

The youth's knowledge of human fertility and reproductive age – evaluation of educational and health care programme

Grażyna Bączek¹ (ADE), Martyna Padzik² (ABEF), Tomasz Duda¹ (CDE),
Wojciech Giermaziak³ (DE)

¹ Warsaw Medical University, Department of Obstetrics and Gynaecology Didactics

² „Żelazna” Medical Centre, St Sophia Specialist Hospital, Warsaw

³ The Stanisław Konopka Main Medical Library, Warsaw

AUTHORS' CONTRIBUTION: (A) Study Design · (B) Data Collection · (C) Statistical Analysis · (D) Data Interpretation · (E) Manuscript Preparation · (F) Literature Search · (G) Funds Collection

SUMMARY

Introduction. It is important to educate young people on the impact that lifestyle has on their health and fertility, which is aimed to develop health-promoting attitude in the future and to improve the society's health. Reliable knowledge of reproductive health is a prerequisite for responsible behaviour in adult life.

Aim. The main purpose of the study was to evaluate the efficiency of an educational programme concerning reproductive age, implemented by a midwife among the youth. The intermediate objective was to evaluate the youth's knowledge of fertility and factors which determine procreative health.

Material and methods. A three-stage survey was carried out in a group of 231 secondary school students. The first stage included preliminary (diagnostic) questionnaire which evaluated the youth's knowledge level of reproductive age. The second stage covered educational classes implemented by a midwife in the study group. The third stage consisted of re-examining the youth's knowledge (using the same tool) and evaluating the educational programme by its participants. The participation in the study was voluntary and anonymous, following an expressed consent of the youth and the school authorities.

Results. The hypothesis was confirmed which assumed that the youth's knowledge level of the functions of human reproductive system is low and that participation in the educational programme contributed to an increase in the knowledge level of the issue. The mean number of points in the knowledge test before the lesson amounted to 38 for girls and 32 for boys. After the lesson the score raised to 52 points for girls and 37 for boys. The youth most often pointed out the Internet as the source of knowledge of procreation. Using books as a source of knowledge was declared less often.

Conclusions. The youth's knowledge level of procreative age before participating in the classes was low. The participation in the educational programme contributed to an increase in the knowledge of the area. The study revealed sex-dependent differences, i.e. girls turned out to have greater knowledge. The youth most often get information on procreation from the Internet and their counterparts rather than from parents or during school classes.

Key words: knowledge; the youth; fertility; reproductive age; education

Address for correspondence:

Wojciech Giermaziak
The Stanisław Konopka Main Medical Library, Warsaw
cim@gb.l.waw.pl

Word count: 5377 **Tables:** 10 **Figures:** 1 **References:** 29

Received: 14.07.2020

Accepted: 02.12.2020

Published: 31.12.2020

INTRODUCTION

It is important to educate young people on issues related to health and procreation, and on factors which may contribute to problem with fertility [1].

Health education means not only communicating information but also developing attitudes and behaviour which can affect the lifestyle and behaviour of young people. Young people do not place sexual and procreative health among their priorities. This group is in a particular need of such education, e.g. because health promoting and anti-health behaviour develops in that age [2]. Sexual education in schools focuses on contraception and sexually transmitted diseases [3]. Reliable education concerning family life education should include, besides the abovementioned areas, items of health education which promotes healthy lifestyle. Unfortunately, school students approach it as an extra task, ranked very low and moreover it is underestimated by people working in education and health policy. Insufficient sexual education of the youth or a lack of sexual education may foster risky behaviour [2,4].

Teaching the basic fertility physiology makes an important part of sexual education. In Poland the basics of curriculum in family life education correspond to A type education, which prefers educating towards sexual abstinence. The core curriculum of family life education is well prepared, teachers can use professional handbooks, but imperfections of the law and organisation of the educational and healthcare sector prevent taking any measures which could combine both the areas. Teaching the basics of fertility physiology is indispensable, regardless of the attitude to sexual education [5]. Every human has the right of exhaustive sexual education [6].

Sexual education in Poland raises a number of controversies because it is related to personal convictions, ethics, morality, religion and

system of social standards. Reliable education does not mean unilateral active conveying of information and its passive reception but an interactive process of assisting young people in building their opinions and attitude, making them sensitive to the issues and increasing their awareness of moral, cultural and social values [7].

Parents often do not have comprehensive knowledge or cannot or do not feel competent to talk with their children about the often embarrassing matters appropriately - and most importantly - in the right time [8]. Moreover, parents' role in the life of their children decreases in puberty - children often negate the parents' role and authority. Counterparts, who convey information and share behavior patterns, are most important. The knowledge is often incomplete and non-systematised or it can even be wrong [2]. That is why school education plays such an important role [8]. Research carried out by the Opinion Poll Centre revealed that 80% of the Polish society support implementation of sexual education in schools. The area of family life education tends to be neglected not only in education but also in the health care organisation [5].

