-related diseases [6]. Previous studies on women reported that maintaining good health was the main reason for attending fitness classes [16]. While only 27% of female fitness participants considered a balanced diet to be the part of a healthy lifestyle, as many as 60% of those women claimed that their involvement in fitness classes caused positive changes in their food behaviour [34]. Unfortunately, we found only two studies on dietary intake in fitness participants from Kraków [10, 11] and no study on food behaviour of either fitness instructors or participants. Moreover, fitness instructors should represent positive role models of a healthy and physically active lifestyle [22, 26], and adequate food behaviour, along with positive attitude towards knowledge on nutrition, is one of the main components of a healthy lifestyle. Therefore, the aim of this study was to compare food behaviour and attitude towards nutritional knowledge in fitness instructors and fitness participants.

## MATERIAL AND METHODS

The studied population comprised 200 women, including 100 fitness instructors and 100 fitness participants from fitness clubs in Poznań and the vicinity. The studied women filled in questionnaires on food behaviour and attitude towards nutritional knowledge. The questionnaire was used in our previous study [23] and included questions about: eating meals, food habits, frequency of eating selected foodstuffs, avoiding foodstuffs and dishes as well as women's opinions of their own diets and their attitude towards nutritional knowledge. Questions on general characteristics of the studied women were also included.

Statistical analysis was carried out by means of the IBM SPSS Statistics 19 computer programme. Quantitative variables were first analysed using the *Shapiro-Wilk* statistic for testing normality. The level of significance was set at $p \leq 0.05$. For all the analysed quantitative variables, means and standard deviations were calculated. The unpaired *Student's* t test for normally distributed variables and the non-parametric *Mann-Whitney* U test for skewed variables were used to investigate statistically significant differences. Qualitative variables were presented in contingency tables. Statistical significance was determined using *Pearson's* chi-square test. If for a certain variable the percentage of population was lower than 20% for at least one subgroup and at least one answer, the *Mann-Whitney* U test was used. The level of significance was set at $p \leq 0.05$.

In case of some questions, one to five women did not answer. However, these were not the same women each time, so they were not excluded from the whole analysis but only from the analysis for those questions. This fact was marked below each table.

## RESULTS

Table 1 shows general characteristics of the studied female fitness instructors and participants. Statistically significant differences were observed in the studied women's age, education, the period of working as a fitness instructor or attending fitness classes and the frequency

Table 1. General characteristics of the studied female fitness instructors and participants

| Variable | | Fitness instructors (n=100) | Fitness participants (n=100) | All women (n=200) |
|---|---|---|---|---|
| Age (years) | $\bar{x} \pm sd$ | 32.0±8.8* | 30.1±9.7* | 31.0±9.3 |
| Weight (kg) | $\bar{x} \pm sd$ | 58.0±6.1 | 60.5±9.0 | 59.3±7.8 |
| Height (cm) | $\bar{x} \pm sd$ | 166.7±5.6 | 167.1±5.2 | 166.9±5.4 |
| The women's assessment of their own somatotype (%) | Endomorphic | 4.4 | 36.2 | 20.7 |
| | Ectomorphic | 28.9 | 27.6 | 28.2 |
| | Mesomorphic | 66.7 | 36.2 | 51.1 |
| Education (%) | Vocational | 0.0* | 1.0* | 0.5 |
| | Secondary | 13.0* | 23.0* | 18.0 |
| | Higher | 87.0* | 76.0* | 81.5 |
| Marital status (%) | Married | 43.2 | 28.6 | 35.8 |
| | Single | 56.8 | 71.4 | 64.2 |
| Place of residence (%) | A city of more than 500 000 inhabitants | 81.5 | 90.6 | 86.2 |
| | A town of 100 000 – 500 000 inhabitants | 4.3 | 1.0 | 2.7 |
| | A town of 10 000 – 100 000 inhabitants | 10.9 | 4.2 | 7.3 |
| | A town of 1 000 – 10 000 inhabitants | 2.2 | 3.2 | 2.7 |
| | A town/village of less than 1 000 inhabitants | 1.1 | 1.0 | 1.1 |
| Women's opinion of their own economic status (%) | Very good | 9.0 | 15.0 | 12.0 |
| | Good | 67.0 | 61.0 | 64.0 |
| | Average | 24.0 | 24.0 | 24.0 |
| Working as a fitness instructor or attending fitness classes, respectively (years) | $\bar{x} \pm sd$ | 7.6±6.6* | 4.1±3.9* | 5.8±5.7 |
| Frequency of teaching fitness classes or attending fitness classes, respectively (%) | Once a week | 9.0* | 2.0* | 5.5 |
| | Twice a week | 18.0* | 19.0* | 18.5 |
| | Three times a week | 12.0* | 45.0* | 28.5 |
| | Four times a week | 13.0* | 21.0* | 17.5 |
| | More than four times a week | 47.0* | 11.0* | 29.0 |

