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TABLE OF CONTENTS

Original papers

- AGATA FURMAN-BEDNARCZYK, JOLANTA PIETRAS
Parents' opinion of children and teenagers' vaccination
in Lower Silesia 3
- KATARZYNA KARINA STACHURA,
MAGDALENA DĄBROWSKA-GALAS
Factors influencing the occurrence of pain and injury
in runners..... 8
- SZYMON WYSZYŃSKI, SYLWIA STILER
Assessment of the influence of ischemic compression
and clavithrapy on compression pain threshold measured
on the lumbar spine rectifier muscle 13
- MARZENA ZOŁOTEŃKA-SYNOWIEC, BEATA CAŁYNIUK,
EWA MALCZYK, ALEKSANDRA ZGRAJA, MARTA MISIARZ
Content of selected vitamins in menus
from a social welfare home 18
- ILONA JASNOS, ALEKSANDRA CIEŚLIK, JOANNA WANOT,
JUSTYNA SEJBOTH, DARIUSZ SZURLEJ, PIOTR GUROWIEC
Knowledge of neurologists and gynaecologists regarding
reproductive and maternity issues in women with epilepsy... 22
- LUCYNA SOCHOCKA, ANNA WIDERA,
KATARZYNA SZWAMEL
Intensity of the phenomenon of refusal to subject children
to preventive vaccinations in the years 2002-2016 based
on analysis of primary health care medical records..... 27

Case reports

- JUSTYNA HAVEMEISTER, KAROLINA CHILICKA
Effect of diamond microdermabrasion on oily skin:
a case report..... 32
- MAŁGORZATA STRUZIŁ, MARTA GAWLIK
The role of the nursing team in the care of patients
with Kabuki syndrome 36

Reviews

- BARBARA BROERS, URSZULA SIOMA-MARKOWSKA,
BARBARA KRÓLAK-OLEJNIK, KAROLINA FILA-WITECKA,
ANNA HALAREWICZ-CIASULLO, ANDRZEJ BRENK
The evolution of natural alimentation..... 42
- KLAUDIA RUBAS, JOANNA MAJ
What should a cosmetologist know about dermatological
lesions on the face? 47

- The instruction for the authors submitting papers
to the quarterly Medical Science Pulse 53



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LADIES AND GENTLEMEN, FACULTY, GRADUATES AND STUDENTS OF UNIVERSITIES, READERS AND ENTHUSIASTS OF MEDICAL SCIENCE PULSE!

With the beginning of the new academic year, 2018/2019, we are pleased to announce publication of the third issue of *Medical Science Pulse*, a quarterly journal.

The academic year starts accompanied by a plethora of organizational changes at the University, resulting from introduction of the 2.0 Act – the Constitution for Science, and in the anticipation of new opportunities for the development of scientific journals, in Poland, related to the governmental actions directed towards supporting publishing activities.

We would like to thank all the authors for their willingness to publish their findings in *Medical Science Pulse* and the readers for their positive feedback! We also would like to thank all the Reviewers, Members of the Scientific Council, Editors and Members of the Editorial Committee for their hard work and continuous support for the journal. Last, but not least, we would like to thank the authorities at Opole Medical School for their ongoing financial and organizational support.

We continue to invite authors to send us their original findings. In parallel with the printed version of the journal, the electronic version e-ISSN 2544-1620 is freely available online. All our articles are published in the Open Access system under the Creative Commons license, so that your findings can reach the widest possible audience. The quarterly is now listed in many renowned indexing and bibliographic databases. A professional electronic version of the journal is available at: medicalsciencepulse.com.

In the scientific section of the journal, we present original papers that provide summaries of research of parents' opinion of children and teenagers' vaccination, intensity of the phenomenon of refusal to sub-

ject children to preventive vaccinations in the years 2002-2016, factors influencing the occurrence of pain and injury in runners, assessment of the influence of ischemic compression, and clavithrapy on compression pain threshold measured on the lumbar spine rectifier muscle, content of selected vitamins in menus from a social welfare home and knowledge of neurologists and gynaecologists regarding reproductive and maternity issues in women with epilepsy.

In the issue we also describe case studies: effect of diamond microdermabrasion on oily skin and the role of the nursing team in the care of patients with Kabuki syndrome.

Review articles on the topics of the evolution of natural alimentation and what a cosmetologist should know about dermatological lesions on the face can be found in the last section of this issue.

At the start of this new academic year, we wish the entire academic community of Opole continued success and creative energy in their scientific and didactic activities. May this time of new challenges be an inspiration to students to develop their potential, gain in knowledge and maximise their personal development. We are sure that the expertise of the academic and administrative staff will maximise their satisfaction and professional fulfilment. We hope that all the didactic and scientific achievements will be a growing source of recognition of the University.

We are delighted to announce the 6th MEDICAL SCIENCE PULSE International Conference: Integration of Science and Care: Innovation and Commercialization, which will take place on 23-24 May 2019, at Opole Medical School. We warmly invite you to Opole to take an active part in our annual scientific meeting!

PARENTS' OPINION OF CHILDREN AND TEENAGERS' VACCINATION IN LOWER SILESIA

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

ABSTRACT

Background: Immunization in Poland might be seriously threatened because of inaccurate information about its safety and effectiveness. It is necessary to monitor people's opinions about immunization in order to stop the negative process of disinformation.

Aim of the study: The aim of the diploma paper was to understand parents' attitude and concerns about immunization in Poland.

Material and methods: Two hundred parents from Lower Silesia were enrolled in the study in 2016. The research tool was the author's unnamed questionnaire.

Results: The research shows that the majority of parents 92.5% (183) have positive attitudes towards immunization. The obligatory immunization rate among children in Poland was very high 96% (191). 70.4% (138) of children were given at least one vaccination that was not obligatory in Poland and in most cases that was vaccination against pneumococcus – 61% (103) of children and chickenpox – 54.4% (92) of children. A relationship was noted between the recommended vaccination and financial situation of parents and their education level. There were several reasons why people's attitudes to vaccination might be negative: financial reasons 60.3% (41), vaccine injury 27.19% (19), ineffectiveness 7.4% (5), and natural ways of supporting immunity 20.6% (14). More than half of respondents 51.6% (101) claim that their knowledge about the immunization is insufficient. The main source of information about immunization for parents is medical staff (doctors, nurses and midwives). Nevertheless, 32.8% (65) of respondents reported not receiving any information about recommended vaccination from their attending physician.

Conclusion: The uptake of immunization is related on parents' education and financial reasons. Medical staff do not inform parents and promote immunization adequately. Parents are not informed about the possibility of extended vaccination. It is necessary to educate parents about the safety and effectiveness of immunization.

KEYWORDS: parents, children, vaccination

BACKGROUND

The introduction of large-scale vaccinations was a breakthrough in the fight against infectious diseases. Vaccinations have eliminated or reduced the incidence of, for example, smallpox, diphtheria, measles and polio. Vaccination is the most reliable and, so far, the most effective method of disease prevention. In the last twelve or so years, the number of available vaccines has significantly increased, and their safety and quality have improved. Despite this, there are some controversies related to active immunization, which mainly result from ignorance and fears of adverse post-vaccination reactions. According to the survey conducted in 2017 by CBOS [Centre for Public Opinion Research], the fear of consequences was the most frequent reason for

giving up vaccinations by parents (40%) [1]. However, specialists agree that vaccinations do not have adverse health effects, such as allergies, autoimmune diseases or autism [2]. The epidemiological study published in March 2018 in the United States also excluded the negative impact of a large number of vaccines on children's immune system [3]. Unfortunately false information among the public about the harmfulness and ineffectiveness of vaccinations has an unfavorable impact on vaccination coverage levels. The increasing activity of so-called *anti-vaccination* movements, which is particularly noticeable on internet portals, and the lack of adequate knowledge of parents about vaccination may in the future pose a threat to the appropriate implementation of preventive vaccination programs. Currently,

in Poland, the percentage of people vaccinated against infectious diseases, who are covered by the mandatory vaccination program, is sufficient to maintain population resistance. Thanks to the high percentage of vaccinated population, community immunity, which usually accounts for 90–95%, ensures protection against diseases, also among people who are unvaccinated [4]. However, the growing number of unvaccinated children observed for several years is disturbing. According to data from the Supreme Audit Office, in 2011 there were 4,689 people who avoided vaccinations, and in 2017 this number increased to 30,089 (fig. 1) [5]. As shown, for example, by the increased incidence of measles, the threat of infectious diseases is real. According to the ECDC data, there were 14,451 cases of measles reported in Europe in 2017, which is three times more than a year before (4,643) [6]. In order to ensure epidemiological security, we need to, among others, constantly monitor attitudes towards vaccination, launch campaigns promoting vaccination and encourage medical staff to undertake educational and information campaigns.

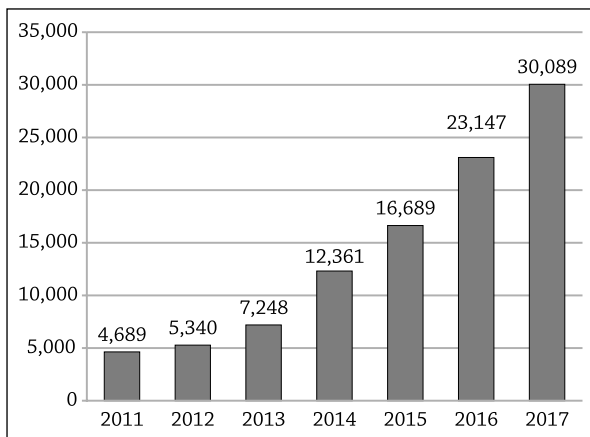


Figure 1. People who avoided compulsory vaccination in the years 2011–2017 according to the data of the National Institute of Public Health.

AIM OF THE STUDY

The main aim of the study was to get to know parents' attitude and concerns towards the immunization in Poland. The next aim was to check the relationship between the number of recommended vaccinations administered to children and education and financial situation of parents. In addition, the survey examined the need for greater education in the field of vaccination.

MATERIAL AND METHODS

This study, evaluating parents' attitudes towards recommended vaccinations, was conducted from January to March 2016. The research covered a group of two hundred parents living in the Lower Silesian province. A diagnostic survey was used in the work, with an original questionnaire applied as a research tool. Participation in the study was anonymous and it was carried out in several medical institutions (180 respondents).

Also, 20 respondents filled in the questionnaire via the website. The questionnaire consisted of the general part containing data on sex, age, education, place of residence, number of children and financial situation of the respondents. The main part consisted of 20 questions (16 closed and 4 semi-open, single choice and multiple choice questions). Microsoft Excel was used to work out the results. When verifying the hypotheses, the significance level of $p < 0.05$ was assumed as the limit value. For analytical purposes, several tests were used: the Fisher, Shapiro-Wilk and Kruskal-Wallis test. In some questions, percentages do not add up to 100%, whereas the number of answers – to 200 because respondents could give more than one answer; not all respondents answered each question; and some questions were addressed only to some parents.

The majority of respondents were women 84% (168). A large group of the subjects were people over the age of 35 – 40% (80), most often with secondary or higher education. The respondents were mainly residents of small towns and usually had one or two children. Over half of those surveyed 60.5% (121) assessed their financial situation as good and very good (tab. 1).

Table 1. Characteristic of respondents.

Feature	Amount (n)	Percentage (%)
Sex		
Female	168	84
Male	32	16
Age		
19–25	12	6
26–30	50	25
31–35	58	29
>35	80	40
Education		
Primary	7	3.5
Vacational	26	13
Secondary	70	35
Higher	97	48.5
Place of residence		
Village	44	22
City to 50 thousand inhabitants	120	60
City to 100 thousand inhabitants	14	7
City > 100 thousand inhabitants	22	11
Number of children		
1	85	42.5
2	84	42
3 or 4	29	14.5
>4	2	1
Financial situation		
Bad	6	3
Average	73	36.5
Good	107	53.5
Very good	14	7
Altogether	200	100

RESULTS

The research showed that 96% (191) of parents inoculated children according to the current Preventive Vaccination Program. In addition, 70.4% (138) of respondents accepted at least one of the recommended vaccinations. 5 in 1 and 6 in 1 combination vaccinations were used by 55.4% (108) of the subjects. As the main reason for avoiding the inoculation of children with recommended vaccines, parents usually indicated financial reasons 60.3% (41) and fear of adverse post-vaccination reactions 27.9% (19). Some of the respondents were supporters of natural methods of increasing immunity 20.6% (14) and 7.4% (5) did not believe in the effectiveness of vaccines. The study demonstrated a relationship between the financial situation of parents and avoiding vaccination. The lower the income, the more often parents indicated financial problems as the reason for refusing to subject the child to recommended vaccinations $p < 0.01$. Almost one third, i.e. 32.9% (26), of the respondents in a poor or average financial situation indicated that economic considerations were decisive in this regard. The same answer was chosen by 14% (15) of the respondents in a good financial situation. Parents whose economic status was very good did not mention the financial factor at all.

Among the recommended vaccinations, parents most frequently chose inoculation against pneumococci 61% (103), chickenpox 54.4% (92) and rotavirus 48.5% (82). Least common were inoculation against tick-borne encephalitis 10.7% (18) and HPV 11.2% (19) (fig. 2). From 2017, vaccination against *Streptococcus pneumoniae* has been compulsory and free for children.

The level of education significantly affects the number of recommended vaccinations to which parents subject their children; people with higher education were more willing to make use of additional vaccinations

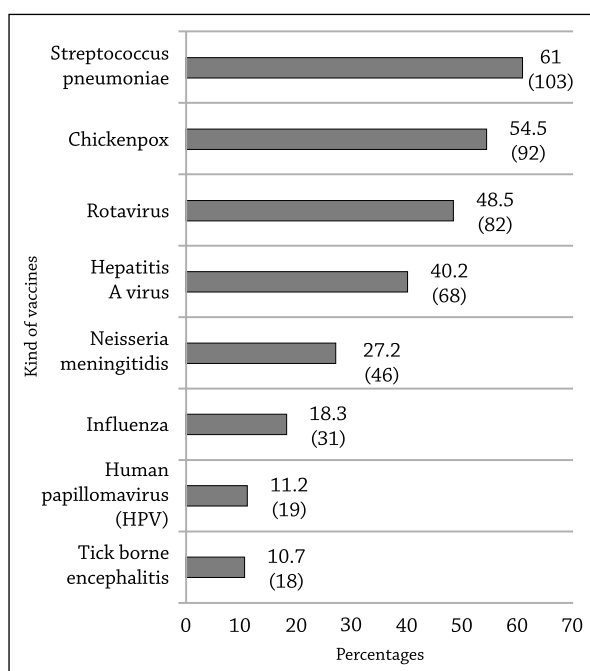


Figure 2. The use of recommended vaccines.

