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# Zachowania zdrowotne u kobiet leczonych z powodu niepłodności i ich wpływ na występowanie depresji

# Health behaviours in women treated for infertility and their influence on the incidence of depression

**Streszczenie**

**Wstęp.** Tryb życia, sposób odżywiania się, podejmowanie zachowań ryzykownych, takich jak na przykład palenie papierosów, spożywanie alkoholu mogą w istotny sposób wpływać na płodność. Blisko 21% populacji kobiet doświadcza dużej depresji w ciągu życia. Nasilenie lęku i depresji występujące u kobiet z problemem niepłodności okazuje się być porównywalne do tych doświadczanych przez kobiety chorujące na raka czy też na chorobę wieńcową.

**Cel.** Celem pracy było dokonanie analizy wybranych zachowań zdrowotnych u kobiet leczonych z powodu niepłodności oraz ocena ich potencjalnego wpływu na występowanie lęku i depresji.

**Materiał i metody.** Narzędziem badawczym był kwestionariusz ankiety, który opracowano dla celów tej pracy, który zawierał pytania dotyczące zachowań pro- i antyzdrowotnych przed i w trakcie leczenia niepłodności. Do oceny nasilenia lęku i depresji zastosowano Inwentarz Depresji Becka (BDI).

**Wyniki.** Prowadzenie aktywnego trybu życia przed rozpoczęciem leczenia niepłodności wiązało się częściej ze zwiększeniem tej aktywności w porównaniu do kobiet, które nie prowadziły aktywnego trybu życia w przeszłości. Większość ankietowanych nie zmieniła sposobu odżywiania się w trakcie leczenia niepłodności. Te kobiety, które zmieniły swój sposób odżywiania znacznie zwiększyły spożycie ryb, warzyw, nabiału i owoców.

**Wnioski.** Leczenie niepłodności w istotny sposób wpłynęło na decyzję badanych na ograniczenie lub rzucenie palenia oraz na ograniczenie spożywania innych używek, takich jak alkohol czy kawa.

**Słowa kluczowe:** zachowania zdrowotne, niepłodność, depresja.

**Abstract**

**Introduction.** The style of life, the diet, undertaking risky behaviours, such as for instance smoking, drinking alcohol, can significantly influence fertility. Almost 21% of the female population experiences a major depression during their lives. The severity of anxiety and depression in women with infertility problem seems to be comparable with that experienced by women with cancer or coronary disease.

**Aim**. The aim of the study was to analyze the chosen health behaviours in women treated for infertility and to assess the potential impact of these behaviours on the presence of anxiety and depression.

**Material and methods.** The questionnaire comprising questions related to promoting health- and health-adverse behaviours before and during infertility treatment was developed for the purpose of the study. Beck Depression Inventory (BDI) was used to assess the severity of anxiety and depression.

**Results.** Leading an active lifestyle prior to infertility treatment was connected with intensification of that activity comparing to the women who did not lead an active lifestyle in the past. Most of the respondents did not change their dietary habits during infertility treatment. The women who changed their diet significantly increased the consumption of fish, vegetables, dairy products and fruits.

**Conclusion.** Infertility treatment significantly influenced the decision of the studied women about reducing or quitting smoking, as well as reducing the consumption of other stimulants, such as alcohol or coffee.

**Key words:** health behaviours, infertility, depression.

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## INTRODUCTION

Infertility is defined as an inability to become pregnant within twelve months regardless of maintaining the regular sexual intercourses without using any type of contraceptive methods.

The incidence of these disorders varies from 10% to 20% of the population at the reproductive age. It is estimated in Poland that difficulties with procreation concern 2.4 million of women and men. With regard to the prevalence and consequences of this problem, the World Health Organization defined infertility as a social disease [1, 2].

The problem of infertility and inability to give birth to a child is a difficult area of the clinical practice related to human procreation. The treatment of this disease is very burdensome in a physical and emotional way. The therapy of infertile couples is usually long and not always successful. The only criteria of the effectiveness of treatment is giving birth to a child and taking the child home [3, 4].

The world specialists dealing with the infertility problem more and more often turn their attention to the factors negatively affecting fertility and the possibilities of their elimination or reduction to the minimum as a result of the human commitment [2, 5].

Health behaviours determining keeping good health are very creditable in medicine. Nowadays health is a matter of choice, making conscious decisions [6]. The essential element of involution of health is increasing consciousness, knowledge and skills as well as building the proper attitudes of specific individuals towards health [7].