Asterisks denote statistically significant results ($p \leq 0.05$).
Some percentages are fractions because not all women answered the question.

Table 2. Answers of the studied female fitness instructors and participants to the questions concerning having meals (%)

| Variable | | Fitness instructors (n=100) | Fitness participants (n=100) | All women (n=200) |
|---|---|---|---|---|
| Number of meals a day | Two | 3.1 | 0.0 | 1.6 |
| | Three | 21.3 | 24.2 | 22.8 |
| | Four | 37.8 | 34.3 | 36.0 |
| | Five | 34.7 | 35.4 | 35.0 |
| | Six | 3.1 | 6.1 | 4.6 |
| Having breakfast every day | | 79.8 | 85.0 | 82.4 |
| Having lunch every day | | 41.8 | 55.0 | 48.5 |
| Having dinner every day | | 75.5 | 78.0 | 76.8 |
| Having tea every day | | 22.4 | 23.7 | 23.1 |
| Having supper every day | | 58.2 | 41.4 | 49.7 |
| The longest interval between meals | Four hours or shorter | 64.6 | 74.0 | 69.3 |
| | Longer than four hours | 35.4 | 26.0 | 30.7 |

Some percentages are fractions because not all women answered the question.

of teaching fitness classes or attending fitness classes. Fitness instructors were older than fitness participants, 32.0 vs 30.1 years, and a higher percentage of them had higher education, 87.0% vs 76.0%. The period of working as a fitness instructor was almost twice as long as the period of attending fitness classes, 7.6 vs 4.1 years. The highest percentage of fitness instructors, 47.0%, taught fitness classes more than four times a week, while the highest percentage of fitness participants, 45.0%, attended fitness classes three times a week.

Tables 2 to 5 show the answers of the studied female fitness instructors and participants to the questions concerning their food behaviour, that is: eating meals, food habits, frequency of eating selected foodstuffs and avoiding foodstuffs and dishes, respectively, and table 6 presents the studied women's opinions of their own diets and their attitude towards nutritional knowledge. Statistically significant differences were observed only in avoiding poultry. More fitness participants than fitness instructors avoided poultry, 17.0% vs 6.0%.

## DISCUSSION

Since there is lack of the studies on food behaviour of female fitness instructors and participants, we could not assess the studied females' behaviour in comparison to other populations of females who practice fitness.

Although food behaviour of the studied female fitness instructors and participants did not differ statistical-

Table 4. Answers of the studied female fitness instructors and participants to the questions concerning frequency of eating selected foodstuffs (%)