($p < 0.001$). Respondents indicated number of recommended vaccinations received by their child ranged from zero to eight. Among people with primary, vocational and secondary education, the median number of additional vaccinations was 1. The minimum for all these groups was 0, whereas the maximum was 4 for people with primary and 6 for those with vocational and secondary education. In each of these groups, at least half of the respondents declared that the child received not more than one such vaccination. Among the parents with higher education, the median was 2, minimum was 0 and the maximum was 8.

As the main source of information on vaccinations, the parents usually indicated doctors, nurses and midwives, followed by the Internet, press and advertisements (tab. 2).

Table 2. Sources of parents' knowledge about vaccinations.

Where did you get the information on vaccination?	Number of responses (n)	Percentage (%)
Doctor	130	65.0
Nurse or Midwife	89	44.5
Friends, family	44	22.0
Internet press corps, ads	62	31.0
Scientific and medical sources	31	15.5
Courses and training	1	0.5
Other	2	1.0
Altogether	359	179.5

Parents were also asked if they received information about new, recommended vaccinations from medical staff. A positive answer was given by 67.2% (133) and negative answer by 32.8% (65). Almost half of the carers 48.5% (95) believed that they have sufficient knowledge about vaccinations, 33.7% (66) had the opposite opinion, while 17.9% (35) had additional questions in this regard. More than a third of respondents 36.1% (70) was mistakenly convinced that vaccines fully protect against diseases. A lot of parents 28% (49) were not aware of the possibility of receiving some recommended vaccinations by selected groups of children free of charge. The results reveal that the majority of those surveyed did not have sufficient knowledge about the contraindications to protective vaccinations. More than half 53.4% (93) incorrectly nominated a runny nose, a slight cold, cough and low fever as contraindications to vaccination. 16.1% (28) of the respondents believed that allergy, bronchial asthma and atopic dermatitis were also contraindications to inoculation, while malnutrition/prematurity and breastfeeding were mentioned by 12.1% (21) and 3.4% (6), respectively. Parents with higher education had the greatest knowledge $p = 0.040$.

Most of the respondents rated their attitude to vaccinations as positive – 55.1% (109) and 37.4% (74) as positive with some reservations. Only 1.5% (3) of parents had a negative attitude towards vaccination and 6% (12) of those surveyed had no opinion.

DISCUSSION

Infectious diseases are a threat to health and life, especially of infants and young children whose immune system is not fully mature. Vaccinations are effective and the best method of prevention so far. In Poland, due to limited budget, only part of the cost of inoculations is refunded by the state. These are the so-called mandatory vaccinations, which are part of the Preventive Vaccination Program updated every year. This research shows that 96% (191) of parents vaccinate their children according to this program. The result is close to the data published in the annual bulletin "Protective vaccinations in Poland in 2016". The National Institute of Public Health reports that the level of compulsory vaccination in the population is above 90% [5]. More than half of the respondents 55.4% (108) made use of combination vaccines 5 in 1 or 6 in 1. Data reported by many authors vary in this respect. Leszczyńska et al. [7] claim that only 32% of parents decided to buy a combination vaccine, while Pomnian-Osiak et al. found this percentage much higher, at 76% [8].

In the study group, 70.4% of the respondents declared that they subjected their children to at least one of the recommended vaccinations. As for combination vaccines, different authors also present different statistics. Nitsch-Osuch et al. claim that 74.4% of respondents made use of at least one recommended vaccination [9]. However, there are studies that show that less than half of parents choose recommended vaccinations [10]. Among additional vaccinations, parents most often make use of inoculation against pneumococcus and least often against tick-borne encephalitis. The data are comparable with the results obtained by other researchers [7,10,11].

The respondents who avoided vaccinations were asked about the reasons for their decisions. In more than half of the cases 60.3% (41) financial factors had a decisive impact on vaccination avoidance. The cost of the cheapest vaccine is around several dozen PLN, however, to the cost of vaccinating a child against meningococcal B (Bexsero vaccine), is about PLN 300 per one dose of the vaccine. For this reason, it seems understandable that the price of some vaccines may be too high for some parents. Only 5.7% (11) of respondents declared that they would not make use of the recommended vaccinations even if they were free. The importance of the financial aspect with regard to recommended vaccinations was also confirmed by Kalinowski et al. who claimed that the majority of respondents would subject their children to recommended vaccinations if they were free, but only sometimes. 30% of respondents < 26 years of age and over 42% of people > 26 years of age would regularly make use of such vaccinations [12]. On the other hand, Pieszka et al. noted that almost half of the respondents (47.7%) declined vaccination because of the price. The same study reported that 86% of the respondents expressed the will to vaccinate the child with the combination vaccine provided

if it was financed by the state budget [11]. Another factor influencing carers' decisions is the fear of adverse post-vaccination reactions 27.9% (19). In addition, 7.4% (5) of parents did not believe in the effectiveness of vaccines. This is despite the high level of vaccine safety, the process of detailed testing, checking the degree of purification, immunogenicity and efficacy [13]. The study also found that people with higher education more often vaccinate children with recommended vaccines compared to other groups of parents. The analysis carried out by Kochman et al. also shows that mother's education is an important determinant of decisions to subject the child to additional vaccinations [14]. 28.6% of women having primary education decided to make use of additional vaccinations, 33.3% (8) with vocational, 58.9% (40) with secondary and 90.6% (87) with higher education. In the study group, parents with higher education had greater knowledge about vaccinations. There was no such relationship between age and sex of the subjects. Barczykowska [15] concluded that the age of parents was not related to their knowledge about vaccinations. However, the authors show that the level of knowledge is significantly higher in people with higher education, both in women and men, than in people with primary and vocational education.

Doctors are the main source of knowledge for parents about vaccinations, and this was confirmed by other researchers studying similar problems [16–18]. One of the mandatory tasks of the primary care doctor is to inform patients about vaccinations, both those mandatory and recommended. This obligation stems from the Act on Prevention and Combating Infections in People [20]. However, as many as 32.8% (65) of respondents reported that they did not receive such information from their doctor. In the publication "Parental opinions on vaccinations in children" Gawlik et al. demonstrated that 13% of respondents were not informed about recommended vaccinations by a primary care physician [17]. In order to ensure the correct implementation of the Preventive Vaccination Program, it is important for the medical staff to be actively involved in the promotion of vaccinations and the education of patients in this regard.

CONCLUSIONS

1. The majority of parents vaccinate their children according to the current vaccination calendar and define their attitude towards vaccination as positive.
2. Willingness to subject children to recommended vaccines depends on education and financial situation of carers.
3. Parents' knowledge about vaccination is incomplete and insufficient. There is a need to provide them with more information, especially about the safety and effectiveness of vaccination.

REFERENCES

1. Gwizdała M. Polacy o obowiązku szczepienia dzieci [online] [cit. 20.09.2018]. Available from URL: https://www.cbos.pl/SPISKOM.POL/2017/K_100_17.PDF. (in Polish).
2. Bernatowska E, Pac M. Fakty o mitach – czy szczepionki są bezpieczne. *Stand Med Pediatr* 2011; 8: 711–718. (in Polish).
3. Glanz JM, Newcomer SR, Daley MF, DeStefano F, Groom HC, et al. Association between estimated cumulative vaccine antigen exposure through the first 23 months of life and non-vaccine-targeted infections from 24 through 47 months of age. *JAMA* 2018; 319(9): 906–913.
4. Narodowy Instytut Zdrowia Publicznego – Państwowy Zakład Higieny. Na czym polega odporność zbiorowiskowa? [online] [cit. 03.09.2018]. Available from URL: <http://szczepienia.pzh.gov.pl/faq/na-czym-polega-odpornosc-zbiorowiskowa/>. (in Polish).
5. Biuletyny „Szczepienia ochronne w Polsce” [online] [cit. 16.01.2018]. Available from URL: http://www.wold.pzh.gov.pl/oldpage/epimeld/index_p.html. (in Polish).
6. European Centre for Disease Prevention and Control [online] [cit. 19.09.2018]. Available from URL: <https://ecdc.europa.eu/en/news-events/measles-cases-eu-treble-2017-outbreaks-still-ongoing>.
7. Leszczyńska K, Borkowska E, Irzyniec T, Pałka I, Stawicka K, et al. Postawa rodziców wobec szczepień ochronnych. In: *Dobrostan a rozwój i zdrowie dzieci i młodzieży*. Lublin: Wydawnictwo Naukowe Neurocentrum 2016; 157–170. (in Polish).
8. Pomian-Osiak A, Owłasiuk A, Gryko A, Bielska D, Chlabicz S. Vaccination of children at the age of 0–2 with combination and recommended vaccines – assessment of the frequency of use and the knowledge of parents. *Probl Med Rodz* 2014; 3: 18–27.
9. Nitsch-Osuch A, Kozerska A, Topczewska-Cabanek A, Życińska K, Wardyn K. Realization of immunization schedule with recommended vaccines among children from one general practice. *Fam Med Prim Care Rev* 2012; 14(3): 410–413.
10. Lipska E, Lewińska M, Górnicka G. Realizacja szczepień zalecanych u dzieci i opinie rodziców na temat tych szczepień. *Nowa Med* 2013; 2: 43–48. (in Polish).
11. Pieszka M, Waksmańska W, Woś H. Wiedza rodziców dzieci do drugiego roku życia na temat szczepień ochronnych. *MONZ* 2016; 22(3): 221–226. (in Polish).
12. Kalinowski P, Makara-Studzińska M, Kowalska M. Opinie i poglądy młodych osób dotyczące wykonywania szczepień ochronnych. *Hygeia Public Health* 2014; 49(4): 782–786. (in Polish).
13. Panasiuk B, Prokopowicz D. Czy szczepienia są bezpieczne? *Nowa Pediatr* 2006; 4: 86–89. (in Polish).
14. Kochman D, Rudzińska T. Znaczenie edukacji rodziców w kontekście szczepień obowiązkowych i zalecanych u dzieci w wieku 0–2 lat. *Probl Pielęg* 2008; 16: 163–172. (in Polish).
15. Barczykowska E, Graczkowska R. Rodzice wobec zalecanych szczepień ochronnych u dzieci. *Zesz Nauk WSHE* 2013; XXXVII: 61–70. (in Polish).
16. Tarczoń I, Domaradzka E, Czajka H. Co na temat szczepień ochronnych wiedzą rodzice i pracownicy ochrony zdrowia. *Prz Lek* 2009; 66: 27–33. (in Polish).
17. Gawlik K, Woś H, Waksmańska W, Łukasik R. Opinie rodziców na temat szczepień ochronnych u dzieci. *MONZ* 2014; 20(4): 360–364. (in Polish).
18. Rogalska J, Augustynowicz E, Gzyl A, Steffanof P. Źródła informacji oraz wiedza rodziców na temat szczepień ochronnych w Polsce. *Przegl Epidemiol* 2010; 64: 83–90. (in Polish).
19. Ustawa z dnia 5 grudnia 2008 r. o zapobieganiu oraz zwalczaniu zakażeń i chorób zakaźnych u ludzi (Dz.U. 2008 nr 234 poz. 1570) [online] [cit. 20.09.2018]. Available from URL: <http://prawo.sejm.gov.pl/isap.nsf/download.xsp/WDU20082341570/U/D20081570Lj.pdf>. (in Polish).

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FACTORS INFLUENCING THE OCCURRENCE OF PAIN AND INJURY IN RUNNERS

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ABSTRACT

Background: With the growth of running popularity, the number of running-related injuries has risen. Long-term training and inadequate training loads are only a few factors causing overload injuries amongst runners.

Aim of the study: To determine factors influencing the onset of pain and injury in runners.

Material and methods: The study involved 150 runners aged 17-64 years (mean age: 30±10 years) and was conducted via a questionnaire containing questions concerning, for example, training frequency, location of pain, type of trauma, treatment and rehabilitation.

Results: 38% (n = 57) of runners often felt pain during training. 41% of them (n = 23) reported pain after running short distances and it was most frequently located in the knee joints (26%, n = 15). 48% (n = 72) experienced a running injury. The largest percentage of these (36%, n = 26) were related to knee injuries. As factors causing injuries, the interviewees mentioned one-sided training plan (24%, n = 17), overtraining (24%, n = 17), and insufficient warm-up (16%, n = 12). The analysis of the results has shown a statistically relevant positive correlation ($r = 0.177$, $p < 0.05$) between weekly frequency of training and the number of injuries sustained in the last year. The higher the weekly frequency, the more often injuries occur amongst runners.

Conclusions: The study shows that the occurrence of pain and injury depends on many factors. A frequent cause of any disturbances within the musculoskeletal system is overloaded soft tissue caused by overtraining. Lower limbs, particularly knee joints, are mostly at risk.

KEYWORDS: running, injuries, pain, overloading syndrome, knee injuries

BACKGROUND

Running is a natural human activity which nowadays is perceived as an element of a modern, healthy lifestyle. It is a simple and an easily accessible sport, which does not require expensive or specialist equipment, resulting in its great popularity amongst all ages. Nowadays, it is one of the most widely spread amateur sports disciplines. The awareness of a healthy lifestyle has risen considerably which has led to increased interest in running. It has beneficial influence on many conditions, including cardiovascular diseases. Unfortunately, as well as the positive effects of running, there is a high number of injuries concerning the locomotor system.

There are great discrepancies between scientific reports on how often injuries occur among runners, ranging from 1.4 to 94.4% [1–3]. Such discrepancies may be due to different definitions of injury, the choice of the group under examination or different research methods. Long-term training and inadequate training

loads are only a few of the factors contributing to overload injuries amongst runners.

Usually the most acute sign of overload of the locomotor system is pain, which can take different forms. If overload is sustained over in time, this often results in overload syndromes, which typically appear about two-years after commencing a sport [4]. They occur in about 25-50% of sportspeople treated in sports surgery clinics and if they are ignored, can lead to more serious injuries [5].

Research concerning the frequency of lower limb injuries amongst long distance runners has revealed that most injuries affected the knee joints (7.2% – 50%), lower legs (9% – 32.2%), feet (5.7% – 39.3%) and upper legs (3.4% – 38.1%). Research has also shown that for 2000 injuries connected with running, the most frequent were: medial tibial stress syndrome (4.9%), Achilles Tendinitis (4.8%), tibial fractures (3.3%) and straining and tears of the triceps surae (1.3%) [6].

AIM OF THE STUDY

The aim of this research is to show the causes and locations of the most common injuries in runners. The research also aims to describe the treatments undertaken by injured runners.

