# HEALTH HABITS OF GIRLS OF CHILDBEARING AGE AND THE PREVENTION OF OBESITY, FERTILITY DISORDERS AND OBSTETRIC COMPLICATIONS. A PRELIMINARY REPORT

## *ZACHOWANIA ZDROWOTNE DZIEWCZĄT W WIEKU PROKREACYJNYM A PROFILAKTYKA OTYŁOŚCI, ZABURZEŃ PŁODNOŚCI I POWIKŁAŃ POŁOŻNICZYCH – DONIESIENIE WSTĘPNE*

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ABSTRACT

**Introduction.** The World Health Organisation has declared obesity and overweight an epidemic of the 21st century. Both obesity and absence of health promoting attitudes are important issues in the context of female reproductive health, a growing problem of fertility disorders, and future obstetric complications.
**Aim.** The aim of this paper was to obtain information from girls of child-bearing age on their lifestyle, including dietary attitudes in the context of obesity, fertility disorders and obstetric complications that are inherent to dietary habits and lifestyle. The paper aims to find out priorities for actions related to reproductive health promotion.
**Material and methods.** 93 students of high schools, aged 17–19 years old were enrolled. The study involved a medical survey on the problems girls of childbearing age have. The study was prepared by an interdisciplinary team of doctors (including a sexologist), psychologists, a dietician and teachers. The study also involved the Eating Attitudes Test-26.
**Results.** 67.74% of the girls confirmed that diet is very important, yet 56.99% ate sweets every day, 36.56% ate fast food every day, and 45.16% had no breakfast before going to school. It was determined that 50.54% did not do any sport, and 38.71% smoked cigarettes. What is more, 30.11% of the girls have at least once been on a weight loss diet, which resulted in inhibition of menstruation in 7.53% of them. Eating attitude disorders were found in 9.68% of the young women enrolled.
**Conclusions.** The health education standard represented by the girls is low. Their dietary habits are alarming and may in time cause adverse health problems, including overweight and obesity. Furthermore, almost 40% of the young women were smokers and more than half of them failed to exercise, which could prevent obesity, fertility disorders, and obstetric complications.

STRESZCZENIE

**Wstęp.** Otyłość oraz nadwaga zostały uznane przez Światową Organizację Zdrowia za epidemie XXI wieku. Występowanie otyłości, jak i brak postaw prozdrowotnych to ważne zagadnienia w kontekście zdrowia prokreacyjnego kobiet, narastającego problemu zaburzeń płodności oraz występowania późniejszych powikłań położniczych.
**Cel.** Celem pracy było uzyskanie informacji od dziewcząt w wieku prokreacyjnym, dotyczących stylu życia, w tym zbadanie postaw wobec odżywiania, w aspekcie problemu otyłości oraz zaburzeń płodności i powikłań położniczych, które są nierozerwalnie ze sobą związane ze sposobem żywienia i stylem życia. Praca ma na celu pokazanie priorytetów dotyczących działań w zakresie promocji zdrowia prokreacyjnego.
**Materiał i metody.** W badaniach brały udział 93 uczennice szkół średnich, w wieku 17–19 lat. Badania przeprowadzono za pomocą opracowanej przez interdyscyplinarny zespół, składający się z lekarzy (w tym seksuologa), psychologów, dietetyka i pedagogów, ankiety-wywiadu lekarskiego dotyczącej problemów dziewcząt będących w okresie prokreacyjnym. W badaniach wykorzystano także kwestionariusz postaw wobec odżywiania EAT-26 (*Eating Attitudes Test-26*).
**Wyniki.** Wśród dziewcząt 67,74% twierdziło, że jedzenie jest bardzo ważne, ale jednocześnie 56,99% codziennie spożywało słodycze, 36,56% codziennie zjadało żywność typu fast-food, a 45,16% dziewcząt nie jadło śniadań przed wyjściem do szkoły. Wykazano, że 50,54% nie uprawiało sportu, a 38,71% paliło papierosy. Ponadto 30,11% dziewcząt przynajmniej raz stosowało dietę odchudzającą, w wyniku której u 7,53% z nich doszło do zahamowania miesiączki. Zaburzenia postaw wobec odżywiania stwierdzono u 9,68% młodych kobiet.
**Wnioski.** Wśród dziewcząt obserwuje się braki w edukacji prozdrowotnej. Niepokojący jest sposób żywienia, który w perspektywie czasu może mieć negatywne konsekwencje zdrowotne, w tym generować nadwagę i otyłość. Ponadto stwierdzono fakt palenia papierosów przez prawie 40% młodych kobiet i nie podejmowanie przez ponad połowę badanych aktywności fizycznej, która pełni istotną rolę w profilaktyce otyłości, zaburzeń płodności i pozwala zapobiec wielu powikłaniom położniczym.