The results of numerous observations show that the most serious dangers for health in Poland are:

- little physical activity,
- inadequate diet – concerns specifically the excess of energy taken from the food, the overuse of animal fats and kitchen salt, insufficient consumption of milk and dairy products, vegetables and fruits, as well as dark bread,
- tobacco smoking,
- excessive consumption of alcohol,
- social environment – the limited access to the housing and work, food and clothes, withdrawal of some types of social care, increase in social pathologies, which means weaknening of family ties, increase in crime,
- physical environment – air, water and soil pollution, bad work conditions, such as noise, vibrations, toxic dust [7].

The way of life, and especially the used stimulants, such as alcohol, nicotine, drugs and the overuse of medicines, is an important element affecting fertility [8, 9].

Nicotine affects fertility disorders in both spouses, and the reduced fertility depends on the number of smoked cigarettes [6, 9, 10].

The presence of nicotine and its metabolite – cotinine – which can be toxic for the sperm - has been confirmed in the cervical mucus of smoking women. Oviducts dysfunctions and inter-oviduct transport dysfunctions caused by the disturbed growth and function of cilium in oviducts are also possible. It has been proved that the risk of extrauterine pregnancy is growing. Cigarette smoking causes reduced estrogen production and smoking women enter the menopause period earlier [11-13].

Nicotine also affects negatively the male fertility. It was proved that it reduces the biological value of sperm. It is stated that the volume of ejaculate, as well as the activity of sperm cells, is smaller among smoking men. Males, especially in the reproductive age, should stop smoking because it causes a decrease in the concentration of testosterone and prolactin [9, 10].

Alcohol belongs to the group of commonly available toxic substances. Used in excess and regularly, it negatively influences the function of sexual organs. Chronic alcohol addiction can lead to ovulation and menstruation disorders among women [8, 9]. Alcohol influences the synthesis and secretion of testosterone, the occurrence of sexual disorders, and significantly disturbs morphological construction of sperm cells among men [13].

Poor diet is also listed among factors leading to reduction of human fertility. In the group of women with nutrition deficiencies, the lack of important nutritional components and uncontrolled diet lead to disorders and inhibition of menstruation, and in consequence to reduction of fertility. It has been shown that starting and maintaining the correct menstruation period by a woman depends on gaining the proper built, which means the proper body weight [13].

Procreation processes can be negatively influenced both by the deficiency and the excess of food. The research shows that the incorrect menstruation period is connected with the extent of obesity.

Almost 21% of the female population experiences a major depression during their lives. The severity of anxiety and depression in women with the infertility problem seems to be comparable with that experienced by women with cancer or coronary disease. The incidence of depression and anxiety in infertile women was studied in some countries; Jones et al. (1993) showed (using Beck Depression Inventory) that a mild depressive episode was present in 28.3% of women with the infertility problem, a moderate episode – in 7.2%, and a severe episode – in 1.2%. Another study showed that 67% of infertile women suffered from anxiety symptoms [14].

## AIM

The aim of this paper was to analyze the selected health behaviours among women treated for the infertility problem.

## MATERIAL AND METHODS

The research was conducted between June 2007 and December 2008 in a private infertility treatment centre and in OVUM Procreation and Andrology NZOZ (Independent Health Care Unit) in Lublin. The research covered the group of 104 women. The biggest subgroup consisted of the respondents aged 20-25 - 28.85% (n=30), and 30-35 - 28.85% (n=30), whereas the respondents aged 25-30 were 19.23% (n=20), aged 35-40 - 16.35% (n=17), and the smallest subgroup of the respondents comprised women aged over 40 - 6.73% (n=7). According to their marital status, 75.96%

women (n=79) were married, 18.27% (n=19) single, whereas only 4.81% (n=5) divorced and 0.96% (n=1) widowed.

Among the questioned women, 40.38% (n=42) were high school graduates, 21.15% (n=22) - bachelor degree study graduates, 33.65% (n=35) - higher degree study graduates, whereas only 3.85% (n=4) had vocational education and 0.96% (n=1) primary school education. Most of the questioned women evaluated their living conditions, in comparison to their contemporaries, as good - 64.42% (n=67), whereas 31.73% (n=33) evaluated their living conditions as very good, and only 3.85% (n=4) as bad.

The tool of the research was a questionnaire prepared for the purpose of this study. It consisted of 25 questions. The questions included in the questionnaire concerned the personal data of the respondents and the subject of the research, the pro-health behaviours, such as active way of life, nutrition habits and risky behaviours, such as smoking cigarettes or using other stimulants (coffee, drugs, alcohol). The behaviours mentioned above were compared before and during infertility treatment.