MATERIAL AND METHODS

The questionnaire used in the survey did not require any assessment from the Bioethical Commission. It was created by the author of this article and consisted of 43 questions, which were divided into four areas. The research was conducted from September to the end of November 2017 during the following competitions: "Leśne Run" in Zabrze, "IX Bytom Half-Marathon" and "IV The Golden Cone Run" in Bystra.

150 people were asked to fill out a questionnaire. The group consisted of 78 women aged from 17 to 48 (mean = 27.025 ± 7.034), and 72 men aged from 21 to 64 (mean = 33.861 ± 11.485). The average age of the group was 30 (mean = 30 ± 10).

The women weighed between 47 to 85 kilograms (mean = 60.512 ± 7.792), and their heights ranged from 155 to 176 centimeters (mean = 167.641 ± 5.357). The men's weights ranged from 60-105 kilograms (mean = 78.083 ± 10.769), and their height were between 164-196 centimeters (mean = 179.388 ± 6.909).

On the basis of body weight and height, the BMI of the questioned women was calculated. This ranged from 18 to 25 (mean = 20.1 ± 2). The men's BMI ranged between 18 to 29 (mean = 22.1 ± 2.34).

Sixty-four percent (n = 96) of the people trained from 2 to 5 years. 26% (n = 39) of the whole group consists of those who trained from 1 to 2 years (Tab. 1).

Table 1. Period of training percentage.

Training period [years]	1-2	2-5	4-10	>10
Number of people [%]	26, n = 39	64, n = 96	4, n = 6	6, n = 9

Forty-four percent (n = 66) were the people training from 2 to 3 times a week, 34 % (n = 51) trained 4 to 5 times a week, and 7% (n = 11) trained over five times a week. (Tab. 2).

Table 2. Weekly training frequency percentages.

Weekly training frequency	1x	2-3x	3-4x	>5
Number of people [%]	15, n = 23	44, n = 66	34, n = 51	7, n = 11

Among the interviewees, 49% (n = 73) ran at least 6-10 kilometers during a training session, 43% (n = 64) ran 1-5 kilometers at a time, 7% (n = 11) ran 11-15 kilometers and 1% (n = 2) over 20 kilometers.

The maximum distance during one training session was 6-10 km for 27% (n = 41) of the respondents, 16-20 kilometers for 20% (n = 30), 11-15 kilometers for 19% (n = 28) and 20-30 kilometers for 19% (n = 29) of all groups. 11% (n = 16) covered distances above 30 kilometers during a training session. For 4% (n = 6) of the survey participants the longest distance at one time was 1-5 kilometers.

The respondents took part in different running competitions, such as: a street running (50%, n = 75), half marathon (38%, n = 57) quarter-marathon (36%, n = 54), marathon (20%, n = 30), mountain runs (19%, n = 29), obstacle running (6%, n = 9) and other runs (5%, n = 8).

RESULTS

During the previous year, 10% (n = 8) of the women and 13 % (n = 9) of the men never felt any pain. Pain appeared in 42% (n = 33) of the women and 33 % (n = 24) of the men (fig. 1).

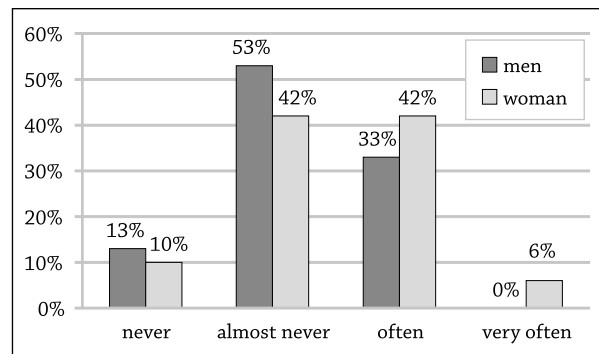


Figure 1. Pain during training in the last year differentiated by gender – percentage distribution.

The highest percentage of women who felt pain was after running 6 to 10 km, the fewest women felt pain after running 16–20 kilometers (7%, n = 5) and over 20 kilometers (7%, n = 5). 47% of the men felt pain after running the distance from 1 to 5 kilometers (fig. 2).

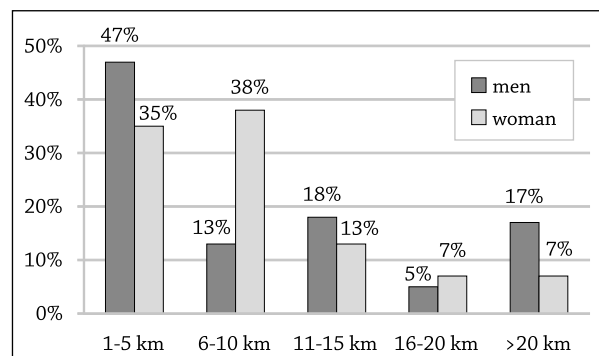


Figure 2. Distance after which pain occurs – differentiated by gender in percentage terms.

Pain in knee joints appeared in 57% (n = 86) of the respondents. Pain also appeared in the foot area (27%, n = 23), shin (24%, n = 21), calf (14%, n = 12), hip joints (12%, n = 10), lumbar spine (14%, n = 12), thoracic spine (5%, n = 4) and other (2%, n = 2).

Thirty-four percent (n = 30) of respondents held the opinion that the occurrence of pain was closely related to a previous injury. As factors causing pain, respondents identified either: one event of overtraining (34%, n = 30), insufficient warm-up, training too often (25%, n = 22), adverse weather conditions (7%, n = 6) or being in a bad frame of mind (5%, n = 4) (fig. 3).

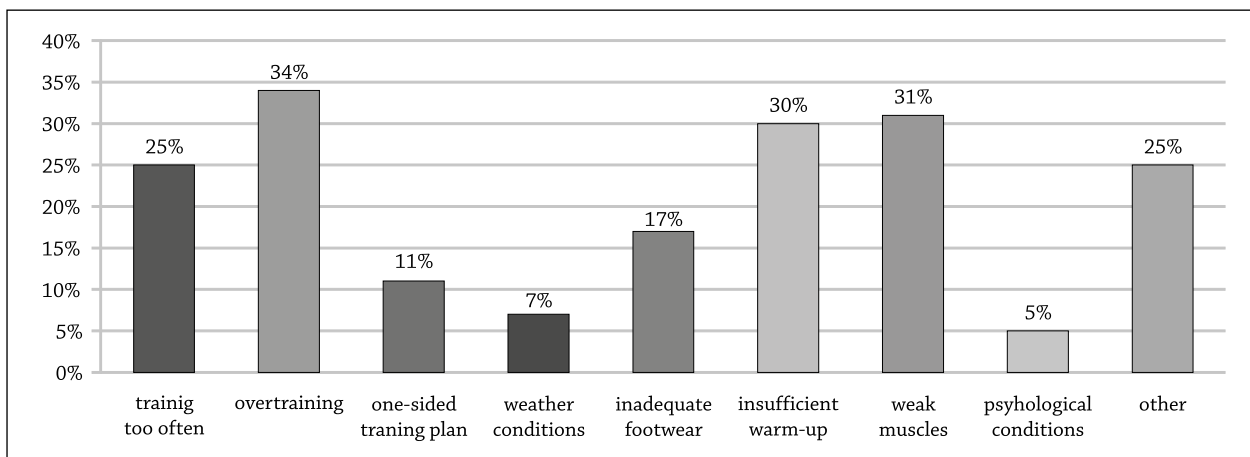


Figure 3. Causes of pain according to respondents – percentage distribution.

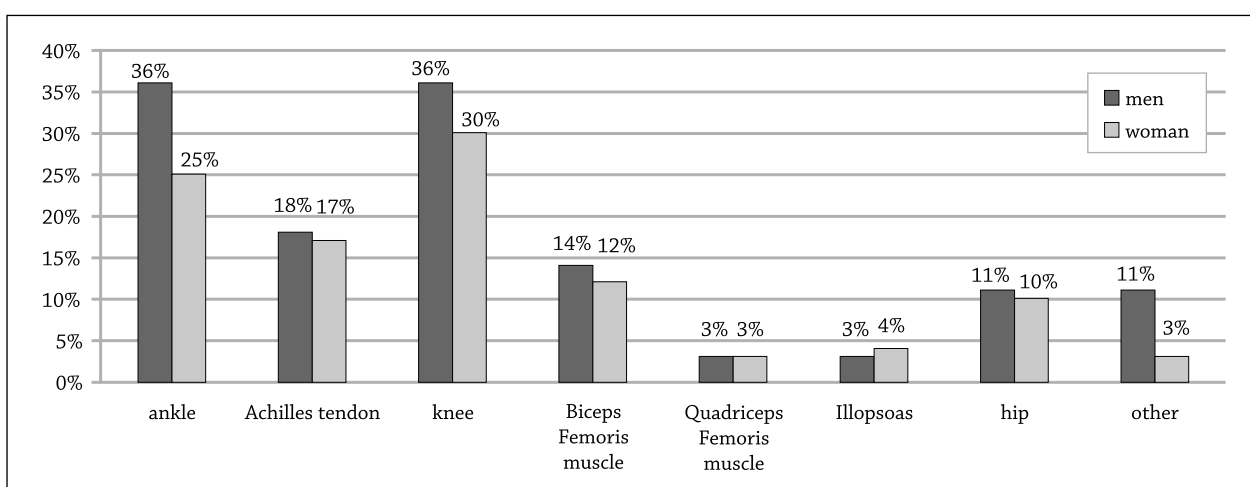


Figure 4. Location of injuries among respondents – differentiated by gender in percentage terms.

The most frequent strategy for dealing with pain was a break in training until the ailment stopped (48%, $n = 41$) and using analgesic creams (42%, $n = 36$).

During the last year, 48% of the runners sustained an injury ($n = 90$), out of which 37% ($n = 36$) were women, and 60% ($n = 54$) were men. In the group studied, the most common injuries were those affecting knee joints (36%, $n = 32$) and the ankle (32%, $n = 29$). Injuries were also located in area of the Achilles tendon (19%, $n = 17$), Biceps Femoris muscle (12%, $n = 11$), Hip joints (8%, $n = 7$), Quadriceps Femoris muscle (7%, $n = 6$), Iliopsoas (3%, $n = 3$) and other areas (20%, $n = 18$).

In the female group, the percentage of knee joint injuries was 36% ($n = 13$), ankle injuries 36% ($n = 13$), and hip joint injuries 11% ($n = 4$). Amongst the men, damage to knee joints accounted for 35% ($n = 19$) of injuries, and ankle injuries were 32% ($n = 17$) (fig. 4).

The respondents experienced either: a pulled tendon (45%, $n = 41$), sprain (33%, $n = 30$), muscle tear (29%, $n = 26$), pulled muscle (9%, $n = 8$), tendinitis (7%, $n = 6$) or another injury (15%, $n = 14$).

Ninety-eight percent ($n = 88$) of the interviewees did not require an operation. 32% ($n = 29$) started rehabilitation after suffering from the injury. 80% ($n = 72$) of the respondents expressed the opinion that the injury

could have been avoided. They mentioned the following causes of the injury: training too often (42%, $n = 38$), following one event of overtraining (42%, $n = 38$), insufficient warm-up (27%, $n = 24$), as well as other factors such as: third party interference, lack of concentration, uneven terrain.

The analysis of these results has shown that there is a statistically significant positive correlation ($r = 0.177$, $p < 0.05$) between weekly frequency of training and the number of injuries sustained in the last year. The higher the weekly frequency, the more often injuries occur amongst runners.

There was a statistically significant correlation between the minimal distance covered at a time and the number of injuries ($r = 0.253$; $p < 0.05$). The longer the minimal distance at one training session, the more frequently injuries occurred. In the group studied there is a statistically significant correlation ($r = 0.233$; $p < 0.05$) between the maximum distance covered during training and the number of injuries in a year.

There is a statistically relevant association between the average weekly distance and the number of injuries in the runners ($r = 0.244$; $p < 0.05$). The longer the average weekly distance, the more injuries appeared in the examined group of runners.

DISCUSSION

Undoubtedly, running has many benefits, such as lowering the risk of cardiovascular diseases. However, negative effects of this sport should not be underestimated. Pain is usually the first sign of injury, and if one notices this symptom, it can prevent the development of serious medical consequences.

In medical literature we find information that experiencing pain is closely connected with the period of training and the distances that one runs [7,8]. The frequency of injuries among runners ranges from 18.2% to 92.4% [9,10]. It can be stated that each 1000 hours of training leads to between 6.8 to 59 injuries [11–13]. In the group of high-ranking sportspeople, the frequency of injuries varies, depending on the distance. It is 7.2% amongst sprinters, 12.8% amongst middle-distance runners and 15.6% in long-distance runners [22].

If we take training load into consideration, the most frequent injuries experienced by runners are located in the pelvis and lower limbs. In subject literature, knee injuries are most frequent among beginners (30.6%), recreational runners (22.5%) and marathon runners (26.6%) [14,15]. Injuries of the hip joint and those of the hamstrings occur the most often amongst sprinters, and are the rarest amongst cross country runners, who often experience injuries affecting lower leg muscles (30.3%) and the ankles (16.2%) [16].

Risk factors include those that are modifiable such as: the period of training, the frequency of training, a runner's preparation for training, posture, strength, physical fitness or footwear; and those that are not modifiable, such as: build, limb length or weather conditions. What may also be essential in injury prevention is the psychological aspect. In the examined group, statistically significant correlations between the number of injuries, period of training and the frequency have been found. Most factors can be modified by more conscious training, which is suited to one's capabilities and needs. In order to prevent injuries and overload, every runner should pay careful attention to their posture during training [17,18]. In order to prevent musculoskeletal overload and injuries, one should even consider details such as running on both sides of the street. Running on just one side causes pelvic tilt, curvature of the lumbar spine and asymmetrical load on the hips, knees and ankles. Distance and duration of running also should not be increased

to more than 5 to 10%. During the initial phases of training this is not significant, but for distances further than 15 kilometers, this helps avoid overtraining injuries [19].

Ewa Brzozowska's study conducted on 113 professional sprinters, revealed that runners react to injuries in different ways. The most common reactions are to stop training in order to recover, undergo pharmacological treatment or physiotherapy. In the group studied, 32% of injured runners used a physiotherapist's assistance. Amongst them, over half did not continue training, allowing their bodies to recover. An appropriate length of recuperation is crucial to completely recover from an injury. If the time of recuperation is shorter than necessary, there is a high likelihood of suffering the injury again in the same location [20].

Running is rewarding, character forming and, with time, becomes an essential element to an individual's life. Bearing in mind the high rate of injuries amongst runners, taking preventive measures should be considered. These could be achieved by educating the public on the physiology and mechanics of running, paying attention to early signs and using physiotherapy. Suiting the training schedule to one's capabilities and extending one's knowledge on preventing injuries could save many runners from ailments.