Sexual education is often limited to one-hour visit of representatives of a company which produces panty liners or sanitary napkins. They talk about period and intimate hygiene. The classes are intended only for girls who receive product samples afterwards. Boys have to wait in another classroom in the meantime because there are no alternative classes for them during which they could talk about puberty [7].

According to the act on the nurse and midwife profession, within family life education midwives can offer educational and health-promoting activities on family planning methods, protection of motherhood and fatherhood, as well as preparation for parenthood, including advice on hygiene and nutrition (Journal of Laws 2011, No. 174, item 1039). Midwives have vast knowledge of anatomy and physiology of reproductive organs and family planning but schools often do not have extra funds to take on midwives.

Sexual education in Poland is implemented based on art. 4, sect. 3 of the act of 7 January 1993 on family planning, protection of human foetus and admissible abortion conditions (Journal of Laws No. 17, item 78, as amended). Pursuant to the regulation of the Minister of National Education 14 teaching hours are devoted to the subject called *family life education*,

including 5 teaching hours when girls and boys have lessons separately (Journal of Laws No. 67, item 756, of 2001, No. 79, item 845 and of 2002 No. 121, item 1037). Minors do not participate in the classes if the student's parents or guardians submit a written resignation from the classes to the school headmaster. According to the data of the Ministry of National Education, fewer secondary school students participate in the classes than primary school students, most probably because students, teachers and parents of secondary school students focus on preparation to the school-leaving exam (maturity exam) and vocational exams [2].

Education related to procreation should match young people's age and development level as well as understanding skills. Moreover, it should refer to the actual situation in which young people live and should also take human rights into account [10]. Young people who enter the reproductive age need to know that there are numerous factors which limit fertility, including age, stimulants, sexually transmitted diseases and environmental factors [11]. It is important to spread knowledge of sexual and reproductive life in the youth educating programs [12,13].

MATERIAL AND METHODS

The study was carried out by means of a diagnostic survey. Following an approval of the Headmaster of the Border Protection Corps School Complex in Szydłowiec (Mazowieckie region), studies were performed among 231 students of secondary school, technical secondary school and vocational school aged 16 - 19. The general population of young people at the age of 16 - 19 in the municipality of Szydłowiec is 1963 people - 960 girls and 1003 boys [17]. Participation in the study and classes was voluntary. The study was divided into three stages: preliminary (diagnostic) study during which the students filled in a questionnaire developed by the author of the study. Then, educational classes on the issues included in the questionnaire and class summary tests (evaluation) were conducted.

Part I - diagnostic study. A questionnaire consisting of 27 questions - 25 closed questions and 2 open ones - was used within the diagnostic study to check the students' knowledge level.

Part II - educational classes concerning human fertility. This part involved classes with the students on the issues included in the first questionnaire. Each class participated in 45-minute

lessons, which were conducted within weekly class meetings, and the class teacher was present, too. The students who took part in the classes included: 2nd and 3rd year secondary school students, 2nd and 4th year technical secondary school students, and 2nd and 3rd year vocational school students. The project included an informative lecture and a talk. The purpose of the educational classes was to make students familiar with the concepts concerning human fertility and to help students understand their physiology better. Issues related to the menstrual cycle, spermatogenesis, conception and the factors which have a positive and negative impact on human fertility were briefly discussed during the lessons.

Part III - summary test (evaluation of the educational and health care programme). After the class another questionnaire was distributed. It consisted of 29 closed questions, whereby 17 questions were repeated from the previous questionnaire, while 12 questions applied to the class conducted. The questions which were intended to check the students' knowledge were divided into five categories:

1. *Part concerning menstrual cycle* - 6 questions on the knowledge of notions related to the menstrual cycle, maximum score: 6 points.
2. *Part concerning spermatogenesis* - 2 questions on spermatogenesis, maximum score: 2 points.
3. *Part concerning fertility* - 4 questions, including one multiple-choice question, maximum score: 9 points.
4. *Part concerning factors which affect fertility positively* - 1 multiple choice question, 184 maximum score: 9 points.
5. *Part concerning factors which affect fertility negatively* - 3 multiple-choice questions related to the knowledge of factors which negatively affect female and male fertility, maximum score: 33 points.

1 point was granted for each correct answer. The total score to be achieved in the questionnaire: 55 points.