| Foodstuff | Frequency | Fitness instructors (n=100) | Fitness participants (n=100) | All women (n=200) |
|---|---|---|---|---|
| Wholemeal bread | Never | 11.0 | 15.2 | 13.1 |
| | Once a day | 55.0 | 38.4 | 46.7 |
| | Twice a day | 29.0 | 34.3 | 31.7 |
| | Three times a day | 4.0 | 7.1 | 5.5 |
| | Four times a day | 0.0 | 4.0 | 2.0 |
| | Five times a day | 1.0 | 1.0 | 1.0 |
| Vegetables | Never | 2.0 | 0.0 | 1.0 |
| | Once a day | 19.0 | 24.0 | 21.5 |
| | Twice a day | 44.0 | 41.0 | 42.5 |
| | Three times a day | 28.0 | 24.0 | 26.0 |
| | Four times a day | 6.0 | 10.0 | 8.0 |
| | Five times a day | 1.0 | 1.0 | 1.0 |
| Fruit | Never | 3.1 | 4.1 | 3.6 |
| | Once a day | 37.8 | 31.6 | 34.7 |
| | Twice a day | 31.6 | 32.7 | 32.1 |
| | Three times a day | 18.4 | 22.4 | 20.4 |
| | Four times a day | 7.1 | 9.2 | 8.2 |
| | Five times a day | 2.0 | 0.0 | 1.0 |
| Milk and dairy products | Never | 2.1 | 3.0 | 2.5 |
| | Once a day | 41.2 | 39.4 | 40.3 |
| | Twice a day | 41.2 | 41.4 | 41.3 |
| | Three times a day | 12.4 | 13.2 | 12.8 |
| | Four times a day | 3.1 | 3.0 | 3.1 |
| Meat and meat products | Never | 4.0 | 11.0 | 7.5 |
| | Once a day | 49.5 | 55.0 | 52.3 |
| | Twice a day | 34.4 | 26.0 | 30.2 |
| | Three times a day | 8.1 | 5.0 | 6.5 |
| | Four times a day | 4.0 | 3.0 | 3.5 |

Some percentages are fractions because not all women answered the question.

Table 5. Answers of the studied female fitness instructors and participants to the questions concerning avoiding foodstuffs and dishes (%)

| Foodstuff/dish avoided | Fitness instructors (n=100) | Fitness participants (n=100) | All women (n=200) |
|---|---|---|---|
| Cereals and cereal products | 12.2 | 14.0 | 13.1 |
| Refined bread | 57.0 | 74.0 | 65.5 |
| Vegetables | 1.0 | 0.0 | 0.5 |
| Fruit | 4.0 | 2.0 | 3.0 |
| Milk and dairy products | 7.0 | 7.0 | 7.0 |
| Meat | 14.0 | 20.0 | 17.0 |
| Poultry | 6.0* | 17.0* | 11.5 |
| Fish | 5.0 | 2.0 | 3.5 |
| Eggs | 10.0 | 6.1 | 8.0 |
| Butter | 33.0 | 44.0 | 38.5 |
| Margarine | 78.0 | 79.8 | 78.9 |
| Animal fat | 57.0 | 61.0 | 59.0 |
| Vegetable fat | 16.0 | 20.0 | 18.0 |
| Sugar | 74.0 | 75.0 | 74.5 |
| Sweets | 45.0 | 49.0 | 47.0 |
| Alcohol | 44.0 | 41.0 | 42.5 |
| Fried dishes | 54.0 | 49.5 | 51.8 |
| Baked/roasted dishes | 19.0 | 19.2 | 19.1 |
| Boiled dishes | 2.0 | 2.0 | 2.0 |
| Stewed dishes | 5.0 | 4.1 | 4.5 |

Asterisks denote statistically significant results ($p \leq 0.05$). Some percentages are fractions because not all women answered the question.

Table 6. The studied female fitness instructors' and participants' opinions of their own diets and their attitude towards nutritional knowledge (%)

| Women's opinions | Fitness instructors (n=100) | Fitness participants (n=100) | All women (n=200) |
|---|---|---|---|
| My diet is adequate | 68.7 | 46.0 | 57.3 |
| My nutritional knowledge is sufficient | 72.0 | 68.0 | 70.0 |
| I broaden my knowledge about nutrition | 90.0 | 88.9 | 89.4 |

Some percentages are fractions because not all women answered the question.

ly significantly, it is noteworthy that fitness participants showed more favourable food behaviour compared to fitness instructors. None of the fitness participants had less than three meals a day, a higher percentage of them had breakfast, lunch, dinner and tea every day, a higher percentage of them had their longest interval between meals of four hours or shorter and always prepared meals on their own, a lower percentage of them took vitamins and minerals, and a higher percentage of fitness participants avoided refined bread, butter, animal fat and sweets. However, a lower percentage of fitness participants claimed that their diet was adequate and that their nutritional knowledge was sufficient.