There are several limitations of this study which may have contributed to the data collected. The sample surveyed is small ($n = 150$) and could not be contributed to some statistically significant correlations. Furthermore, the questionnaire was filled during the competition and factors such as fatigue and stress may have an impact on the reliability of the answers. This study involved a cross section of community runners in one Silesian Voivodeship area and is not necessarily generalizable to other geographical regions.

CONCLUSION

This study shows that both the occurrence of pain and injury depends on many factors. A frequent cause of any disturbances within the musculoskeletal system is overloaded soft tissues caused by overtraining. Injuries are most often caused by either training too frequently, a specific event of overtraining or insufficient warm-ups. Lower limbs, particularly knee joints, are most at risk.

REFERENCES

1. Lopes AD, Costa LO, Saragiotto BT, Yamato TP, Adami F, et al. Musculoskeletal pain is prevalent among recreational runners who are about to compete: an observational study of 1049 runners. *J Physiother* 2011; 57(3): 179–182.
2. Chandy TA, Grana WA. Secondary school athletic injury in boys and girls: a three-year comparison. *Phys Sports Med* 1985; 13: 106–111.
3. Reinking MF, Austin TM, Hayes AM. A survey of exercise – related leg pain in community runners. *Int J Sports Phys Ther* 2013; 8(3): 269.
4. Wilder RP, Magrum E. Exertional compartment syndrome. *Clin Sports Med* 2010; 29(3): 429–435.
5. Kluitenberg B, Middelkoop M, Diercks R, Van der Worp H. What are the differences in injury proportions between different populations of runners? A systematic review and meta-analysis. *Sports Med* 2015; 45: 1143–1161.
6. Taunton JE, Ryan MB, Clement DB, McKenzie DC, Lloyd-Smith DR, et al. A retrospective case-control analysis of 2002 running

- injuries. *Br J Sports Med* 2002; 36: 95–101.
7. International Association for the Study of Pain. Subcommittee on taxonomy of pain terms: a list with definitions and notes on usage. *Classification of chronic pain* 1979; 6: 249–252.
 8. Barber FA, Oothby MH, Troop RL. Z-plasty lengthening for iliotibial band friction syndrome. *J Knee Surg* 2007; 20(4): 281–284.
 9. Van Middelkoop M, Kolkman J, Van Ochten J, Bierma-Zeinstra SM, Koes B. Prevalence and incidence of lower extremity injuries in male marathon runners. *Scand J Med Sci Sports* 2008; 18(2): 140–144.
 10. Bovens AM, Janssen GM, Vermeer HG, Hoebregts JH, Janssen MP, et al. Occurrence of running injuries in adults following a supervised training program. *Int J Sports Med* 1989; 10(3 Suppl.): 186–190.
 11. Buist I, Bredeweg SW, Bessem B, van Mechelen W, Lemmink KA, et al. Incidence and risk factors of running-related injuries during preparation for a 4-mile recreational running event. *Br J Sports Med* 2010; 44(8): 598–604.
 12. Rauh MJ, Koepsell TD, Rivara FP, Margherita AJ, Rice SG. Epidemiology of musculoskeletal injuries among high school cross-country runners. *Am J Epidemiol* 2002; 163(2): 151–192.
 13. Sieverdes JC, Sui X, Lee DC, Hooker SP, Blair SN. Independent and joint associations of physical activity and fitness on stroke in men. *Phys Sportsmed* 2011; 39(2): 119–126.
 14. Askling C, Tengvar M, Saartok T, Thorstensson A. Sports related hamstring strains – two cases with different etiologies and injury sites. *Scand J Med Sci Sports* 2000; 10: 304–307.
 15. Cona G, Cavazzana A, Paoli A, Marcolin G, Grainer A, et al. It's a matter of mind! Cognitive functioning predicts the athletic performance in ultra marathon runners. *PLoS ONE* 2015; 10(7): e0132943. doi:10.1371/journal.pone.0132943.
 16. Clanton TO, Coupe KJ. Hamstring strains in athletes: diagnosis and treatment. *J Am Orthop Surg* 1998; 6: 237–248.
 17. Allen DJ, Heisler H, Mooney J, Kline R. Original research the effect of step rate manipulation on foot strike pattern of long distance runners. *Int J Sports Phys Ther* 2016; 11(1): 54–63.
 18. Luedke LE, Heiderscheit BC, Williams B, Rauh MJ. Association of isometric strength of hip and knee muscles with injury risk in high school cross country runners. *Int J Sports Phys Ther* 2015; 10(6): 868–876.
 19. Hadała M. Ekscentryczna niewydolność mięśnia pośladkowego średniego, jako częsta przyczyna urazów stawu kolanowego w sporcie na podstawie Kinetic Control. *Prakt Fizjoter Rehabil* 2012; 34: 58–63. (in Polish).
 20. Brzozowska E. Charakterystyka rodzaju i częstotliwości występowania urazów u zawodników trenujących biegi krótkie. *Rozprawy Naukowe Akademii Wychowania Fizycznego we Wrocławiu* 2013; 43: 66–72. (in Polish).

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ASSESSMENT OF THE INFLUENCE OF ISCHEMIC COMPRESSION AND CLAVITHERAPY ON COMPRESSION PAIN THRESHOLD MEASURED ON THE LUMBAR SPINE RECTIFIER MUSCLE

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

ABSTRACT

Background: The British physician, Balfour, at the beginning of the nineteenth century was one of the first to describe thickened nodules and bumps in tissue, which could be painful under pressure. This pressure often also caused pain in other distant parts of the body. The above characteristics perfectly reflected what is now referred to as the trigger point.

Aim of the study: The aim of this study was to assess the impact of ischemic compression using clavithery on the level of compression pain threshold measured with an algometer on the muscle of the lumbar region spine extender. The following research questions were posed:

Material and methods: The research involved 40 patients with pain in the paraspinal muscles who were attending the Physio-Wysz Rehabilitation Center. In each subject, pain threshold was assessed using an algometer, 5 points before and after therapy. Each subject was then subjected to ischemic compression for each of the 5 points. The obtained results were entered into an Excel™ database and then analyzed using the Statistica program.

Results: The mean value of the pain threshold for the L1 point before therapy was 114.4 ± 17.22 N/cm² and for P1 was 113.24 ± 18.85 N/cm². Immediately after therapy, the compression pain threshold decreased to 84.15 ± 10.79 N/cm² and 84.89 ± 10.11 N/cm² for the L1 and P1 points, respectively.

Conclusions: There was a reduction in the mean compression pain threshold immediately after clavicle therapy. There were no significant differences when measuring the pressure pain threshold after therapy.

KEYWORDS: clavithery, ischemic compression, compression pain threshold

BACKGROUND

Generalised muscle soreness or discomfort often occurs on the day after intense physical activity. The concept for this study has its origins in the research of the British scholar, Archibald V Hill. He observed the presence of lactic acid in very fatigued frog muscles and concluded that lactic acid was responsible for this fatigue [1–5]. However, Hill did not carry out other experiments to confirm this thesis, and for some time it remained unclear what caused this muscular soreness. Current research indicates that after physical exertion, lactic acid is oxidized and returns towards normal levels [6–9]. Researchers consider that delayed muscle soreness results from microdamage to muscle

fibers. This microdamage may be caused by excessive intensity, repetitive eccentric contractions and by non-specific exercises of too high strength [10–14]. Typical symptoms of this microdamage include reduced range of motion, joint stiffness, reduction in maximum contraction force, pressure soreness and the presence of increased creatine activity in the blood [15–20].

Klawiterapii (clavithery) is a method of treatment performed using a key. This is an oblong tool about 10 cm in length, with one end being sharp and the other end having a shape similar to a screwdriver. Clavithery is often done with toothpicks. The creator of this method, Ferdynand Barbasiewicz (PhD), considers that this approach is based on neurophysiological processes,

with the main goal to provide a good blood supply to tissues, which may affect activation of neurochemical relays. Clavithery consists of compressing the clavicle into specific points on the body. The pressure usually lasts for a few seconds and is repeated up to 10 times. The heavier the dysfunction, the longer and more frequent the procedure should be. The tools are made of surgical steel and laser-treated so that they do not disturb the integrity of the patient's skin despite being sharp. According to Barbasiewicz, the above-mentioned tightening of the key stimulates nerve impulses that reach the principle structures of the nervous system [20–21].

AIM OF THE STUDY

The aim of this study was to assess the influence of clavicle therapy on compression pain threshold, measured with an algometer, on the spine extender muscle in the lumbar region. The following research questions were posed:

1. Does clavithery influence the compression pain threshold measured with an algometer?
2. Is a difference in therapy detectable between the left and right sides?

MATERIAL AND METHODS

Forty patients with pain in the paraspinal muscles were identified from the Fizjo-Wysz Rehabilitation Center. The conducted physical and physical examination enabled identification of the main cause of the DOMS ailments, ie delayed muscular pain syndrome. In each subject an assessment of the compression pain threshold was made using an algometer, with 5 points for both the left and right muscles of the dorsal rectifier. Values were expressed in kilogram per square centimeter (kg/cm^2). The measurement was repeated three times to eliminate measurement error. Each subject was then given therapy using the clavicle for each of 5 points, on both the left and right side, lasting until the minimum pain had subsided. This therapy consisted of compressing each of the 5 points with a tip reminiscent of a flat screwdriver. The pressure pain threshold was measured immediately after therapy. All obtained parameters were entered into an Excel™ database. Next, a database was created in the Statistica program and normality of the results distribution was

examined using the Shapiro-Wilk test. An appropriate histogram was obtained along with the imposed normal distribution density curve, which allowed for its appropriate assessment. Due to a lack of differentiation of results, statistical analysis in the case of normally distributed data was performed with the Student's t-test for dependent samples. The level of statistical significance was $p < 0.05$ in both cases.

RESULTS

Before therapy, the mean \pm standard deviation pain threshold for the L1 point was $114.4 \pm 17.22 \text{ N}/\text{cm}^2$ and for the P1 points was $113.24 \pm 18.85 \text{ N}/\text{cm}^2$. Immediately after therapy, the compression pain threshold decreased to $84.15 \pm 10.79 \text{ N}/\text{cm}^2$ for the L1 point and $84.89 \pm 10.11 \text{ N}/\text{cm}^2$ for the P1 point. The changes were not statistically significant ($p > 0.05$) (fig. 1).

The mean \pm standard deviation value of the pain threshold before therapy was $114.19 \pm 16.74 \text{ N}/\text{cm}^2$ and $114.69 \pm 18.48 \text{ N}/\text{cm}^2$ for L2 and P2 points, respectively. Immediately after therapy, the compression pain threshold decreased to $83.35 \pm 9.88 \text{ N}/\text{cm}^2$ for point L2 and $85.03 \pm 10.61 \text{ N}/\text{cm}^2$ for point P2. These changes were not statistically significant ($p > 0.05$) (fig. 2).

The mean \pm standard deviation value of the pressure pain threshold for the L3 point before therapy was $113.06 \pm 16.95 \text{ N}/\text{cm}^2$ and for the P3 point was $114.99 \pm 18.99 \text{ N}/\text{cm}^2$. Immediately after therapy, the compression pain threshold decreased to $83.18 \pm 9.94 \text{ N}/\text{cm}^2$ for point L3 and $83.9 \pm 10.84 \text{ N}/\text{cm}^2$ for point P3. The changes did not attain statistical significance (fig. 3).

The mean \pm standard deviation value of the pain threshold for the L4 point before therapy was $118.39 \pm 15.33 \text{ N}/\text{cm}^2$ and for P4 was $113.88 \pm 18.47 \text{ N}/\text{cm}^2$. Immediately after therapy, the compression pain threshold decreased to $82.16 \pm 10.91 \text{ N}/\text{cm}^2$ for the L4 point and $83.05 \pm 10.41 \text{ N}/\text{cm}^2$ for the P4 point. These changes did not attain statistical significance (fig. 4).

The mean \pm standard deviation value of the pressure pain threshold for the L5 point before therapy was $115.05 \pm 18.07 \text{ N}/\text{cm}^2$ and for P5 was $115.65 \pm 17.46 \text{ N}/\text{cm}^2$. Immediately after therapy the compression pain threshold decreased to $85.22 \pm 10.47 \text{ N}/\text{cm}^2$ for the L5 point and $83.59 \pm 10.59 \text{ N}/\text{cm}^2$ for the P5 point. These changes were not statistically significant (fig. 5).

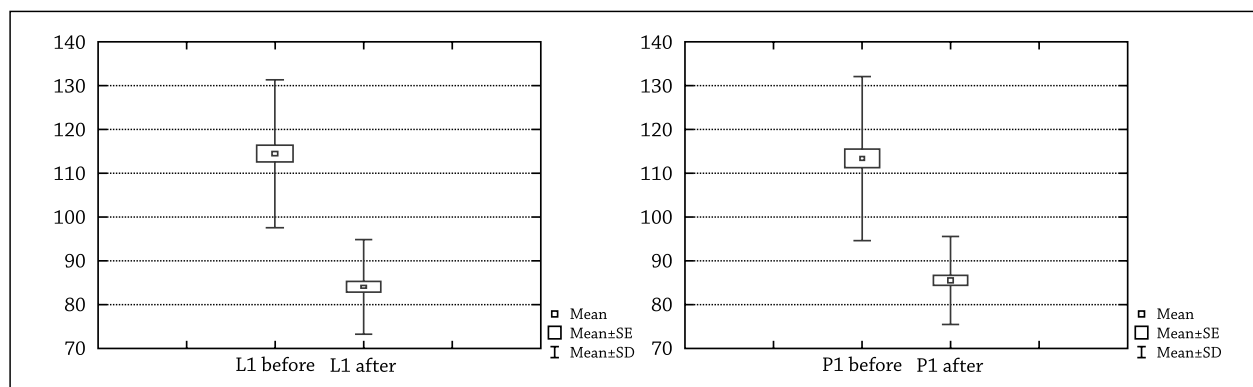


Figure 1. Mean pressure pain threshold values for L1 and P1 points before and immediately after therapy.