Beck Depression Inventory was used to determine the level of depression and anxiety. This research instrument consists of 21 questions covering emotional, cognitive, motivational and somatic symptoms of depression. Each question has four variants of answers reflecting varying intensity of symptoms.

The following division of depression level was determined in the study:

- without symptoms
- mild depression
- moderate depression

The participation of women in the research was anonymous and voluntary, and the selection was random.

The obtained research results were subject to statistical analysis. The values of the analyzed measurable parameters were shown using the average value and standard deviation, and of the immeasurable values – using the number and percentage. The assumed level of relevance was $p<0.05$, showing the occurrence of statistically significant differences or dependences. The database was created and statistical studies were conducted with the use of STATISTICA 8.0 (StatSoft, Polska) software.

## RESULTS

Active life style was reported by 36.54% (n=38) of the respondents and only 1.92%, (n=2) evaluated their style of life as inadequate. The remaining 45.19% (n=47) of the respondents stated that they rather lead an active life, whereas 16.35%, (n=17) admitted that they rather did not lead an active life style. The next question concerned the way of spending the spare time. Most of their free time, the respondents spare for family life: it is about 20-30 hours a week. They spend 10-15 hours watching TV, 8 to 10 hours walking, 6-8 hours listening to music. They spend 5-7 hours reading, 4-7 hours meeting friends, and only 1-3 hours practicing sport.

The respondents prefer the following forms of physical activity: walking - 57.69% (n=60), riding a bicycle - 45.19% (n=47), swimming - 23.08% (n=24), aerobic - 19.23% (n=20), and yoga - 2.88% (n=2.88); 7.69% (n=8) of the respondents prefer other sports.

The majority of the respondents stated that infertility treatment did not have any influence on their physical activity (37.50% (n=39)). The same percentage - 37.50% (n=39) of the respondents were women for whom it was difficult to evaluate the influence of infertility treatment on their physical activity. For 20.19% (n=21) of the respondents the treatment increased their physical activity and for 4.81% (n=5) - it decreased their activity.

Subsequently, the influence of infertility treatment on the increase in activity was evaluated taking into the consideration the declared way of life before starting the treatment. Among the tested women who had kept active life style in the past, as many as 37.65% (n=32) had difficulties in evaluating the influence of the treatment on their physical activity, 36.47% (n=31) of the respondents did not change their physical activity, 23.53% (n=20) increased their activity, and only 2.35% (n=2) decreased their activity. Among the tested women who did not lead an active life style, 42.11% (n=8) did not experience the influence of infertility treatment on the change of their physical activity, 36.84% (n=7) had difficulties in evaluating the influence of the treatment on their activity, 15.79% (n=3) stated that their activity decreased, and only 5.26% (n=1) stated that they increased their activity during the treatment. The obtained results are shown in Table 1.

The analysis of the above data shows that leading an active life style before starting infertility treatment is more often connected with the increase of that activity comparing to the women who did not lead an active life in the past. This difference is statistically significant (p=0.04).

The subsequent questions of the questionnaire concerned nutrition habits. On average the respondents had 3 meals during the day, (average 3.85 ± 1.07), the least - 2 meals, while the most - 6. A majority of the respondents admitted

**TABLE 1. Lifestyle including the influence of infertility treatment on the change of physical activity.**

| Active life | No | Increased | Decreased | Difficult to evaluate | Total | Statistical analysis |
|---|---|---|---|---|---|---|
| | n (%) | n (%) | n (%) | n (%) | n (%) | |
| Yes/rather yes | 31 (36.47) | 20 (23.53) | 2 (2.35) | 32 (37.65) | 85 (100) | |
| Rather not/no | 8 (42.11) | 1 (5.26 | 3 (15.79) | 7 (36.84) | 10 (100) | $Chi^2=8.53$ p=0.04* |
| Total | 39 (37.50) | 21 (20.19) | 5 (4.81) | 39 (37.50) | 104 (100) | |

that they do not eat regularly 57.69% (n=60). The statistically significant difference in the quantity of meals during the day was found between the respondents who eat regularly and those who had meals irregularly (Z=-2.62; p=0.009). The respondents who eat regularly had in most cases 4 meals during the day (4.14 ± 0.80), while those who did not eat regularly – 3 (3.63 ± 1.19).

The research showed that the main meal for the most of respondents was dinner - 59.62% (n=62), while for 19.23% (n=20) of women it was breakfast, for 12.50% (n=13) - supper, for 5.77% (n=6) - lunch, and for 2.88% - an afternoon snack. Over half of the respondents (54.81% (n=57) admitted that they eat between meals, while 45.19% (n=47) said that they never do that.