According to the study, women of childbearing age should be provided with an educational programme that would include issues related to appropriate health promoting behaviours. The education should also be aimed to prevent the development of eating disorders which in turn could affect fertility disorders.

KEYWORDS: overweight, obesity, nutrition, eating disorders, fertility, childbearing age, obstetric complications.

Badania pokazują, że kobiety w wieku prokreacyjnym powinny być objęte programem edukacyjnym uwzględniającym zagadnienia dotyczące prawidłowych zachowań zdrowotnych. Edukacja powinna mieć na celu także zapobieżenie rozwojowi zaburzeń odżywiania (ED-*Eating Disorders*), które mogą mieć wpływ na zaburzenia płodności.

SŁOWA KLUCZOWE: nadwaga, otyłość, żywienie, zaburzenia odżywiania, płodność, wiek prokreacyjny, powikłania położnicze.

## Introduction

Infertility in the reproductive age is an increasing problem. It is estimated that in Poland, around 15% of couples who attempt to have children are affected [1, 2]. Causes of female infertility may include endometriosis, fallopian tubal disorders, ovulation disorders related to the polycystic ovarian syndrome and other ovulation disorders of an unexplained ethiopathogenesis. Male infertility may be caused by oligasthenospermia, asthenospermia, teratospermia, azoospermia, oligospermia and immune factors [2].

In recent years, the percentage of unexplained (idiopathic) infertility cases is on the increase. A common cause of female infertility is poor egg quality, whereas male infertility is related to impaired sperm's ability to fertilize the egg and the changes in sperm chromatin [3].

Male and female factors are responsible for infertility to a similar extent. However, recently there has been an increase in male-related factors, especially in urban settings. Such a shift is probably linked to a greater environmental exposure of city dwellers [2, 4].

Both environmental factors and changes in lifestyle have a considerable influence on sperm motility, concentration and morphology [5, 6]. In recent years, among women, there has also been an increase (of up to 20%) in the number of idiopathic factors (including environmental ones) with the simultaneous decrease of tubal factors (due to a widespread and successful treatment). Other female factors such as endometriosis, PCOS and ovulation disorders have remained at the same level [3, 4, 6].

Around 5% of idiopathic infertility cases may be caused by psychosomatic factors [7].

Environmental factors which considerably influence the health of people of reproductive age include: obesity, inappropriate diet, low physical acivity, smoking, alcohol and other psychoactive substances abuse and risky sexual behaviour [8, 9].

Obesity has been an increasing problem for the last two decades, both in developing and developed countries. It is usually defined as abnormal or excessive body fat accumulation. Obesity increases the risk of metabolic diseases. Although the exact pathophysiological mechanisms responsible for such diseases are not yet known, clinical and epidemiological research indicates the link between the heightened inflammation in obesity and developing insulin resistance, which in turn impaires ovulation [11, 12].

The abnormal energy balance is one of the environmental factors which directly contributes to obesity but it can also lead to malnutrition. Both obesity and insufficient body weight can have an influence on reproductive performance, causing hormone imbalance and fallopian tube disorders [8].

Environmental factors, along with genetic and cultural ones, are said to be risk factors for eating disorders. Although the pathogenesis of eating disorders is not yet well understood, reasearch is being done to determine the percentage of those three factors in eating disorders etiology. The existing research shows that environmental and genetic factors play the main role in anorexia, whereas in bulimia, also cultural factors have a slightly bigger influence. In this context, anorexia nervosa and bulimia nervosa are disorders considered as heterogenic, multifactorial and complex [13, 14].

The lack of balance between the process of reaching biological maturity and socio-emotional development is often the cause of eating disorders. Such disorders are related to insufficient food intake but also to excessive eating which is often accompanied with obesity. A distinct problem is poor nutrition (often resulting from ignorance) and insufficient physical activity.

The lack of balance between biological and psychoemotional development may also lead to sexual precocity, early motherhood and the risks related to abnormalities in under-age pregnancies, sexual promiscuity resulting in the increase of sexually transmitted infections, seduction, sexual harrasment and homosexual encounters/relationships, an increase in the number of alcohol and drug addictions and a rise in the number of psychoemotional disorders [13, 14].

Therefore, it was considered necessary to continue and broaden the research which was done 10 years ago in the Gynecology of the Developmental Age and Sexology Centre. The research was done on high school students aged 15–18 and it aimed to assess the influen-

ce of a lifestyle on puberty. The results may encourage prevention measures to be taken early enough.

## Research material

The study was conducted on 93 female students of three schools in Środa Wielkopolska: the High School, Vocational School Complex and Agricultural School Complex. The average age and the median value was 18, the minimal Body Mass Index – BMI was 16.78 and the maximal one 27.99, whereas both the average BMI and the median were within the normal range (**Table 1**).