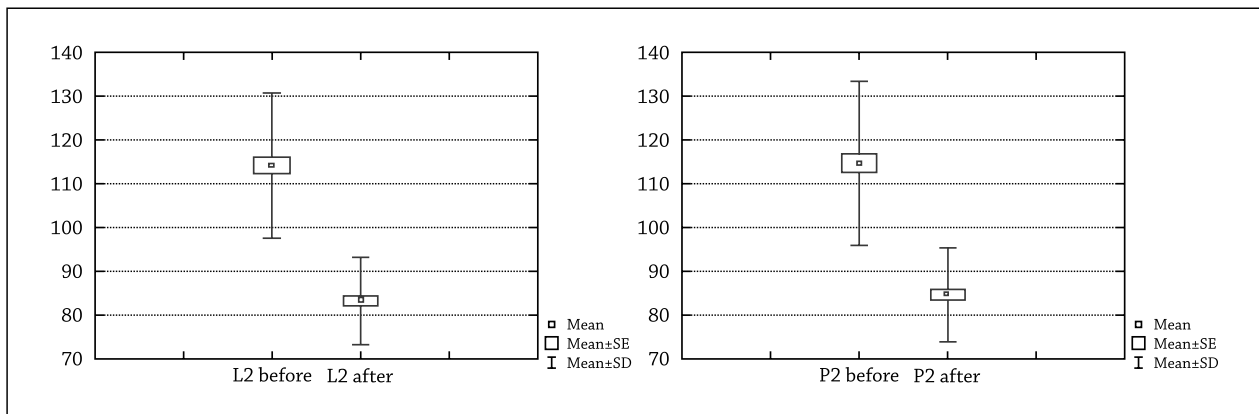


Figure 2. Mean pressure pain threshold values for L2 and P2 points before therapy, and immediately after therapy.

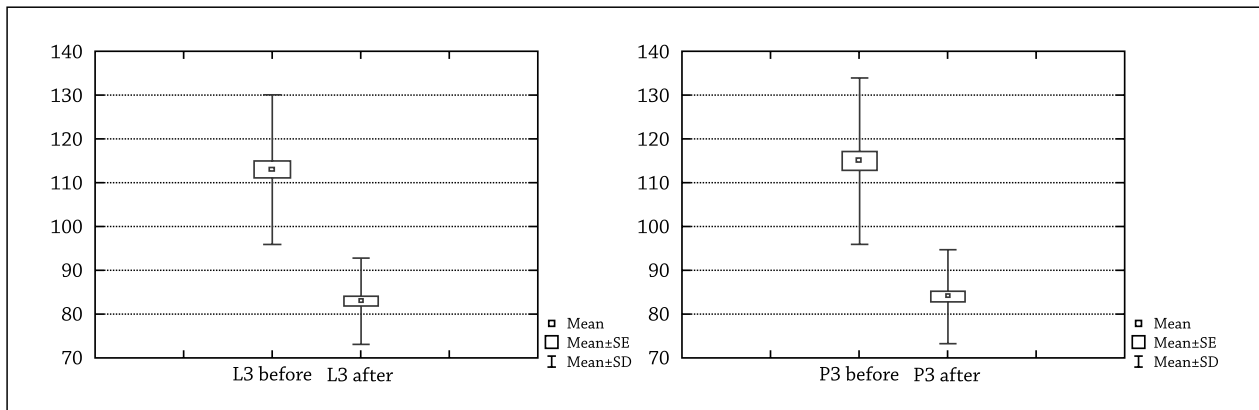


Figure 3. Mean pressure pain threshold values for L3 and P3 points before and immediately after therapy.

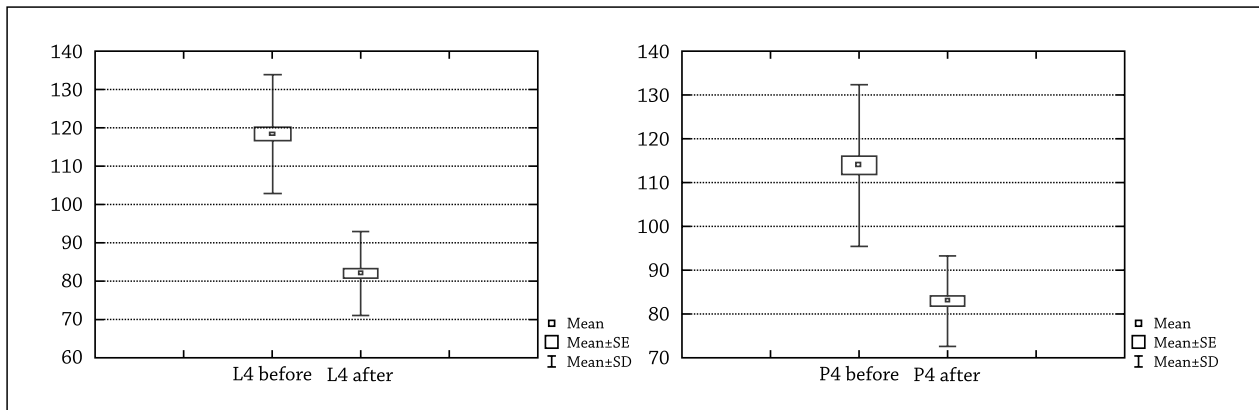


Figure 4. Mean pressure pain threshold values for L4 and P4 points before and immediately after therapy.

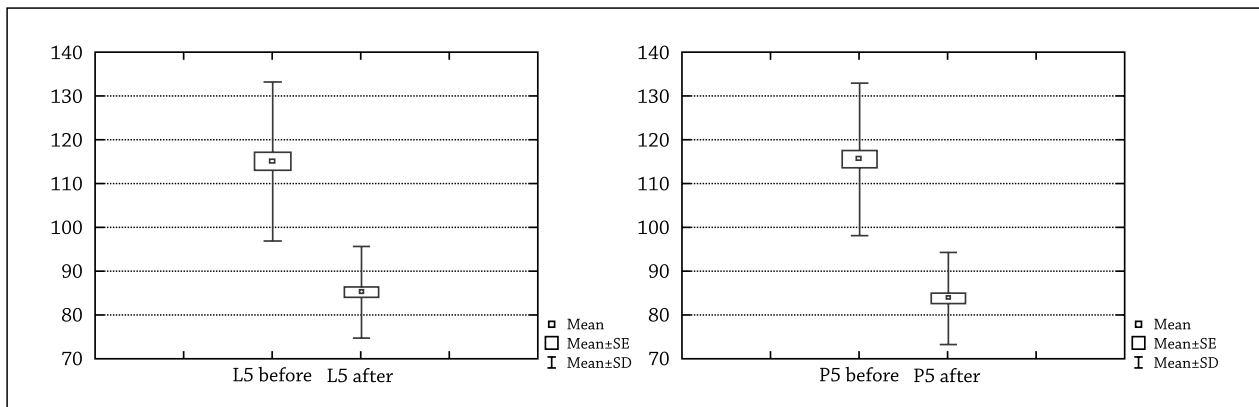


Figure 5. Mean pressure pain threshold values for L5 and P5 points before and immediately after therapy.

DISCUSSION

Our results illustrated that the use of clavicles in the ischemic compression technique is an effective approach that increases compression pain threshold in patients with DOMS. In a characteristic study, it was observed in all cases that an increase in the pressure pain threshold value occurred an hour after therapy, compared with the measurement taken immediately beforehand. In each case, a reduction in standard deviation occurred after treatment. However, there were no changes in the pain threshold with respect to whether the point was located more cranially or caudally. Our group has previously conducted research within the interphalangeal joint, which showed an increase in pain threshold after use of traction techniques [22]. Due to the subjectivity of pain sensation it is difficult to determine its intensity with a quantitative scale. In the tests that we performed, an algometer was used to measure pain threshold. This method allows for precise determination of the place where the pain threshold is increased and enables effective assessment of the effects of the performed therapy [23,24]. An algometer also facilitates planning for and monitoring of the results of therapy [25,26]. There was no significant difference between the left and right muscles of the spine rectifier. It is worth noting that work using the clavicle relieves the therapist's hands. The pressure exerted by the clavicle does not have to be as strong as that exerted by the thumb. The effects of treatment involving clavitherapy and ischemic compression performed with the hands should be evaluated next. Ischemic compression is a technique that has long been

known to be characterized by high efficiency. However, prolonged use in patients can contribute to ailments in a therapist. It is also worth considering whether it is possible to reduce the duration of ischemic compression with clavitherapy, due to the smaller, but more powerful, pressure area exerted by the clavicle. At this point, a fundamental question is whether the pressure exercised by the clavicle, which has a smaller surface of contact with the patient's body than the thumb, will produce a greater therapeutic benefit. It seems advisable to analyze other treatment sites. Due to the large number of techniques that can be used during the execution of clavitherapy, there is a need for detailed studies on their impact on tissues. It is worth mentioning that clavitherapy uses two types of pressure: 5-6 clavicles with an acute side or 1 clavicle with an ending similar to a screwdriver. It is also worth assessing this aspect in future research. It seems appropriate to conduct further studies on other groups of patients. So far, no valuable studies have been undertaken about the method of clavitherapy [27–31].

CONCLUSIONS

3. Clavicle therapy increased the compression pain threshold within the lumbar spine muscle.
4. There were no significant differences during the pressure measurement of the pain threshold after therapy between the right and left muscles of the spine rectifier.
5. Further research should be carried out on a larger group of patients as well as on other muscles.

REFERENCES

1. Weres A, Zwolińska J, Kwolek A, Szpunar P. Skuteczność fototerapii i masażu klasycznego w ograniczeniu zmęczenia mięśnia po treningu fizycznym. Przegląd medyczny Uniwersytetu Rzeszowskiego i Narodowego Instytutu Leków w Warszawie 2015; 13: 104–115. (in Polish).
2. Vequar Z. Causes and management of delayed onset muscle soreness: a review. *Elixir Human Physiology* 2015; 55: 13205–13211.
3. Hody S, Leprince P, Sergeant K, Renaut J, Croisier JL, et al. Human muscle proteome modifications after acute or repeated eccentric exercises. *Med Sci Sports Exerc* 2011; 43(12): 2281–2296.
4. Zondi PC, Janse van Rensburg DC, Grant CC, Jansen van Rensburg A. Delayed onset muscle soreness: no pain, no gain. The truth behind this adage. *South Africa Family Practice* 2015; 57(3): 29–33.
5. Wan JJ, Qin Z, Wang PY, Sun Y, Liu X. Muscle fatigue: general understanding and treatment. *Experimental & Molecular Medicine* 2017; 49 (10).
6. Muscle soreness and damage and the repeated-bout effect. In: Nosaka K. Skeletal muscle damage and repair. *Human Kinetics* 2008; 63–64.
7. Tozzi P. Selected fascial aspects of osteopathic practice. *Journal of Bodywork & Movement Therapies* 2012; 16: 503–519.
8. Spondaryk K. Działanie terapii skrajnie słabymi polami elektromagnetycznymi na oznaki i symptomy późniejszego bólu mięśni (zakwasów). *Medicina Sportiva* 2004; 6: 19–25. (in Polish).
9. Silldorff MD, Choo AD, Lin E, Carr JA, Lieber RL, et al. Effect of supraspinatus tendon injury on supraspinatus and infraspinatus muscle passive tension and associated biochemistry. *J Bone Joint Surg Am* 2014; 96 (12).
10. Jaskólska A, Bogucka M, Świstak R, Jaskólski A. Mechanizmy powstawania, objawy i następstwa opóźnionej bolesności mięśni szkieletowych (DOMS). *Medicina Sportiva* 2002; 6(4): 189–201. (in Polish).
11. Silveira PC, Victor EG, Notoya Fde S, Scheffer Dda L, Silva Ld, et al. Effects of phonophoresis with gold nanoparticles on oxidative stress parameters in a traumatic muscle injury model. *Drug Deliv* 2016; 23(3): 926–932.
12. Souza JD, Gottfried C. Muscle injury: review of experimental models. *J Electromyogr Kinesiol* 2013; 23(6): 1253–1260.
13. Cleary MA, Sweeney LA, Kendrick ZV, Sitler MR. Dehydration and symptoms of delayed onset muscle soreness in hyperthermic males. *J Athletic Training* 2005; 40(4): 288–297.
14. Bompa TO, Haff GG. Periodization. Theory and methodology of training. Champaign: Human Kinetics; 2009.
15. Benjamin PJ, Lamp SP. Understanding sports massage. Champaign: Human Kinetics; 2005.
16. Halson SL. Nutrition, sleep and recovery. *European Journal of*

- Sport Science 2008; 8(2): 119–126.
17. Miladi I, Temfemo A, Mandengué SH, Ahmaidi S. Effect of recovery mode on exercise time to exhaustion, cardio-respiratory responses. *Journal of Strength and Conditioning Research* 2011; 25(1): 205–210.
 18. Macdonald GZ, Button DC, Drinkwater EJ, Behm DG. Foam rolling as a recovery tool after an intense bout of physical activity. *Med Sci Sports Exerc* 2014; 46(1): 131–142.
 19. Imtiyaz S, Vequar Z, Shareef MY. To compare the effect of vibration therapy and massage therapy in prevention of delayed onset muscle soreness (DOMS). *J Clin and Diagn Res* 2014; 8(1): 133–135.
 20. Barbasiewicz F. Klawiterapia. Nadarzyn: Centrum Klawiterapii; 2017. (in Polish).
 21. Barbasiewicz F. Atlas Klawiterapii. Nadarzyn: Centrum Klawiterapii; 2017. (in Polish).
 22. Pozowski A, Paprocka-Borowicz M, Jarzab S. Holistyczne ujęcie rehabilitacji. In: Piotrkowicz J, Woźniak E, Wyszyński S, Sipko T, Halski T. Wpływ trakcji stawu międzypaliczkowego bliższego na poziom uciskowego progu bólowego więzadeł pobocznych u osób bez objawów bólowych. Wrocław: Uniwersytet Medyczny im. Piastów Śląskich we Wrocławiu; 2012. (in Polish).
 23. Vaughan B, McLaughlin P, Gosling C. Validity of an electronic pressure algometer. *Int J Osteopath Med* 2007; 10: 24–28.
 24. Binderup AT, Arendt-Nielsen L, Madeleine P. Pressure pain sensitivity maps of the neck-shoulder and the low back regions in man and women. *BMC Musculoskeletal Disorders* 2010; 11: 234.
 25. Wytrzążek M, Huber J, Lipiec J, Kulczyk A. Evaluation of palpation, pressure algometry, and electromyography for monitoring trigger points in young participants. *J Manipulative Physiol Ther* 2015; 38(3).
 26. Pelfort X, Torres-Claramunt R, Sánchez-Soler JF, Hinarejos P, Leal-Blanquet J, et al. Pressure algometry is a useful tool to quantify pain in the medial part of the knee: an intra- and inter-reliability study in healthy subjects. *Orthopaedics and Traumatology Surgery Res* 2015; 101(5).
 27. Zhuang X, Tan S, Huang Q. Understanding of myofascial trigger points. *Chin Med J* 2014; 127(24): 4271–4277.
 28. Macedo LB, Josué AM, Maia PH, Câmara AE, Brasileiro JS. Effect of burst TENS and conventional TENS combined with cryotherapy on pressure pain threshold: randomised, controlled, clinical trial. *Physiotherapy* 2015; 101(2): 155–160.
 29. Abu Taleb W, Rehan Youssef A, Saleh A. The effectiveness of manual versus algometer pressure release techniques for treating active myofascial trigger points of the upper trapezius. *J Bodyw Mov Ther* 2016; 20(4): 863–869.
 30. Jaeger B. Myofascial trigger point pain. *Alpha Omega* 2013; 106(1–2): 14–22.
 31. Borg-Stein J, Iaccarino MA. Myofascial pain syndrome treatments. *Phys Med Rehabil Clin N Am* 2014; 25(2): 357–374.