The next questions concerned the type of most often eaten products. The products eaten least frequently before starting infertility treatment were fish and dairy products. Fish were eaten often only by 28% of the respondents, dairy products by 56%, bread was the most often eaten product, 76% of respondents eat it often (Table 2).

Most of the questioned women stated that infertility treatment did not affect their nutritional habits (68.27% (n=71)), while 31.73% (n=33) stated that it had significant influence.

The conducted research showed that most of the questioned women did not change their nutritional habits during infertility treatment. A highly statistically significant dependence was found in eating the specific groceries during infertility treatment. The women considerably increased their consumption of fish (p=0.00008), vegetables (p=0.00004), dairy products (p=0.0006), and fruit (p=0.0003).

The research showed that the respondents who changed their nutrition habits during treatment, eat more properly comparing to the respondents, who did not change their nutrition habits.

Most of the tested women did not smoke - 75.00% (n=78), while 25% smoked. Smoking was limited by 61.54% (n=16) of the previously smoking respondents during infertility treatment, 7.69% (n=2) quit smoking, and 3.85% (n=1) started smoking more often. Still, for 26.92% (n=7) of the respondents their treatment did not have any influence on the frequency of smoking.

A highly statistically significant dependence was found between smoking cigarettes and the influence of infertility treatment on the frequency of smoking (p<0.00001*). The research showed that among the respondents, 65.38% (n=68) willingly drank coffee and 51.92,% (n=54) strong tea. Almost half of the women - 49.04% (n=51) admitted that they drank alcohol. A large majority of the respondents - 97.12% (n=101) stated that they did not take drugs.

The result of the conducted research showed that fewer respondents used stimulants during infertility treatment, thus 55.77% (n=58) of the respondents drank coffee, 38.46% (n=40) – strong tea, and only 21.15% (n=22) of women drank alcohol. During infertility treatment as many as 98.08% (n=102) of the respondents did not use drugs (Table 3).

A highly statistically significant dependence was stated between the frequency of using stimulants before and during infertility treatment. During infertility treatment

**TABLE 2. The frequency of eating the selected products before starting treatment.**

| Products | Hardly ever | | Sometimes | | Often | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Farinaceous food | 2 | 1.92 | 65 | 62.50 | 37 | 35.58 |
| Bread | 1 | 0.96 | 27 | 25.96 | 76 | 73.08 |
| Meat | 1 | 0.96 | 40 | 38.46 | 63 | 60.58 |
| Fish | 14 | 13.46 | 62 | 59.62 | 28 | 26.92 |
| Dairy products | 9 | 8.65 | 39 | 37.50 | 56 | 53.85 |
| Vegetables | 6 | 5.77 | 31 | 29.81 | 67 | 64.42 |
| Fruits | 6 | 5.77 | 27 | 25.96 | 71 | 68.27 |

**TABLE 3. The frequency of using stimulants before and during infertility treatment.**

| Stimulants | Before treatment | | | | During treatment | | | |
|---|---|---|---|---|---|---|---|---|
| | Yes | | No | | Yes | | No | |
| | n | % | n | % | n | % | n | % |
| Alcohol | 51 | 49.04 | 53 | 50.96 | 22 | 21.15 | 82 | 78.85 |
| Drugs | 3 | 2.88 | 101 | 97.12 | 2 | 1.92 | 102 | 98.08 |
| Coffee | 59 | 56.73 | 45 | 43.27 | 49 | 47.11 | 56 | 52.89 |
| Strong tea | 54 | 51.92 | 50 | 48.08 | 40 | 38.46 | 64 | 61.54 |
| Nicotine | 22 | 21.15 | 78 | 78.85 | 24 | 23.07 | 80 | 76.93 |
| Others | 2 | 1.92 | 102 | 98.08 | 1 | 0.96 | 103 | 99.04 |

a much lower number of the respondents drank alcohol (Z=4.87; p=0.000001), strong tea (Z=2.77; p=0.006), and coffee (Z=2.12; p=0.03).

An average index of depression level according to BDI scale in the studied group was 11.88 ± 9.45, (0-35). Over half of the respondents had no symptoms of depression 55.77% (n=58), a mild depression was diagnosed in 33.65% (n=35) of the women, and a moderate depression – in 10.58% (n=11). A comparison between the severity of depression and such variables as the place of residence, living conditions, and education level was made. In the studied group, there was no significant relation between the level of depression and marital status (p=0.10), place of residence (p=0.11), living conditions (p=0.09), and education level (p=0.63). In the group of women who had very good living conditions – 66.7% (n=18) had no depression, and in the women with moderate income – 56.52% (n=39). In the group of women who had very bad living conditions a moderate depression was reported by 50.0% (n=4). A significant statistical correlation was found between the level of depression and the assessment of the family income (p=0.002).