Two computer programmes were used for statistical development of the results. The results of the questionnaires were grouped and entered into Excel spreadsheet and then entered into IBM SPSS Statistics 20 to check their statistical significance. The differences regarded to be significant fell within the value range of $p < 0.05$. The diagnostic survey covered 122 girls and 109 boys, while the evaluation study group consisted of 111 girls and 120 boys.

RESULTS

In the part concerning the menstrual cycle in the questionnaire completed before the classes, the mean score was 3 points for the girls and 2 points for the boys. The minimum score was 0 for the girls and boys, while the maximum score was 6. The statistical significance was $p = 0.000$. The mean score for both sexes in an evaluation questionnaire was 3 points. The maximum score achieved by the girls was 5 out of 6 points, while the boys reached the maximum score, i.e. 6 points. The statistical significance was $p = 0.012$. In a questionnaire completed before the classes, in the part concerning spermatogenesis the girls reached the mean score of 0.8 points, while the mean score for the boys was 1 point. The minimum score for both girls and boys was 0, and the maximum one was 2 points. The statistical significance was $p = 0.049$. In the part concerning fertility the girls reached the mean score of 3 points, minimum 0 and maximum 5 points before the class. The result for the boys was: mean score - 2 points, minimum score 0 and maximum score 5 points. The statistical significance was $p = 0.000$. After the classes the students achieved better results - their mean score rose to 7 points for the girls and 6 points for the boys. The minimum score among the girls was 2 points and the maximum was 9 points, while for the boys it was 0 and 9 points, respectively. The statistical significance was $p = 0.000$. The table below illustrates the number of correct answers to different questions concerning human fertility physiology before and after educational classes with the survey participants divided according to their sex (Tab.1.).

In the first part of the educational program concerning the factors which have a positive impact on the fertility, the mean score reached by the girls and boys was 3 points. The maximum score for the girls was 5 points, while the minimum was 1. The maximum for boys was the same, while the minimum amounted to 0. The statistical significance was $p = 0.007$. The mean score for the boys and girls after the classes was 4 points. The minimum score reached by the girls was 3 points, while for the boys it was 1. The maximum score for both girls and boys was 5 points. The statistical significance was $p = 0.000$. In the diagnostic survey, in the part related to the factors which have a negative impact on a woman's fertility, the girls reached the mean score of 24 points before the classes and 28 points after the classes.

The maximum score reached by the girls was 33 points before and after the classes, while the minimum was 0 points before and 11 points after the classes. The boys reached the mean score of 21 points before the classes and 25 points after the classes. The maximum score for the boys, before and after the lesson was 33 points, while the minimum amounted to 0 points before and 5 points after the lesson. The statistical significance was $p=0.009$ before the lesson and $p=0.012$ after the lesson (Tab.2.).

In order to check the knowledge level in all parts of the questionnaire, the possible scores in all categories were added. In the questionnaire carried out before the classes, statistically significant differences were revealed between the total score reached by the students in all parts of the survey and the student's sex ($p=0.000$). In the second questionnaire, the scores reached in all categories of questions were added. The statistical significance level amounted to 0.002 (Tab.3.).

Tab.1. Per cent distribution of answers to questions concerning fertility physiology before and after the educational programme

Part concerning human fertility physiology	Girls before the lesson (%)	Girls after the lesson (%)	Boys before the lesson (%)	Boys after the lesson (%)	Statistical significance before the lesson	Statistical significance after the lesson
Part concerning menstrual cycle						
What is a menstrual cycle?	25	37	15	30	0,000	0,012
What is the duration (in days) of a normal menstrual cycle?	44	46	26	48		
When does a menstrual cycle begin and end?	33	36	20	36		
What is ovulation?	35	33	17	34		
On what day of an average 28-day menstrual cycle does ovulation occur?	37	39	23	38		
How many oocytes are released in a normal menstrual cycle?	34	41	18	46		
Part concerning spermatogenesis						
What is a spermatogenesis?	19	36	18	41	0,049	0,000
What does the process of spermatogenesis look like?	28	46	33	43		
Part concerning fertility						
How long does a released oocyte maintain its conception capacity?	35	28	25	22	0,000	0,000
How long do spermatozoons live in a female genital tract?	37	37	18	31		
What is fertility?	48	35	38	44		
Where is an oocyte fertilised by a spermatozoon?	24	20	13	11		
A woman is fertile cyclically	95	98	88	96		
A man is fertile permanently	77	94	78	89		
Correct structure of female and male internal and external genital organs is the condition of fertility	30	88	14	77		
Correct female and male hormone function is the condition of fertility	55	92	21	79		

Tab.2. Per cent distribution of answers to the questions in the part concerning the factors which affect fertility, before and after the classes