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CONTENT OF SELECTED VITAMINS IN MENUS FROM A SOCIAL WELFARE HOME

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ABSTRACT

Background: Psychological old age is considered a developmental process in which there is a juxtaposition of profit and loss. Developmental changes are multi-faceted and include biological, psychological and social spheres. The quality of human life diminishes as mobility lessens, and this compromises self-perception. The biological changes of old age are retroactive. Poor nutritional status and other negative behaviors like addictions contribute to the physiological regression of aging. Interest in nutrition amongst the elderly is heightened because of the aging population in Poland and internationally. There is also interest in the application of proper nutrition to prevent diseases in this age group. Proper nutrition is one of the main factors determining ideal human function and positively affects the natural processes within it. Analysis of food composition gives the opportunity to eliminate nutritional errors, which in turn contributes to improving the quality of life and delaying the aging process in the examined age group.

Aim of the study: The aim of this study was to evaluate the content of selected vitamins in 10 seasonal menus applied at a Social Welfare Home.

Material and methods: This study included 40 decade menus, prepared over four seasons of a year for the residents of a Social Welfare Home. The vitamin content of the meals was assessed quantitatively using the computer program, Diet 5. The selected vitamins were those considered most essential to the elderly diet because of the common appearance of their deficiencies. Taking into consideration physical activity of the elderly (1,4 physical activity level) and utilizing the norms developed by the Food and Nutrition Institute, the average norms of the analyzed nutrients were calculated for people over 60 years of age. For this purpose the formula $(K+M)/2$ was used, where K is the norm for women and M is the norm for men. The results obtained were compared with the calculated mean values of the norm for elderly at the level of the estimated average requirements (EAR). The results were analyzed statistically giving the mean value (X) and the median. The calculations were performed using Microsoft Excel.

Results: Deficiencies in vitamin D were found. The menu content of vitamins E and C was correct in all seasons. The amount of vitamins A, B₂, B₁₂ and PP was excessive in all the seasons.

Conclusions: The evaluated menus showed errors in the supply of the assessed vitamins.

KEYWORDS: elderly people, nutrition, nutrients, menu quantitative evaluation

BACKGROUND

Old age in psychology is considered a development process in which there is a balance of profits and losses. These changes are multi-faceted and include biological, psychological and social spheres. The quality of human life diminishes due to reduced mobility, which affects self-perception. In old age, biological changes are retroactive. They become visible and are generally felt at around 60 years of age [1].

Physiological changes in the elderly are in part due to poor nutritional status [2]. The aging process is linked frequently to inappropriate nutrition and addictions (e.g. smoking, alcohol, coffee) [3]. There is interest in nutrition amongst the elderly due to the growing aging population in Poland and worldwide. There is also attention placed upon the application of proper nutrition to prevent diseases in this age group [4]. Good nutrition is one of the main factors determining ideal function

through positively affecting natural processes within the human body [5].

Consumption of nutrients, especially by the elderly, should be consistent with the metabolic needs of the body. The increased occurrence of chronic diseases in old age is often associated with a need for food restrictions. Due to the aging population, nutrition within this group is a significant but also complex problem for the science of human nutrition [6].

It is well-known that excessive consumption of fat and simple sugars leads to a decrease in nutritional density of the diet and thus to potential deficiencies, especially of vitamins and minerals. It is believed that in old age the need for vitamins D, C, E, A and β -carotene increases. Appropriate ingestion of dietary vitamin B6, folic acid and vitamin B12 can positively affect the cardiovascular system and mental performance [7].

The diet of elderly individuals is often not consistent with the principles of rational nutrition, and thus leads to numerous body deficiencies. Regular consumption of varied meals, their proper selection and preparation should be one of the basic behaviors [8].

AIM OF THE STUDY

To evaluate the content of vitamins in the selected decade menus applied at a Social Welfare Home in the different seasons of the year.

MATERIAL AND METHODS

The menus prepared at the Social Welfare Home in Lower Silesia region were assessed. Residential meals were prepared in the canteen located in the facility. Due to the use of menus on a 10-day cycle, we evaluated 10 randomly chosen meals from each season over a one year period across 2016 and 2017. For the purpose of the study Diet 5 software was used to analyze meals chosen from the period of 40 days focusing on breakfast, diner, and super. The selected vitamins were the most essential to the elderly diet because of the common appearance of deficiencies in this age group. Taking into consideration the physical activity of the elderly (1,4 physical activity level) and utilizing the norms developed by the Food and Nutrition Institute [9], we calculated the average norms of the analyzed nutrients for people over 60 years of age. For this purpose the formula was used, where K is the norm for women and M is the norm for men. The results obtained were compared with the calculated mean values of the norm for the elderly at the level of average consumption (estimated average requirements or 'EAR'). The results were analyzed statistically giving the mean value (X) and the median. The calculations were performed using Microsoft Excel.

RESULTS

Tab. 1 presents the content of selected vitamins in the evaluated menus. During analysis, vitamin D deficiency was found. The highest amount was recorded in

Table 1. Content of the selected vitamins in each season.

Season	Assessment parameters	Vitamins						
		Vitamin A [µg]	Vitamin E [mg]	Vitamin B2 [mg]	Vitamin PP [mg]	Vitamin C [mg]	Vitamin B12 [µg]	Vitamin D [µg]
Spring	X±SD	867.7±499.4	9.0±1.9	1.6±0.2	16.0±5.4	68.0±11.8	3.9±2.6	4.4±5.4
	Min	366.4	6.5	1.3	9.5	24.0	1.8	1.8
	Max	2105.5	11.8	2.1	27.0	137.13	9.8	19.8
	Median	708.8	8.4	1.6	15.6	50.4	3.0	2.6
	% of the norm	154	100	160	133	100	195	44
Summer	X±SD	2230.3±3418.7	9.4±1.7	2.0±1.0	15.1±3.4	70.8±36.0	8.6±12.7	3.7±2.5
	Min	587.9	6.7	1.3	9.3	33.1	1.8	1.5
	Max	11856.5	12.8	4.6	21.3	143.8	43.5	10.1
	Median	1130.0	9.2	1.7	15.5	56	3.4	2.9
	% of the norm	395	104	200	126	104	430	37
Autumn	X±SD	1105.7±495.4	9.1±1.3	1.5±0.3	14.3±4.7	64.8±45.0	4.5±4.1	4.8±3.7
	Min	481.0	7.4	1.0	9.3	20.5	1.9	1.7
	Max	2023.1	10.7	2.2	25.5	156.8	12.7	12.1
	Median	999.8	9.2	1.5	13.6	52.3	2.6	3.3
	% of the norm	196	101	150	119	95	225	48
Winter	X±SD	990.5±689.9	9.4±1.5	1.6±0.2	14.2±2.7	74.2±46.4	4.5±3.9	4.5±5.1
	Min	397.0	7.0	1.3	9.5	21.2	1.9	2.0
	Max	2740.3	11.4	1.9	17.9	149.6	14.1	19.0
	Median	748	10	1.6	13.9	61.1	2.6	3
	% of the norm	175	104	160	118	109	225	45

autumn at 4.8 µg, which was 48% of the norm, while the lowest intake was in summer (3.7 µg) and covered 37% of the daily demand of older people.

The content of vitamin E in the evaluated menus was correct in all seasons. The average amount in summer and winter was the highest (9.4 mg) and covered 104% of the demand. The lowest average value was in spring (9.0 mg), meeting the standard at 100%.

The amount of vitamin C was within standard limits in all four seasons. The highest consumption occurred in winter (74.2 mg), which accounted for 109% of the daily demand. The lowest quantity was recorded in autumn (64.8 mg), covering 95% of consumption suitable for the elderly.

The amount of vitamin A in all seasons exceeded the norm. In summer, the average content was 2230.3 µg and it surpassed the standard by almost 4-fold (395%). The lowest consumption was in spring (867.7 µg), although the daily requirements were still exceeded at 154% of the norm.

The content of vitamin B₂ in the diet menus also exceeded recommendations. In summer, it was twice as high as the recommended daily dose, amounting to an average of 2.0 mg, or 200% of the demand. In autumn, slightly lower values (1.6 mg) were noted, which equaled 160% of the daily consumption.

The average content of vitamin B₁₂ was also too high. In summer it was 8.6 µg and exceeded the standard norm by 4-fold. In autumn, the amount (4.5 µg) was twice as high as the recommended norm.

Excessive intake of vitamin PP was found in all seasons. The highest value was observed in spring (16 mg), covering 133% of the daily demand. The lowest consumption occurred in winter (14.2 mg), and was 118% of the daily demand.

DISCUSSION

Quantitative evaluation of the menus tested showed an excess or deficiency in the content of selected vitamins and nutrients for the elderly. Vitamin A is a very important dietary component due to its antioxidant properties. It also participates in the visual process and contributes to normal skin condition through production of collagen fibers. However, it should be remembered that excess accumulation of this vitamin is toxic to the human body. Too much vitamin A may manifest itself in, among others, skin color, weakness and muscle pain as well as gastrointestinal disorders [10]. The average supply of vitamin A in all seasons in the examined diets exceeded the daily dose. Research carried out by Malczyk et al. [11], Tokarz et al. [12], and Goluch-Koniuszy et al. [13] assessing nutrition in the elderly also found that the presence of this vitamin was too high in the diet.

The amount of B vitamins in the daily meals was also too high regardless of the season. In the summer, the daily dose of vitamin B₂ was 2-fold higher, and of B₁₂ up to 4-fold higher than recommended. In a study carried out by Goluch-Koniuszy et al. [13] assessing the nutri-

tional status and diet of people who had been retired for six months, the recommended norm for older people was also exceeded. Malczyk et al. [11] and Tokarz et al. [12] also noted excessive consumption of vitamin B₁₂. Thus far no harmful effects of consuming too high much vitamin B₂ have been observed because the digestive tract has limited ability to absorb this vitamin [10]. Further, excess vitamin B₁₂ is expelled from the body without causing harmful effects.

Excess niacin may eventually contribute to an increase in insulin resistance and consequently to development of insulin-dependent diabetes [9]. Our study has shown too high an intake of niacin in all seasons. Malczyk et al. [11] assessed the nutrition of elderly people living in Jodłów and Nadziejów by [14] analyzing the menus in the selected Social Welfare Home and Care and Treatment Facilities, and stated that the niacin intake was too low. Long-term niacin deficiency may contribute to development of pellagra, which is accompanied by disorders of the nervous system, inflammation of the mouth and tongue as well as dermatitis and diarrhea [10].

Of all the selected vitamins, the largest deficit was found for vitamin D, which covered only 37-48% of the daily intake regardless of the season. Other authors [11,12,15-17] stated that the supply of this ingredient was insufficient in food they analyzed. Vitamin D shows a pleiotropic effect on the human body, directly or indirectly affecting about 200 genes. This vitamin is essential for maintaining calcium-phosphate homeostasis and positively affects the immune, muscular and nervous systems. Therefore, an insufficient dose of vitamin D causes calcium and phosphate metabolic disorders, which in turn may lead to bone demineralization and development of rickets. Vitamin D deficiency can also contribute to development of diabetes or autoimmune diseases. It should be emphasized that, as a result of reduced skin synthesis, the demand for this component in older people is increased [18].

In our presented research, the level of vitamin C and E was sufficient. Vitamin C is vital for humans because it participates in numerous metabolic processes and also affects immunity [18]. However, according to research conducted by Malczyk et al. [11] it appears that average vitamin E consumption was significantly exceeded but the assessed diet was poor in vitamin C. In the research of Syngowska et al. [17], it was noticed that the vitamin E content in an average diet in the study group was satisfactory while the amount of vitamin C was slightly below the recommended norm. Goluch-Koniuszy et al. [13] showed that the variety of groceries was not sufficient in the menus of elderly people, resulting in vitamin C deficiencies. However, the content of vitamin E in meals ingested by women in the study was much higher than the recommended norm.

Overall, our research and that of other authors, proves that the assessed meals of elderly patients had an incorrect supply of vitamins. Thus, there is a constant need to monitor menu planning and such monitoring is possible in such institutions.

CONCLUSION

The menus analyzed were characterized by the correct amount of vitamins C and E, vitamin D deficiency and too high a supply of vitamins A, PP, B₂ and

B₁₂ regardless of the season. Prepared meals for residents of nursing homes should be controlled in respect of the nutritional content. It is possible to introduce supplementation of vitamin D.