Next, we assessed influence of the life style (active versus non-active) and smoking cigarettes (as an example of anti-health behaviour) on depression incidence in the group. We showed that 56.47% (n=48) of the physically active women and 52.63% (n=10) of the non-active women had no depression symptoms. There was no statistically significant correlation between depression severity and lifestyle (p=0.24).

Considering an impact of risky behaviours on the emergence of depression, we assessed the influence of smoking cigarettes and drinking coffee on the presence of depression symptoms. Other active substances were used by too few of the studied women – it was impossible to conduct a reliable statistical assessment. Many studied women reduced alcohol drinking during their treatment, so we decided not to assess its influence on the severity of depression symptoms.

A moderate depression was present in 11.54% of the smoking women and in 10.26% of the non-smoking ones; a mild depression – in 37.18% of the smoking and in 23.08% of the non-smoking women. There was no statistically significant correlation between the severity of depression and smoking cigarettes in the women treated for infertility (p=0.42).

The results showed that smoking cigarettes had no influence on the severity of depression in the women treated for infertility. Similarly, there was no correlation between coffee drinking and the severity of depression in the studied group (Tables 4 and 5).

Overweight and obesity, assessed with BMI index, as a result of incorrect nutrition had an influence on the severity of depression symptoms. The results showed a statistically significant correlation between depression severity and level of BMI (p=0.01). Women with a correct BMI had symptoms of depression less frequently (Table 6).

**TABLE 4. The relationship between smoking and depression level.**

| Smoking | Without depression symptoms | Mild depression | Moderate depression | Total | Statistical analysis |
|---|---|---|---|---|---|
| | n<br>% | n<br>% | n<br>% | n<br>% | |
| No | 41 | 29 | 8 | 78 | Chi2=1.76<br>p=0.42 |
| | 52.56% | 37.18% | 10.26% | 100.00% | |
| Yes | 17 | 6 | 3 | 26 | |
| | 65.38% | 23.08% | 11.54% | 100.00% | |
| Total | 58 | 35 | 11 | 104 | |
| | 55.77% | 33.65% | 10.58% | 100.00% | |

**TABLE 5. The relationship between drinking coffee and depression level.**

| Coffee | Without depression symptoms | Mild depression | Moderate depression | Total | Statistical analysis |
|---|---|---|---|---|---|
| | n<br>% | n<br>% | n<br>% | n<br>% | |
| No | 31 | 16 | 8 | 55 | $Chi^2$=2.47<br>p=0.29 |
| | 56.36% | 29.09% | 14.55% | 100.00% | |
| Yes | 27 | 19 | 3 | 49 | |
| | 55.10% | 38.78% | 6.12% | 100.00% | |
| Total | 58 | 35 | 11 | 104 | |
| | 55.77% | 33.65% | 10.58% | 100.00% | |

**TABLE 6. The relationship between Body Mass Index and depression level.**

| BMI | Without depression symptoms | Mild depression | Moderate depression | Total | Statistical analysis |
|---|---|---|---|---|---|
| | n<br>% | n<br>% | n<br>% | n<br>% | |
| Norm | 52 | 23 | 7 | 82 | $Chi^2$=9.21<br>p=0.01* |
| | 63.41 | 28.05 | 8.54 | 100.00 | |
| Overweight or obesity | 6 | 12 | 4 | 22 | |
| | 27.27 | 54.55 | 18.18 | 100.00 | |
| Total | 58 | 35 | 11 | 104 | |
| | 55.77 | 33.65 | 10.58 | 100.00 | |

## CONCLUSIONS

1. Leading an active life before starting infertility treatment was more often connected with an increase in such activity comparing to the women who did not lead an active life in the past. There is a need to increase the awareness among inactive women about the influence of physical activity on their health state.
2. Most of the respondents did not change their nutrition habits during infertility treatment.
3. The respondents who changed their nutrition habits during treatment ate more properly comparing to those respondents who did not change their nutrition habits.
4. The research showed that infertility treatment significantly influences the decision about reducing or quitting smoking.
5. The research showed that infertility treatment influences a reduction in the consumption of alcohol, strong tea and coffee.
6. There was no statistically significant correlation between the severity of depression and lifestyle (p=0.24), smoking cigarettes and drinking coffee.
7. There was a statistically significant correlation between the severity of depression and the level of BMI (p=0.01)

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