Part concerning the factors which affect fertility, before and after the lesson	Girls before the lesson (%)	Girls after the lesson (%)	Boys before the lesson (%)	Boys after the lesson (%)	Statistical significance before the lesson	Statistical significance after the lesson
Part concerning factors which have a positive impact on fertility						
Proper diet	81	86	82	94	0,007	0,000
Correct body weight	84	90	76	93		
Correct BMI	70	96	59	94		
Moderate physical activity	64	74	64	68		
Enough sleep	71	88	74	85		
Factors which have a negative impact on woman's fertility						
Wrong eating habits	78	91	73	85	0,009	0,012
Lack of physical exercise	64	85	65	82		
Overweight/obesity	81	90	72	84		
Underweight	70	87	64	85		
Stimulants	93	98	90	94		
Medicines	77	86	77	68		
Radio- and chemotherapy	70	86	65	74		
Caffeine	65	86	56	79		
Stress	88	93	67	82		
Hormone disorders	87	86	68	71		
Concomitant diseases	66	84	64	69		
Malformations/ injuries of genital organs	81	77	76	78		
Premature sexual initiation	77	73	67	65		
Many sexual partners	53	82	44	71		
Frequent vaginal fungal/ bacterial infections	81	82	77	82		
Age > 35 years	79	83	68	78		
Factors which have a negative impact on man's fertility						
Wrong eating habits	66	82	63	79	0,009	0,012
Lack of physical exercise	63	88	60	85		
Overweight/obesity	74	82	55	83		
Medicines	80	81	65	72		
Radio- and chemotherapy	63	78	60	82		
Caffeine	61	80	44	79		
Stress	69	86	51	78		
Hormone disorders	72	83	63	70		
Concomitant diseases	61	76	60	60		
Age > 55 years	72	92	61	77		
Sedentary job	58	83	44	67		
Keeping laptop computer on one's lap	72	94	57	75		
Malformations/ injuries of genital organs	84	79	73	70		
Premature sexual initiation	46	80	33	72		
Many sexual partners	83	83	75	72		
Stimulants	97	86	81	85		

The impact of participation in educational classes conducted within the study on the students' knowledge was measured. It meant checking if the students' knowledge level increased after the lecture. To that end the results of added answers were analysed by means of Student's t-test for dependable samples (Cohen's d) based on the mean values and standard deviation, i.e. general variability in the studied population. The mean score for all students in the first questionnaire was 33 points, while in the second questionnaire it was 46 out of 55 points. In order to calculate the effect size, an effect size calculator was used to calculate the Cohen's d value, which amounted to 1.366 (Tab.4.).

Analysing the standard deviation one can observe that the difference between the worst and the best answers given by the girls was reduced, while it increased for the boys (Tab.5.). The effect size calculator was used again to calculate the Cohen's d value. The following results were obtained: Cohen's d for girls: 1.174, Cohen's d for boys: 1.293. The analyses helped to demonstrate that girls' and boys' knowledge level increased after the educational classes.

The respondents were asked about the sources of knowledge concerning fertility. Girls and boys most often used the Internet as their source of knowledge - 87% and 77% respectively. Knowledge was least frequently obtained from midwives. 7% of the girls and 16% of the boys did not get any information on the reference issue. An analysis of the answers to the question about where the youth would like to obtain knowledge from revealed that girls would like a gynaecologist to communicate information to them (68%) and from the Internet (63%). The boys declared that they would like to get knowledge from the Internet (44%) and their counterparts (32%). 12% of the girls and 31% of the boys were not interested in extending their knowledge of the topic. The per cent values do not add up to 100% because the students gave more than one answer (Tab.6.).

Girls most often talk to their counterparts - 66% of the girls gave such an answer. The majority of the boys stated that they did not talk to anybody about procreation (48%), while 46% of them talked to their friends. In the „Other” field the respondents most often marked „My boyfriend” or „My girlfriend” (Tab.7.).

Tab.3. Total knowledge before and after the lesson

	N	Mean	Standard deviation	Standard error of the mean	Minimum	Maximum	Statistical significance
First part of the educational programme							
Girls	123	38	9,558	0,861	10	53	0,000
Boys	108	32	9,841	0,947	14	52	
Second part of the educational programme							
Girls	110	52	8,466	0,807	21	53	0,002
Boys	121	47	11,735	1,066	14	53	

Tab.4. Comparison of knowledge before and after educational classes

	Mean	Standard deviation	Cohen's d
Questionnaire 1	33	9	1,366
Questionnaire 2	46	10	

Tab.5. Comparison of knowledge before and after educational classes depending on the respondent's sex

	Questionnaire 1		Questionnaire 2	
	Mean	Standard deviation	Mean	Standard deviation
Girls	36	9	48	8
Boys	31	9	44	11

Pearson's r correlation analysis revealed that there is a relationship between the number of sources used by a studied person and his/her knowledge of fertility - $r=0.441$, statistical significance $p=0.001$. The total knowledge means added results for questions checking the students' knowledge (Tab.8.).