REFERENCES

1. Łój G. Rehabilitacja, a jakość życia osób w starszym wieku. *Gerontol Pol* 2007; 15: 153–157. (in Polish).
2. Ożga E, Małgorzewicz S. Ocena stanu odżywienia osób starszych. *Geriatrics* 2013; 7: 98–103. (in Polish).
3. Gabrowska E, Spodaryk M. Zasady żywienia osób w starszym wieku. *Gerontol Pol* 2006; 14: 57–62. (in Polish).
4. Markiewicz R, Borawska M, Socha K, Gutowska A. Wapń i magnez w dietach osób starszych z regionu Podlasia. *Bromat Chem Toksykol* 2009; 42: 629–635. (in Polish).
5. Humańska A, Kędziora-Kornatowska K. Wpływ miejsca zamieszkania osób w podeszłym wieku na stan odżywiania się. *Gerontol Pol* 2009; 17: 126–128. (in Polish).
6. Roszkowski W. Żywność osób starszych. In: Hasik J, Gawęcki J, ed. *Żywność człowieka zdrowego i chorego*. Warszawa: PWN; 2000: 86–94. (in Polish).
7. De Groot CP, West CE, van Staveren WA. Meeting nutrient and energy requirements in old age. *Maturitas* 2001; 38: 75–82.
8. Sheiham A, Stelle JG, Marcenes W, Finch S, Wells AW. The relationship between oral health status and Body Mass Index among older people: a national survey of older people in Great Britain. *Br Dent J* 2002; 192: 703–706.
9. Jarosz M, ed. *Normy żywienia dla populacji polskiej – nowelizacja*. Warszawa: Wydawnictwo IŻŻ; 2012: 7–143. (in Polish).
10. Głębska M, Włodarek D. Witaminy. In: Nowak-Pacholczak B, ed. *Dietoterapia*. Warszawa: Wydawnictwo PZWL; 2014: 74–101. (in Polish).
11. Malczyk E, Zołoteńka-Synowiec M, Całyniuk B, Guzik W. Ocena sposobu żywienia osób po 60 roku życia pochodzących z Jodłowa i Nadziejowa. *Piel Zdr Publ* 2014; 3: 219–226. (in Polish).
12. Tokarz A, Stawarska A, Kolczewska M. Ocena sposobu żywienia i suplementacji u ludzi starszych z chorobami sercowo-naczyniowymi z terenu Warszawy. Warszawa: Wydawnictwo PZH; 2008: 467–472. (in Polish).
13. Goluch-Koniuszy Z, Fabiańczyk E. Ocena stanu odżywienia i sposobu żywienia osób przebywających na emeryturze do 6 miesięcy. *ROCZN PZH Szczecin* 2010; 2: 191–199. (in Polish).
14. Leszczyńska T, Sikora E, Bieżanowska-Kopeć R, Pysz K, Nowacka E. Ocena prawidłowości bilansowania składu racji pokarmowych osób starszych zamieszkałych w wybranych Domach Pomocy Społecznej oraz w Zakładzie Opiekuńczo-Lecznym. *Żywność Nauka Technologia Jakość* 2008; 2: 140–154. (in Polish).
15. Różańska D, Wyka J, Biernat J. Sposób żywienia ludzi starszych mieszkających w małym mieście – Twardogórze. *Probl Hig Epidemiol* 2013; 94: 494–502. (in Polish).
16. Całyniuk B, Grochowska-Niedworok E, Zołoteńka-Synowiec M, Malczyk E, Misiarz M, et al. Ocena wartości energetycznej i odżywczej jadłospisów dekadowych realizowanych w wybranym Domu Pomocy Społecznej. Nysa: Wydawnictwo PWSZ w Nysie; 2011: 71–85. (in Polish).
17. Sygnowska E, Waśkiewicz A. Ocena sposobu żywienia osób starszych w wieku 60–74 lat. Badanie WOBASZ. *Bromat Chem Toksykol* 2011; 3: 240–244. (in Polish).
18. Wertanowicz M, Gronowska-Sengar A. Witaminy. In: Gawęcki J, ed. *Żywność człowieka. Podstawy nauki o żywieniu*. Warszawa: Wydawnictwo Naukowe PWN; 2010: 320–325. (in Polish).

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KNOWLEDGE OF NEUROLOGISTS AND GYNAECOLOGISTS REGARDING REPRODUCTIVE AND MATERNITY ISSUES IN WOMEN WITH EPILEPSY

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ABSTRACT

Background: Epilepsy is one of the most common neurological disorders, with more than 400,000 individuals in Poland (about 1% of the population) affected. Epilepsy complicates approximately 0.5% of pregnancies.

Aim of the study: To determine the level of knowledge that neurologists and gynaecologists have about reproductive and maternity issues for women with epilepsy.

Material and methods: This study included 141 neurologists and physicians undergoing specialist training in neurology as well as 72 gynaecologists and physicians undergoing specialist training in gynaecology. A validated questionnaire was used to survey these neurologists and gynaecologists, who worked in Silesia Province.

Results: In the group of physicians advising on contraception, significantly ($p=0.003$) more gynaecologists than neurologists recommended hormonal birth control. Significantly more ($p=0.031$) neurologists than gynaecologists believed that monotherapy with antiepileptic medications should be aimed for before a planned pregnancy in women with epilepsy. More than a half of the surveyed physicians (56.8%) believed that pregnant women with epilepsy can have a natural delivery.

Conclusions: On the basis of these results, we have concluded that gynaecologists and, to a lesser extent, neurologists should have more extensive knowledge regarding reproductive and maternity issues for women with epilepsy. We further propose that close collaboration between neurologists and gynaecologists in the care of epileptic women is necessary.

KEYWORDS: epilepsy, reproduction, pregnancy, maternity, neurologists, gynaecologists

BACKGROUND

Epilepsy is one of the most common neurological disorders. Approximately 50 million people suffer from epilepsy worldwide, with around half being women. In Germany, 400,000 women have epilepsy, with three to four epileptic women for every 1000 pregnant ones. In the United States of America, there are approximately 500,000 women of childbearing age suffering from epilepsy. In India, around 2.73 million women suffer

from epilepsy, and more than half of them are of childbearing age. There are over 400,000 individuals with epilepsy in Poland (approximately 1% of the population). A multicentre study conducted in 2000-2001 suggested that pregnant women with epilepsy accounted for 4.7% of women of childbearing age suffering from this disorder [1-4].

The appropriate care of women with epilepsy during the reproductive years is still a considerable prob-

lem for physicians dealing with this issue around the world. This is in spite of great progress in knowledge in the fields of neurology and obstetrics. Physicians caring for women with epilepsy of childbearing age should have knowledge about the impact of antiepileptic medications on hormonal methods of birth control, the effect of epilepsy and antiepileptic medications on fertility and pregnancy, the potential influence of pregnancy on epileptic seizures and antiepileptic medications as well as the possible consequences of seizures and antiepileptic medications on the developing foetus. They should also understand the indications and contraindications for feeding a newborn infant during maternal antiepileptic therapy, and the challenges a women with epilepsy may face when caring for her child. Availability of neurologists and gynaecologists with a good knowledge base in this area would facilitate better preparation of women with epilepsy for pregnancy.

AIM OF THE STUDY

The objective of this study was to determine the level of knowledge that neurologists and gynaecologists have with respect to reproductive and maternity issues for women with epilepsy. Identification of potential inadequacies in knowledge of the study participants and demonstration of needs associated with this problem would allow an improvement in the care of female patients with epilepsy during the reproductive period.

MATERIAL AND METHODS

This study included 141 neurologists and physicians undergoing specialist training in neurology, as well as 72 gynaecologists and physicians undergoing specialist training in gynaecology. The participants were employed at teaching hospitals, hospital departments and neurology outpatient clinics in Silesia Province as well as running private practices. The study was survey-based and was conducted with the use of a questionnaire designed for neurologists and gynaecologists, based on the survey for women created by the Polish Epilepsy Centre for Pregnant Women, headed by Prof. Joanna Jędrzejczak.

The database for recording clinical material was created with the use of a licensed version of Microsoft Excel 2003. Statistical analyses were carried out using the StatSoft Statistica 7.1 statistics suite. A value of $p < 0.05$ was accepted as statistically significant

RESULTS

Twenty of the surveyed physicians, one with 16–29 years of professional experience and 19 with less than 15 years of professional experience, had not managed a female patient of childbearing age with epilepsy. Specialist physicians ($p = 0.0001$) and those with more extensive professional experience ($p = 0.0001$) had cared for significantly more epileptic women of childbearing

age. For the question regarding contraception, hormonal birth control was more frequently recommended by gynaecologists, but had the fewest supporters among physicians with more than 30 years of professional experience. More than a half of the surveyed physicians (60.0%) including 97 (68.8%) neurologists and 31 (43.1%) gynaecologists, believed that women with epilepsy should not use hormonal contraceptives. In the group of physicians recommending contraception, significantly ($p = 0.003$) more gynaecologists than neurologists recommended hormonal birth control. The surveyed physicians were asked which female hormones could have proconvulsant effects. A significant correlation ($p = 0.011$) between the answer to this question and specialisation was found. Oestrogen was indicated by greater than 20% more neurologists than gynaecologists, while progesterone was indicated by over 20% more gynaecologists. Seventy-four percent of physicians with 15 to 29 years of professional experience knew about the proconvulsant effects of oestrogens. In this group, there were also the fewest incorrect answers (19.8%). Almost all of the surveyed physicians (except for two individuals specialising in neurology) gave a negative answer to the question about whether epilepsy constituted a contraindication for having a child. Significantly more neurologists ($p = 0.008$) than gynaecologists were of the opinion that pregnancy in women with epilepsy should be planned. Eighteen percent of the gynaecologists and only 4% of the neurologists did not see such a need. Irrespective of their specialisations, they were physicians with the least professional experience. The vast majority of physicians, both neurologists and gynaecologists, answered the question about the risk of developmental abnormalities in the offspring of mothers with epilepsy compared with healthy women, stating that it was slightly higher. Most (91.5%) of the surveyed physicians, irrespective of their specialisations and length of work experience, gave an affirmative answer to the question about whether epileptic seizures could have a negative impact on foetal development. For the question regarding the frequency of epileptic seizures in pregnancy, most surveyed physicians answered that the impact of pregnancy on seizure frequency is different in different women. Significantly more ($p = 0.017$) gynaecologists believed that pregnancy had no effect on the course of epilepsy. The vast majority (80.7%) of respondents believed that monotherapy with antiepileptic medications should be aimed for before pregnancy, and 15% of physicians stated that the method of treatment should not be changed during pregnancy at all. Eight gynaecologists would administer antiepileptic medications only on an as-needed basis during seizures, and one gynaecologist would forbid the use of antiepileptic medications in pregnancy. Significantly more ($p = 0.031$) neurologists than gynaecologists believed that monotherapy should be aimed for before a planned pregnancy in women with epilepsy. All of the physicians training to be neurologists and 81.3%

of the neurologists had such knowledge. Only two of the neurologists did not know of the need to administer folic acid to women with epilepsy before a planned pregnancy. More than a half of the respondents would administer it at a dose of 0.4 mg daily, but over 44% would increase the dose of folic acid in such women. More than a half of the surveyed physicians (56.8%) believed that pregnant women with epilepsy can have a natural delivery. Physicians specialising in neurology were significantly more frequently ($p=0.011$) of the opinion that caesarean section should be performed in such women. Seventy-one percent of the respondents did not see any contraindications for women with epilepsy taking antiepileptic medications while breastfeeding. Almost 16% of the respondents were strongly opposed to breastfeeding. Physicians who had already completed their specialist training, both neurologists and gynaecologists, would recommend breastfeeding more frequently ($p=0.004$). Physicians with more extensive professional experience would also more frequently make such a decision ($p=0.019$).

DISCUSSION

Even though women with epilepsy have over 90% chance of giving birth to a healthy child, the knowledge of physicians regarding pregnancy in such women seems insufficient. Literature devoted to the issue is not very extensive. So far, there has been no survey evaluation of the level of knowledge that neurologists and gynaecologists have about maternity management of women with epilepsy in Poland. Twice as many neurologists as gynaecologists participated in our survey. The survey indicated that more than 60% of physicians did not recommend that women with epilepsy use oral contraceptives. They may have been afraid of interactions between these agents and antiepileptic medications. Such interactions occur in the case of, for instance, carbamazepine, phenytoin, phenobarbital, oxcarbazepine and topiramate. These medications decrease the serum concentrations of oral contraceptives to cause their ineffectiveness [2]. A question regarding interactions between contraceptives and antiepileptic medications was included in a survey sent to 1000 neurologists and 1000 gynaecologists from 47 USA states in 1996. Of the 160 (16%) neurologist and 147 (15%) gynaecologist respondents only 4% of the neurologists and none of the gynaecologists knew of the impact of the six most commonly used antiepileptic medications on contraceptives. In addition, the applied contraception proved to be ineffective in women with epilepsy treated by 27% of the surveyed neurologists and 21% of the gynaecologists [5]. A survey regarding knowledge of the principles of care for women with epilepsy established by the American Academy of Neurology and the American College of Obstetricians and Gynecologists was conducted by the Epilepsy Foundation four years later. In this work, 3535 physicians specialising in different areas of medicine participated, with a number not knowing

which antiepileptic medications interacted with contraceptives. The knowledge of this interaction was better among neurologists than gynaecologists [6]. In 2003, most (71%) participants of the American College of Physicians Annual Meeting knew that enzyme-inducing antiepileptic medications could decrease the effectiveness of oral contraceptives [7]. Out of 100 obstetricians employed at university, private and state-owned hospitals in the south of India, almost all (94.8%) knew of the potential interactions between antiepileptic medications and contraceptives [8].

Gonadal sex hormones are known to affect the seizure threshold. The hormones that decrease seizure threshold include oestrogen, whereas progesterone has anticonvulsant effects [9,10]. There are also opinions that deny the proconvulsant effects of oestrogen [11]. In the present study, significantly more neurologists than gynaecologists knew that gonadal hormones could affect the seizure excitability of the brain. Of the 3535 specialists surveyed by the Epilepsy Foundation, the highest number of individuals did not know of the specific impact of oestrogen and progesterone on the seizure threshold [6]. Only quarter of the attendees of the American College of Physicians Annual Meeting in 2003 knew about the effects of these gonadal hormones on the seizure threshold [7]. Population-based studies showed that pregnancies in women with epilepsy account for approximately 0.5% of all recorded pregnancies and their course is mostly normal [12, 13]. Although epilepsy does not constitute a contraindication for pregnancy, in the present study, two physicians (one neurologist and one gynaecologist) were of the opinion that pregnancy is not recommended in women with epilepsy. The vast majority of neurologists and gynaecologists surveyed in this study believed that the risk of developmental abnormalities in children of mothers with epilepsy was slightly higher than the risk in healthy women. Most (86%) of the surveyed physicians participating in the American College of Physicians Annual Meeting in 2003 knew that there was a high probability of a woman with epilepsy giving birth to a healthy child. Further, 75% of them were of the opinion that there was no need to discontinue antiepileptic medications during pregnancy [7]. Almost all (92.7%) of the 88 surveyed neurologists practising in Massachusetts informed their female patients with epilepsy about the possibility of developmental abnormalities in their children, recommending avoidance of valproic acid [14]. Additionally, 91% of surveyed Indian obstetricians showed good knowledge regarding the teratogenic effects of antiepileptic medications. The same proportion of physicians knew that most women with epilepsy have a chance of giving birth to a healthy child without discontinuing antiepileptic treatment. Although the risk of a woman with epilepsy giving birth to a child with a defect is 2-6%, 44% of neurologists and 23% of gynaecologists who participated in the survey conducted in 1996 thought that the risk was 0-3% and some respondents believed it to be 50%. A

number of physicians surveyed by the Epilepsy Foundation also did not know how high the risk of developmental abnormalities in the children born to mothers with epilepsy was.