The number of meals eaten a day by the studied women was highly favourable, since almost all of them met the recommendation of having three meals a day or more. However, the percentages of the studied women who had breakfast, lunch, dinner, tea and supper every day suggest having meals irregularly. More than half of the studied women skipped lunch and supper, and a very low percentage of them had tea every day. Skipping lunch and tea may be the cause of too long intervals between the meals. A much higher percentage of fitness participants who skipped supper, compared to fitness instructors, may be explained by their desire to lose weight, since previous studies showed that this is one of the main reasons for women's participation in fitness classes [16]. Since women usually attend fitness classes in the afternoon or in the evening, the very low percentage of the studied women who did not have tea every day is probably due to the common belief that no food should be eaten before exercise and the unawareness of the fact that a light high-carbohydrate meal is recommended before exercise. Having meals irregularly has an adverse effect on serum lipid profile and insulin resistance, and thus increases

the risk of type 2 diabetes, atherosclerosis and metabolic syndrome [8, 9, 31, 33]. Moreover, skipping meals both before and after exercise may decrease training effectiveness and reduce glycogen resynthesis [2].

It was very favourable that a high percentage of the studied women always prepared meals on their own. Preparing meals on one's own makes it possible to decide about the content of the meal and about the way of preparing food. A good habit was also not eating until the feeling of satiety by most of the women. Such behaviour is in accordance with the recommendations concerning the prevention of overweight and obesity, as well as type 2 diabetes. The habit of eating between the main meals may be considered either favourable or unfavourable depending on the foods eaten. More than half of the studied women ate fruit between the main meals and almost none of them ate fast foods, which is a desirable food behaviour. However, more than half of the studied women ate sweets between the main meals and a very low percentage of them ate fermented milk drinks, nuts and dried fruits, bread, sandwiches or rusks, as well as vegetables or cereals. Taking vitamins and minerals was also an undesirable behaviour, especially popular among fitness instructors. The question arises whether using supplements by the studied women was recommended by their doctors due to poor nutritional status, for example iron deficiency which is very common in physically active females [36], or rather a false belief that such supplements are necessary for those who perform physical exercise.

The frequency of eating wholemeal bread was satisfactory, since most of the studied women ate this kind of bread at least once a day. It was unfavourable that most of the studied women ate vegetables and fruit twice a day or less frequently. This poses the risk of not meeting the recommendation to eat four portions of vegetables and three portions of fruit every day [6]. The frequency of eating milk and dairy products, as well as meat and meat products, was also adverse. This is because not even half of the studied women ate milk and dairy products twice a day. Eating these products only once a day increases the risk of deficient calcium intake – a major risk factor for osteoporosis [1]. Eating meat and meat products more frequently than once a day, suggests the risk of excessive animal protein intake which not only increases calcium excretion [21], but also increases the risk of atherosclerosis [17].

A good habit was avoiding refined bread and sugar by a high percentage of the studied females. Refined bread is disposed of a substantial quantity of dietary fibre which is important in preventing diet-related diseases, especially colorectal cancer [4], while sugar, because of its unfavourable effect on serum triacylglycerols, increases the risk of atherosclerosis [19]. It was unfavourable that about 40% of the studied women did not avoid animal fat and that most of them did not avoid butter, but avoided margarine. Animal fat, including butter, due to a high content of cholesterol and saturated fatty acids [18], favours atherogenesis, and that is why it should be exchanged for margarine or, preferably, for rapeseed oil and olive oil. A bad habit was not avoiding sweets and alcohol by more than half of the studied women. In order to prevent diet-related diseases, sweets should be exchanged for dried fruits and fresh, sweet fruit, while alcohol may be consumed, however, in small amounts and preferably as red wine due to its high content of antioxidant resveratrol [27].

The observed inadequacies in the studied women's food behaviour, along with their conviction that their diets were adequate and that their nutritional knowledge was sufficient, suggest the necessity to spread basic dietary recommendations. Since almost all of the studied women declared that they broadened their knowledge about nutrition, every kind of nutrition education should turn out effective.

## CONCLUSIONS

1. Unfavourable food behaviour observed in the studied women, both fitness instructors and fitness participants, may increase the risk of diet-related diseases.
2. The observed inadequacies in the studied women's food behaviour, along with their conviction that their diets were adequate and that their nutritional knowledge was sufficient, suggest the necessity to implement education programme to popularise basic dietary recommendations.

**Conflict of interest**

*The authors declare no conflict of interest.*

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