A regression analysis was carried out concerning the impact of the knowledge sources on the knowledge that the studied people had. The analyses revealed that friends and parents had the greatest impact on the knowledge level

acquired by the respondents - $p=0.001$ and $p=0.027$, respectively. The results of the studies demonstrated a negative impact of television ($p=0.038$). The people who pointed out TV programmes had statistically lower knowledge level than people who talked with their counterparts and parents (Tab.9.).

Only 17% of the study participants attended family life education classes, whereby 54% of them were girls. The students who attended family life education classes knew more about fertility than their counterparts who did not

Tab.6. Comparison of answers given by the girls and boys about sources of knowledge

	Where do you get knowledge about fertility?		Where would you like to learn about fertility?	
	Girls (%)	Boys (%)	Girls (%)	Boys (%)
from the Internet	87	77	63	44
from parents	46	21	45	19
from friends	58	43	46	32
from a gynaecologist	37	11	68	14
from a midwife	4	2	35	8
from your GP	11	6	39	19
from posters / leaflets	17	15	29	13
during classes at school	45	98	46	27
from magazines	31	19	44	18
from TV	34	32	28	20
from books	29	14	43	12
I do not learn about it/I'm not interested in learning about it	7	16	12	31

Tab.7. People with whom the students usually talk to on the fertility-related issues

Who do you usually talk about fertility with?	Girls (%)	Boys (%)
With parents	34	7
With doctor	37	7
With friends	66	46
With teacher	20	11
I do not talk to anyone	29	48
Other - who?	8	8

Tab.8. Relationship between the number of sources and knowledge

		Number of knowledge sources
Total knowledge	Pearson's r correlation	0,441
	P	0,001
	Number of people	231

participate in such classes, which is evidenced by their mean scores (Tab.10.).

It shall be highlighted that the conclusions from the analyses must not be too far-fetched because there is huge disproportion between the students who attended the reference classes and those who did not attend them (p=0.031). The final question in the project was actually a request for the students' evaluation of the programme. The students' opinions on the lessons are presented below (Fig.1.). Based on the

answers it can be concluded that students definitely approved of such classes.

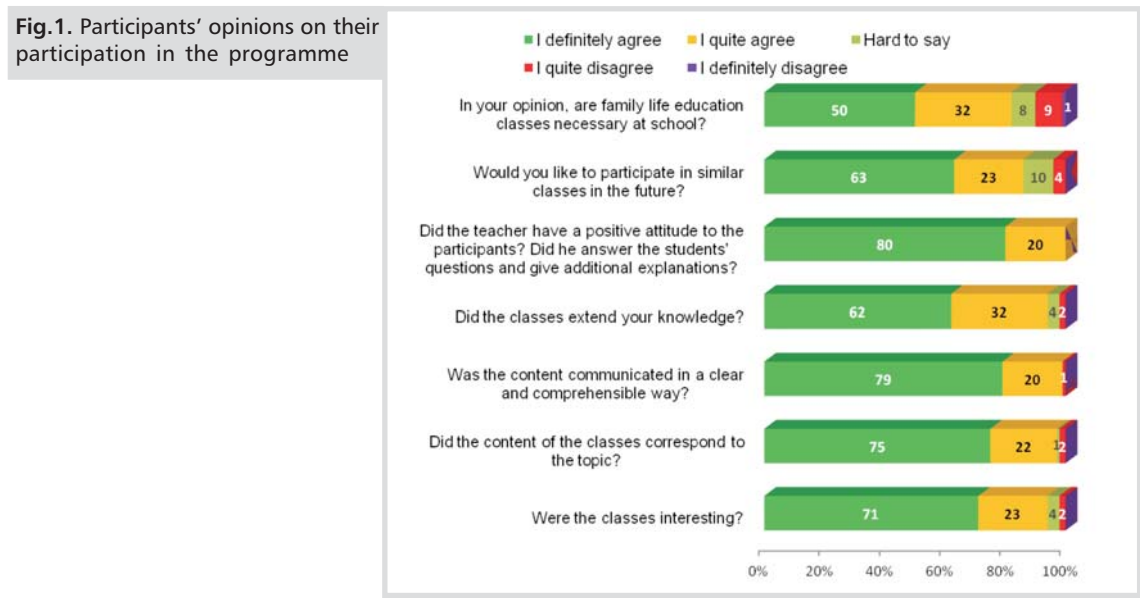
The students were also asked about who they would most likely see as the person running the reference classes. 83% of the students indicated a midwife, while 67% per cent of them chose a sexual educator. The participants made a self-evaluation of their knowledge after the programme - 48% of them evaluated their knowledge as good and 43% as very good.