**Table 1.** General characteristics of the subjects enrolled

| | Age (years) | Height [m] | Weight [kg] | BMI [kg/m2] |
|---|---|---|---|---|
| Min. | 17 | 1.55 | 45 | 16.78 |
| Max | 19 | 1.83 | 79 | 27.99 |
| Median | 18 | 1.68 | 58 | 20.70 |
| Mean value ± SD | 17.93±0.63 | 1.67±0.05 | 58.67±7.69 | 20.94±2.3 |

SD – standard deviation

Source: author's own analysis

## Methods

The height and weight of the students were used to calculate their BMI. Weight measurements were taken to the nearest 100g on medical electronic scales (SECA 899). The height was measured to the nearest 1mm on a stadiometer (SECA217). Eating Attitudes Test (EAT-26) was used. This 26-item test is a screening tool designed to determine the frequency of ED across various populations and to assess the progress in the treatment of the patients suffering from eating attitude disorders. The score of 20 or more points may indicate eating attitude disorders and so the possibility of ED or susceptibility to them [15, 16].

A medical survey interview designed by an interdisciplinary team of doctors (including a sexologist), psychologists, teachers and a dietician was used in the research to collect information about the problems girls in the reproductive age face. 10 years ago, the survey was used by the Gynecology of the Developmental Age and Sexology Centre (now a department), in the research done on teenagers aged 15–18 to assess the influence of a lifestyle on puberty.

## Results

Although 67.74% of the girls recognize the importance of diet, 56.99% of them eat sweets on a daily basis. 36.56% admit eating fast food every day and 45.16% do not have breakfast before leaving for school. It was determined that 50.54% do not do any sports and 38.71% are smokers. Additionally, 30,11% of the girls have been on a slimming diet at least once and 7.53% of them have suffered from amenorrhea as a result. 6.88% of the respondents rarely eat fruit and vegetables and 49.46% mostly choose white bread made with refined wheat grains. Nearly 60% hardly ever eat fish (< 1 serving per week), which is in stark contrast to regular meat consumption. 57% admit eating meat every day. Also, the girls eat pulses and legumes much too rarely. 75 % eat them less frequently than once a week (**Figure 1**).

The analysis of the EAT-26 questionnaire reported the mean value of 10.53±7.34%. What is more, it was determined that 9.68% of the girls in the research group are likely to suffer from eating disorders (**Table 2**).

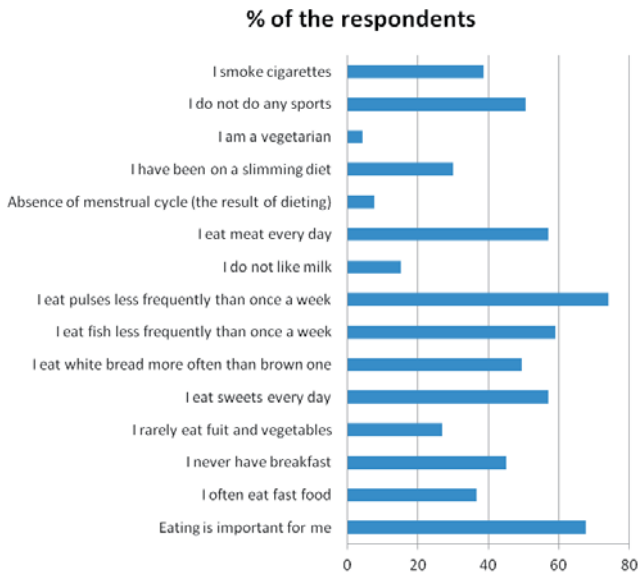


**Figure 1.** The results of the medical survey interview

Source: author's own analysis

**Table 2.** EAT-26 results and sexual initiation age

| | Number of points in EAT-26 [min-max] N=93 | Percentage of girls who scored ⩾20 N=93 | Sexual initiation age N=28 |
|---|---|---|---|
| Median | 9 | | 16 |
| Mean value±SD (min-max) | 10,53±7,34 (1-45) | 9,68% | 16,07±1,25 (14-18) |

SD – standard deviation

Source: author's own analysis

## Discussion

A well balanced diet seems to be of vital importance in the prevention of fertility disorders. The quality and quantity of carbohydrates and the amount of fibre in diet are among the factors studied so far and related to fertility disorders [17, 18]. Chavarro JE et al. analyzed the data from the NHS II (Nurses' Health Study II) and showed a positive correlation between eating products

with a high glycemic index (such as sweet cornflakes, white rice and potatoes) and ovulatory disorder infertility among primigravidas. A negative correlation was found in case of eating products with a low glycemic index (e.g. brown rice, pasta and wholemeal bread) [17]. As our research indicates, the girls ate products with a high glycemic index and poor in fibre (56,99% ate sweets every day and 49,46% preferred white bread rather than brown one). 30% of them ate food rich in fibre and with a low glycemic index (such as most fruit and vegetables) much too rarely.