Tab.9. Analysis of the impact of sources on the students' knowledge level

Model	Standardised Beta	T	Statistical significance
(Constant)		32,515	0,001
From friends	0,247	3,913	0,001
From parents	0,140	2,221	0,027
From TV	0,131	2,089	0,038
R (explained variance)	0,090		
F (Fischer's F)	8,660		
Df (number of the degrees of freedom)	230,000		
p (statistical significance)	0,001		

Tab.10. Students' knowledge of human fertility vs participation in family life education classes

	N	Mean score	Standard deviation	Df – number of degrees of freedom	F	Statistical significance
Students who attended family life education classes	39	42,84	10,45	1	4,703	0,031
Students who did not attend family life education classes	192	38,85	10,47	229		
Total	231	39,53	10,55	230		



DISCUSSION

One of the objectives of the study was to examine the knowledge level that secondary students' had of basic notions related to fertility and factors which impact it. The results of the studies confirm the hypothesis which assumes that the youth's knowledge level of human reproductive system functions is low. When searching the literature and analysing the information contained therein it was difficult to find studies concerning the youth's knowledge of fertility. There are many studies examining the knowledge that girls and young women have on the menstrual cycle or natural fertility recognition methods. Boys and young men are often neglected in such studies.

According to own studies 13% of the respondents did not seek knowledge of human fertility, while 21% of the respondents were not interested in extending their knowledge of the issue. The data available in the Report of the Council of Ministers of 2016 show that 47% of secondary school students participated in the family life education classes in the school year 2014/2015 [9]. An analysis of own studies showed that only 17% of the survey participants attended the classes. When asked about the reasons for attending or not attending the classes most students said that the classes were boring (24%), while 23% of the respondents had already attended such classes. The students who had participated in the family life education classes said they would like to learn more about human physiology and procreation. According to the Report of the „Ponton” Group of Sexual Educators 70% of secondary school students participated in such classes. Among the most common reasons for their attendance in the family life education classes young people mentioned curiosity and will to get the necessary knowledge. Similarly to own studies, young people did not feel like attending such classes because they thought the lessons would be boring and run by incompetent people [15].

According to own studies the students who attended family life education classes knew statistically more ($p=0.031$) of fertility than their counterparts who did not attend such classes, however the conclusions from the analyses must not be too far-fetched because there is high disproportion between people who attended family life education classes and those who did not attend the lessons. An analysis of own studies suggests that the majority of students would like to attend sexual education

classes if the lessons were taught by competent people. The conducted studies revealed that as much as 83% of the students would like the sexual education classes to be given by a midwife, while 67% would rather see a sexual education in this role. Unfortunately schools often do not have extra funds to employ midwives to communicate knowledge of fertility. As much as 82% of the respondents regarded such classes as necessary at school. Similar results were presented by Deluga and Wiśniewska in their studies where 76% of women said that extending the knowledge was necessary, while 24% did not enhance their knowledge of fertility regarding it as unnecessary [16]. The majority of young people (89%) participating in the survey carried out by „Ponton” group also claimed that sexual education classes were necessary at school. Only 6% of the respondents said there was no need to offer such classes at school [16]. In own studies 10% of the respondents were of the same opinion. Studies carried out by the Opinion Polls Centre demonstrated that 80% of the Polish society supports the idea of implementing social education in schools [17].

It is necessary to introduce health education programmes with sexual education elements. The classes have to be given by competent people in the way which is interesting for young people. The results of own studies also indicate that the youth want to attend sexual education classes. Young people are eager get knowledge from reliable sources.

Analyses of own studies showed that young people most often evaluated their knowledge level as sufficient (47%), while 17% were of the opinion that their knowledge level was insufficient (first questionnaire). On the second stage of the study the students were asked to evaluate their knowledge level after the classes. 48% of them evaluated their knowledge level as good, while 43% as very good. In the analyses by Deluga and Wiśniewska 40% of women claimed that they had good knowledge level [16]. The conclusions from the comparison of both studies must not be too far-fetched because the studies by Deluga and Wiśniewska applied only to women.

According to studies carried out the „Ponton” Group of Sexual Educators girls get more information about human physiology and anatomy, and procreative health than boys. It seems that boys' access to information is hindered [15]. Own studies and studies by Przestrzelska et al. and Izdebski et al. as well as the „Ponton” Report revealed that counterparts are the source of knowledge of physiology for the majority of

young people [2,15,18]. Nowadays the information on reproductive health comes from the Internet, which is confirmed by the statistics from the analyses carried out by Bakalczuk et al., where as much as 77% of the respondents indicated the Internet as the most common source of knowledge of fertility [19]. Own studies rendered similar results - 83% of the respondents chose the same answer. According to studies conducted by „Ponton” organisation parents are the source of knowledge of sexuality for 55.5% of the respondents [15], while the number in own studies amounted to 35%. Parents have to become aware of their important role in educating their children. They should be the ones to whom young people turn to with their questions and doubts [2,8]. Analysis of own studies revealed that only 33% of the students want to get knowledge from their parents. Only 23% indicated a midwife, which most probably should be attributed to the fact that young people do not know exactly what a midwife's profession involves because it is usually associated with working in a delivery room. Studies carried out by Avril et al. [20] demonstrated that health care staff specialising in period-related issues were the source of information on the topic for as little as 2% of young people. Only 22% of the respondents talked to their parents on puberty and reproductive health, whereby their counterparts remained the major group they turned to (57%). Trust was the main reason which determined the young people's behaviour - 38% of the respondents gave such answers. According to an analysis of studies by Przestrzelska et al. friends were the main source of knowledge of puberty and fertility for girls (59%), while only for 50% their mothers were the main source of knowledge [18]. In own studies the Internet was pointed out as the main source (87%). Men tend to seek knowledge from a physician or pharmacist (60%) and the Internet (43%) [18]. In own studies the Internet was mentioned as the main source of knowledge by as much as 77% of the boys. An analysis of Pearson's r correlation ($r=0.04$) helped to reveal that there is a relationship between the number of sources used by the respondents and their knowledge ($p=0.001$). It means that knowledge level increases with the number of sources. Own studies demonstrated that girls and boys most often talk to their counterparts on issues related to human fertility (66% and 47%, respectively). An analysis of correlation concerning the source which has the greatest impact on the

knowledge level was performed. It turned out that the students who talked to their counterparts and parents about fertility had the greatest knowledge of the matter ($p=0.001$ and $p=0.027$, respectively).

According to studies by Kanadys et al., 59% of the respondents regarded the first day of menstrual bleeding as the first day of a menstrual cycle [21]. The same answer was given in own studies by 40% of the students in the first questionnaire and 67% of the students in the second questionnaire done after educational classes. In the studies by Deluga and Wiśniewska 90% of the women pointed out the first day of the menstrual cycle correctly [16]. In own studies such answer was marked by 33% of the girls in the first questionnaire and 36% of the girls in the second one. According to studies by Kremska et al. 74% of the girls and 47% of the boys knew what ovulation was [22]. The results obtained by students in own studies were much poorer. Only 35% of the girls and 17% of the boys answered the question about ovulation correctly. In the second questionnaire the girls gave poorer answers (33%), while the boys improved - 34% of them knew the correct answer. Studies by Biskupska et al. revealed that 43% of midwifery and nursing students knew the spermatozoon survival time [5]. 73% of the respondents studied by Deluga and Wiśniewska claimed that a spermatozoon can live 3-5 days but no more than 7 days in the female genital tract [16]. In own studies 55% (diagnostic questionnaire) and 68% (evaluation questionnaire) of the students gave correct answers. Own studies also revealed that 37% of the girls and 18% of the boys had correct knowledge of the sperm survival time in the female genital tract. A statistically significant difference between the sex and knowledge level of human fertility was demonstrated ($p=0.000$). In the questionnaire filled in after the classes 37% of the girls and 31% of the boys marked the correct answer. Kremska et al. in their studies revealed that 36% of the students thought that conception takes place in the uterine tube [22]. 37% of the students - 24% of the girls and 13% of the boys were of the same opinion in own studies (first questionnaire). In the second part of the study only 31% of the respondents gave correct answers to the question - 20% of the girls and 11% of the boys.