The analysis of NHS II showed that the consumption of large amounts of fish and high-fat dairy foods was crucial in the prevention of ovulatory disorder infertility [19].

Mozaffarian D et al. show that palmitoleic acid found in milk may reduce insulin resistance. This is even more important as insulin resistance is a pathogenic mechanism of many diseases, e.g. the polycystic ovary syndrome. PCOS is also an endocrine disorder characterized by the androgen excess and chronic anovulation leading to ovulation disorders and infertility [11, 12]. n-3 Fatty acids found in saltwater fish may in turn play a huge role in the prevention of endometriosis which is, just as PCOS, related to fertility disorders [20]. As our research indicates, nearly 60% of young women eat fish less frequently than once a week, 15% never drink milk and nearly 37% often eat fast food and this percentage is too high. Fast food and sweets, which are eaten by the majority of the studied cohort, are rich in isomeric trans fatty acids. It was shown that replacing 2% of food energy from MFA (*Monounsaturated Fatty Acids*) with energy from trans fatty acids doubles the risk of ovulatory infertility.

It seems that trans isomers are responsible for reducing the activity of PPAR-γ (peroxisome proliferator–activated receptor γ) and thus contributing indirectly to reduced insulin sensitivity, the increase of the inflammatory process and obesity which is a direct risk factor for fertility disorders [19, 21, 22].

The factors that link insulin resistance and obesity are adipokines produced and released by the adipose tissue. PPAR-γ receptors (also known as NR1C3) play an essential role in their regulation. PPARγ are transcriptional factors belonging to the nuclear receptor superfamily

which directly regulate the expression of a large number of genes involved in adipocyte

differentiation, lipid and carbohydrate metabolism as well as adipokine synthesis. They are implicated in metabolic disorders such as obesity, insulin resistance, dyslipidemia and hypertension [10].

Chavarro JE et al. showed that overweight women whose BMI was between 25 to 29,99 kg/m$^2$ had a 30% higher risk of ovulatory disorder infertility, whereas obese women (BMI of 30 or more) had more than twofold greater risk than women with the right BMI [17].

Not only does physical activity help to maintain the right weight but it also aids the implantation of embryos and lowers miscarriage risk. As it was shown, regular exercise and weight loss also lead to lowering insulin resistance [9, 23]. In view of the above, it is worrying that about half of the girls studied admitted having no physical activity at all.

Another important factor in the pathogenesis of fertility disorders is the type of protein that is eaten. It was determined that substituting 5% of energy from the plant protein for the animal protein halves the risk of ovulatory infertility. This is probably due to the fact that the plant protein has a positive influence on insulin resistance and lowers the concentration of IGF-I (*Insulin-like growth factor 1)* which has an important role in the pathogenesis of PCOS (*Polycystic Ovary Syndrome*) [17, 24]. One of the best sources of the plant-based protein are pulses. However, almost 75% of the girls ate them less frequently than once a week. Pulses and legumes, together with whole grain cereal products are also a source of non-heme iron. As it was shown, non-heme iron from plant-based foods may substantially reduce the risk of ovulatory infertility [17, 25].

Among factors responsible for infertility are past or present eating disorders, related to both anorexia (AN – *anorexia nervosa)* and bulimia (BN – *bulimia nervosa)* [26, 27]. It was determined that ED are not only positively correlated to infertility but also result in high incidence of twin pregnancies, mothers' negative attitude towards pregnancy and a higher unintended pregnancy rate [26, 27]. Unplanned pregnancies have implications especially for young, emotionally immature women who are studying [14]. It should be emphasized that the respondents of the study had their sexual initiation quite early, i.e. at the age of 16 (**Table 2**). However, the data have yet to be confirmed on a bigger research sample, since only 30% of the respondents answered the question about the sexual initiation age (**Table 2**).

## Conclusions

A well balanced diet (both in terms of quality and quantity), sufficient physical activity, avoiding smoking, stress and drinking alcohol may have a major significance in the prevention of infertility. Half of the respondents of the study do not follow a balanced diet, and they lack physical activity. In the long run, these factors may lead to overweight and obesity. Additionally, 40% of them smoke. Therefore, involving young women in an educational programme should be a matter for consideration. Such a programme should include issues related

to appropriate health attitudes and the prevention and treatment of eating disorders which, together with environmental factors mentioned above, can be related to fertility disorders. This is especially important since eating disorders are showing an upward trend [3].

According to this study, educating young people is crucial. Environmental factors are modifiable and in order to limit the exposure to them, educational programmes should be implemented as early as possible.

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