In the study by Deluga and Wiśniewska 96% of the respondents claimed that a woman is fertile cyclically [16]. The same answer was given in own study by 92% of the students in

the first questionnaire and 97% of the students in the second questionnaire. According to the same study 79% of the women stated that a male is always fertile, while in own study 75% of the students gave the same answer in the first questionnaire and 91% in the second questionnaire. The conclusions drawn from the comparison must not be too far-fetched though because Deluga and Wiśniewska checked only the girls' knowledge. The factors which affect fertility determine a human's general health and condition. That is why young people could infer that since the factors impact health they also affect fertility. When only the answers concerning the questions which may affect fertility were taken into account, the results of the studies show that the youth have knowledge of the issue. Healthcare behaviours develop in puberty and continue in adult life. Habits are hard to change that is why it is so important for the youth to be aware of hazards for health and consequently for procreation [4]. In a study by Przestrzelska et al. 56% of teenagers pointed out poor diet as a health risk factor [18]. Own studies showed that 70% of the students in the diagnostic questionnaire and 90% of the students in the evaluation questionnaire were aware of that. Przestrzelska et al. demonstrated that 91% of the teenagers knew that alcohol is dangerous for health, while the same knowledge concerning the impact of drugs and cigarettes was revealed by 97% and 93% of the respondents [18]. The result is positive because according to Huras et al. only 32% of the lower secondary school students their examined knew about the issue [23]. According to the report called „Health Styles of Polish Women and Men” 11% of the women and 13% of the men claimed that smoking does not have a negative impact on health, while in the study by Quach and Librach 66% of the women and 67% of the men revealed such knowledge [24,25]. The same report showed that 49% of the women and 46% of the men claimed that alcohol has no negative impact on health [24]. An analysis of own studies demonstrated that young people were aware of the negative impact of stimulants on fertility. The factor was correctly identified by 91% of the respondents in the first questionnaire and 96% of the respondents in the second one. According to the report called „Plodny Polak” (Fertile Pole) 18% of the men regarded overwarming of testicles and stress as factors which affect the sperm quality. In the same report 28% of the men admitted that they kept their laptop computer on the lap and 18% said

they were wearing tight underwear [26]. Keeping a laptop computer directly near the scrotum may increase its temperature. Following a 60 minutes' exposure to temperature generated by a computer (ca. 39.9°C) the temperature in the testicles increased to 36.1°C on average. It cannot be excluded that testicle overwarming occurs in the males who keep laptop computers near the testicles for several hours a day [27]. Own studies revealed that 51% of the students before the educational lesson had known that a sedentary job has a negative impact on male fertility, while the number of such answers increased by 23 per cent points after the lesson. In the first questionnaire 65% of the respondents said that keeping a laptop computer on the lap for many hours can negatively impact male fertility, while the number of such answers increased to 84% in the second questionnaire. The higher percentage of correct answers can be attributed to the explanation given to the students on why it contributes to reduction in the sperm parameters. Lampic et al. revealed in their studies that 25% of the women and 38% of the men that after 35 years of woman's age her capacity to become pregnant decreases [28]. In own studies 83% of the girls and 78% of the boys revealed such knowledge. It proved that those who attended classes on human fertility learnt that a woman's reproductive potential decreases with age.

A study by Przestrzelska et al. showed that only 23% of the respondents knew that premature sexual initiation entails reduction in fertility [18]. After education classes the majority of 488 the students pointed out the factor as one which has a negative impact on the woman's (76%) and 489 man's (77%) fertility. Huras et al. in their studies checking the knowledge level that lower secondary students had of family planning methods demonstrated that only 18% of the respondents knew of the negative impact of sexually transmitted diseases on fertility [23], while in the study by Quach and Librach 60% of the women and 55% of the men revealed such knowledge [25]. Own studies showed that 87% of the respondents were aware of the connotation (diagnostic questionnaire). After the educational classes the number of such answers increased by 2 per cent points.

The majority of students participating in the study evaluated their knowledge level of fertility as sufficient. The answers they gave suggest the opposite. Low knowledge level before the classes and the level increase after the classes evidenced how important education on procre-

ation health is in Polish schools. Studies by Larson et al. carried out among young people in Latin America revealed that the knowledge of sexual health was insufficient and implementation of relevant educational programmes for the youth was necessary [29]. 60% of the respondents would like to participate in classes devoted to the issue in the future. Moreover, the majority of the respondents chose a midwife as a person who they would like to teach family life education. It is important to include health care staff in the procreation health educational system in future.

CONCLUSIONS

The results of the conducted studies revealed that students' knowledge of fertility and procre-

ative health is insufficient. Respondents found it easier to recognise the factors which affect fertility than answer the questions on fertility physiology. The youth find most information on fertility, procreation and physiology on the Internet and talking to their counterparts, and some young people learn the information at school. The participation in the educational programme contributed to an increase in the respondents' knowledge, girls in particular. The programme participants evaluated it very high - they were satisfied with all components of the classes. It seems that the idea of implementing educational and health-promoting programmes for the youth, taught by midwives, graduates from medical universities, is worthy of consideration and continuation.

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