It is believed that folic acid supplementation before and during pregnancy, monotherapy and monitoring of antiepileptic medication serum concentrations can contribute to decreasing the occurrence of birth defects in newborn infants. It should also be remembered that some antiepileptic medications cause a decrease in the serum levels of folic acid [5,6,8,15–17]. In the present study, two neurologists did not know of the need to administer folic acid to women with epilepsy before a planned pregnancy. More than a half of the respondents would administer it at doses used in healthy women (0.4 mg/day). Almost 90% of the 88 surveyed neurologists from Massachusetts recommended that their female patients with epilepsy take folic acid before and during pregnancy [14]. The significance of folic acid in the prevention of developmental abnormalities was also known to 97% of the obstetricians surveyed in India [8]. To minimise the risk of birth defects in the children of mothers with epilepsy, more than 80% of physicians surveyed in this study believed that monotherapy with anticonvulsants should be attempted before pregnancy. Significantly more neurologists than gynaecologists were of this opinion. Attempts to introduce monotherapy in women with epilepsy planning a pregnancy were also applied in practice. An analysis of the course of the adaptation period of newborn infants born to mothers with epilepsy, carried out by Kociszewska and Wilczyński, showed that almost 70% of these mothers received only one medication [18]. Monotherapy used for at least six months before a planned pregnancy was also preferred by almost two-thirds of the respondents in studies from the USA and from India [7,8]. In the present study, over half of the physicians believed that pregnant women with epilepsy can have a natural delivery. Physicians specialising in neurology significantly more frequently believed that caesarean section should be performed in such women. The high frequency of caesarean sections in pregnant women with epilepsy in Poland was confirmed by a study by Stelmasiak et al. In this report, more than 50% of epi-

leptic women gave birth by caesarean section. Caesarean section was also commonly used in women with epilepsy treated at the Polish Mother's Memorial Hospital – Research Institute in Lodz. In the United Kingdom, on the other hand, most pregnancies in mothers with epilepsy were delivered naturally. There are no contraindications against breastfeeding for women with epilepsy taking antiepileptic medications [15,18–20]. A little more than 70% of the physicians surveyed in this study knew that. However, more than 15% of the physicians were strongly against breastfeeding. Only 47% of the attendees at the American College of Physicians Annual Meeting in 2003 knew that women taking antiepileptic medications can breastfeed their offspring. A slightly lower proportion of the surveyed neurologists from Massachusetts (38.2%) were of the same opinion, and 67.3% of respondents believed that the benefits of breastfeeding considerably exceeded the potential risks. A number of obstetricians surveyed in Scotland in 1994 had insufficient information regarding the possibility that epileptic women taking antiepileptic medications could breastfeed. Most (91.7%) obstetricians in India recommended that mothers taking antiepileptic medications could breastfeed their infants. Close collaboration between neurologists and gynaecologists as well as adherence to guidelines regarding care of women with epilepsy during reproductive years are necessary for the normal pregnancies in epileptic women. Canadian studies did not show an increased risk of obstetric complications in women with epilepsy, as long as appropriate care was provided. It is also necessary for epileptic women planning to have a child to follow their physician's recommendations. The findings of this research offer confirmation of this [7,8,14,21,22].

CONCLUSIONS

1. Gynaecologists and, to a lesser extent, neurologists should have more extensive knowledge of the reproductive and maternity issues of women with epilepsy.
2. Close collaboration between neurologists and gynaecologists in the care of epileptic women is necessary.

REFERENCES

1. Viale L, Allotey J, Cheong-See F, Arroyo-Manzano D, Mccorry D, et al. Epilepsy in pregnancy and reproductive outcomes: a systematic review and meta-analysis. *Lancet* 2015 Nov 7; 386(10006): 1845–1852.
2. Thomas SV. Managing epilepsy in pregnancy. *Neurol India* 2011; 59(1): 59–65.
3. Weil S, Deppe C, Noachtar S. The treatment of women with epilepsy. *Dtsch Arztebl Int* 2010; 107(45): 787–793.
4. Sethi N, Wasterlain K, Harden CL. Pregnancy and epilepsy – when you're managing both. *J Fam Pract* 2010; 59(12): 675–679.
5. Jasnos I, Cieślak A, Wanot J, Sejboth J, Szurlej D, et al. The knowledge of women with epilepsy on motherhood. *MSP* 2017; 11(3): 21–25.
6. Williams D. Antiepileptic drugs and contraception. *US Pharm* 2014; 39(1): 39–42.
7. Sharma A, Boller F, Koubeissi M. Women with epilepsy. *Funct Neurol* 2016 Jul-Sep; 31(3): 125–126.
8. Long L, Montouris G. Knowledge of women's issues and epilepsy (KOWIE-II): a survey of health care professionals. *Epilepsy Behav* 2005; 6(1): 90–91.
9. Bhat M, Ramesha KN, Nirmala C, Sarma PS, Thomas SV. Knowledge and practice profile of obstetricians regarding epilepsy in women in Kerala state, India. *Ann Indian Acad Neurol* 2011; 14(3): 169–171.

10. Stevens SJ, Harden CL. Hormonal therapy for epilepsy. *Curr Neurol Neurosci Rep* 2011; 11(4): 435–442.
11. Chiba S. Comprehensive management for women with epilepsy. *Brain Nerve* 2011; 63(4): 301–308.
12. Taubøll E, Sveberg L, Svalheim S. Interactions between hormones and epilepsy. *Seizure* 2015 May; 28: 3–11.
13. Patel SI, Pennell PB. Management of epilepsy during pregnancy: an update. *Ther Adv Neurol Disord* 2016 Mar; 9(2): 118–129.
14. Burakgazi E, Pollard J, Harden C. The effect of pregnancy on seizure control and antiepileptic drugs in women with epilepsy. *Rev Neurol Dis* 2011; 8(1–2): 16–22.
15. Viguera AC, Cohen LS, Whitfield T, Reminick AM, Bromfield E, et al. Perinatal use of anticonvulsants: differences in attitudes and recommendations among neurologists and psychiatrists. *Arch Womens Ment Health* 2010; 13: 175–178.
16. Steinhoff BJ. Pregnancy, epilepsy and anticonvulsants. *Dialogues Clin Neurosci* 2008; 10(1): 63–75.
17. Harden CL, Pennell PB, Koppel BS, Hovinga CA, Gidal B, et al. Practice parameter update: management issues for women with epilepsy – focus on pregnancy (an evidence-based review): vitamin K, folic acid, blood levels, and breastfeeding: report of the Quality Standards Subcommittee and Therapeutics and Technology Assessment Subcommittee of the American Academy of Neurology and American Epilepsy Society. *Neurology* 2009 Jul 14; 73(2): 142–149.
18. Kampman MT. Folate status in women of childbearing age with epilepsy. *Epilepsy Res* 2007; 75(1): 52–56.
19. Kociszewska I, Wilczyński J. Przebieg okresu adaptacyjnego noworodków matek chorych na padaczkę. *Gin Pol* 2002; 73(3): 194–202. (in Polish).
20. Stelmasiak Z, Semczuk W, Nowicka-Tarach B, Halczuk I, Semczuk-Sikora A, et al. Analiza przypadków kobiet chorujących na padaczkę rodzących w lubelskich klinikach położniczych w latach 1992–1998. *Neurol Neurochir Pol* 2002; 36(LII),2: 259–266. (in Polish).
21. Mawer G, Briggs M, Baker GA, Bromley R, Coyle H, et al. Pregnancy with epilepsy: obstetric and neonatal outcome of a controlled study. *Seizure* 2010 Mar; 19(2): 112–119.
22. Allen R, Grosu L, Das I, Kyei-Mensah A. The management of epilepsy in pregnancy at the Whittington Hospital: a retrospective audit 2004–2006 and 2007–2010. *Obstet Med* 2013 Jun; 6(2): 72–75.

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INTENSITY OF THE PHENOMENON OF REFUSAL TO SUBJECT CHILDREN TO PREVENTIVE VACCINATIONS IN THE YEARS 2002-2016 BASED ON ANALYSIS OF PRIMARY HEALTH CARE MEDICAL RECORDS

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

ABSTRACT

Background: Vaccinations are the most effective method for preventing infectious diseases. Massive implementation of long-term vaccinations strategies has resulted in elimination or a reduced incidence of many infectious diseases.

Aim of the study: To evaluate the intensity of the phenomenon of refusal to subject children to preventive vaccinations by attempting to characterize the parental group who refuse to vaccinate their children, determining the type and number of unrealized vaccinations, and identifying the reasons for being unvaccinated.

Material and methods: The research material was medical records from the Non-Public Health Care Unit in Opole. It concerned implementation of the Protective Vaccine Program over the years 2002-2016. A method of retrospective analysis of medical records using modern technology was applied.

Results: The phenomenon of refusal to subject children to preventive vaccinations is increasing. In the years 2002-2016, our retrospective analysis identified that 81 vaccinations (0.8% of the 10,057 vaccinations) were not carried out. The largest percentage of unrealized vaccinations involved hepatitis B (23.4%). Parents refusing to vaccinate their children were adults (Median = 31 years old, range: 27-36 years) and predominantly living in cities (87.88%). The reasons for abandoning mandatory vaccinations were not reporting with a child for vaccination (48.1%), deliberate refusal to subject a child to the vaccination (28.4%) and postponement of vaccination due to contraindications (23.5%).

Conclusions: The vaccination coverage level in the study area was assessed as satisfactory and is comparable to the results obtained on the national scale. The scale of the refusal for preventive vaccinations is not an epidemiological threat currently. However, it requires constant monitoring, and educational and information actions directed at parents/guardians.

KEYWORDS: vaccination, public health, preventive medicine

BACKGROUND

The first vaccination campaigns in Poland date back to the beginning of the 19th century and involved protection against smallpox. Poland's first law requiring vaccination against this disease was made in the year 1922. Subsequent legal regulations for mandatory vaccination were undertaken in the interwar years of the last century at the initiative of the Polish Institute of Hygiene. These vaccinations were against cholera, typhoid fever, typhus fever and tuberculosis. The first

Protective Vaccine Program was designed by the Polish Institute of Hygiene and was introduced in 1994. It included obligatory vaccinations financed in full from public funds as much as recommended vaccinations (vaccine preparation financed by patients own sources but medical examination and procedure financed from public funds) [1]. The legal aspects regarding implementation of preventive vaccinations in Poland are regulated by the provisions of the Act on the Prevention and Control of Infections and Infectious Diseases

in Humans (5th December 2008). By 31st October each year, the Chief Sanitary Inspector announces the Protective Vaccine Program that will be in force the following year. It is included in the Official Journal of the Minister of Health as form of a message. People living in the Polish territory are obliged to undergo specific protective vaccinations [2]. One condition to ensure legality of the preventive action is that individual patient consent must be obtained. The legal obligation to undergo preventive vaccinations in the Act of 5th December 2008 (referred to above) interferes with an individual patient's rights under Article 15 of the *Patients' Rights and Patients' Rights Ombudsman Act*, to consent to (or refuse) a health benefit in the form of vaccination. In this case, the protection of public health prevails over protection of an individual's rights. Evasion of the obligation to vaccinate is related to administrative coercion and legal responsibility regulated in the Petty Offences Code. A person evading vaccination may be punished through a fine or reprimand. A fine may be imposed repeatedly to enforce vaccination [3].

Objections to vaccinations were observed over two hundred years ago. The first mass protest in the history of vaccinations took place in the second half of the nineteenth century. This was when an epidemic of dangerous infectious diseases appeared and when compulsory vaccinations were introduced in Great Britain and the United States [4]. In the Polish literature, the first mention of the negative impact of active opponents of vaccinations on their implementation appeared in the Medical Chronicles of Tymoteusz Stepiński in 1931 and related to use of smallpox vaccines [5]. Over the past dozen or so years, an unsettling phenomenon has been observed globally, with the growing tendency for parents to abandon vaccinations of children [6]. A report from the Supreme Chamber of Control on the vaccination system indicates that the number of people evading vaccinations systematically grew by 40% each year from 2011-2014 [7]. Data from quarterly reports on the supervision of immunization cards and on persons evading compulsory preventive vaccinations provided by the Polish Institute of Hygiene showed the absolute number of individuals was 16,689 in 2015 [8].

AIM OF THE STUDY

Our objective was to evaluate the intensity of the phenomenon of refusal to subject children to preventive vaccinations through attempting to characterize a group of parents who refused to vaccinate their children, determining the type and number of unrealized vaccinations and identifying the reasons for not being vaccinated.

MATERIAL AND METHODS

The study lasted from 31st October to 23rd December 2016 and was conducted at the Non-Public Health Care Unit in Opole. Consent was obtained from the head of the facility and the Bioethical Commission of

the State Medical Higher Vocational School in Opole (approval no. KB – 46/2016). The research material was paper and electronic medical records belonging to the therapeutic entity and concerning children who did not receive the mandatory vaccinations. We analyzed 1683 immunization cards of children whose obligatory vaccinations fell in the years 2002-2016. The immunization cards for children born between 1983-1996 (622 cards) were obtained from the Non-Public Health Care Unit archive, while those from children born in the years 1997-2016 (1061 cards) were kept on site at the facility. The analysis also included copies of quarterly reports on protective immunization and the reports on persons evading mandatory preventive vaccinations submitted to the District Sanitary-Epidemiological Station in Opole. Copies of annual reports on protective vaccinations were made on the MZ-54 forms.

The method of retrospective analysis of medical records using modern technology was applied. The research tools comprised notes, bulk sheets and datasets in the form of tables. Data regarding children who were not subjected to mandatory vaccinations, the type of vaccination, the number of vaccine doses and the year of vaccination were obtained from the children's immunization cards. An additional information source was the copy of the reports on persons who evaded the obligation to vaccinate, which constituted an annex to the mandatory quarterly reports of protective vaccinations. The age and place of residence of the parents of unvaccinated children was obtained from the declaration of choice of the primary health care doctor and nurse, and the data collected in the electronic mMEDICA system, which is a computer program used in doctor's surgeries.

To analyze and interpret the data, the number (n) and percentage were calculated. The normality of distribution of quantitative variables was verified using the Shapiro-Wilk test with a statistical significance set at $p < 0.05$. The variables "age of parents of vaccinated children" and "age of parents of unvaccinated children" was characterized by a distribution not compatible with the normal distribution. Therefore, their median values, minimum and maximum were used for interpretation.

RESULTS

In the analyzed period, 10,138 vaccinations were planned and 10,057 were performed. There were 81 vaccinations not carried out, which accounted for 0.8% of the total number of due vaccinations. Only in the years 2006 and 2010 were all planned vaccinations administered (fig. 1).

The highest percentage of unrealized vaccinations was recorded in 2015 (2.94%) (tab. 1).

In the years 2002-2016, a total of 81 doses of vaccines were not administered including: 19 against hepatitis B (23.4%), 16 against diphtheria, tetanus and pertussis ('DTP'; 19.8%), 12 against measles, mumps and rubella (14.8%), 12 against Hib - *Haemophilus influenzae* type B vaccine (14.8%), 11 against polio-

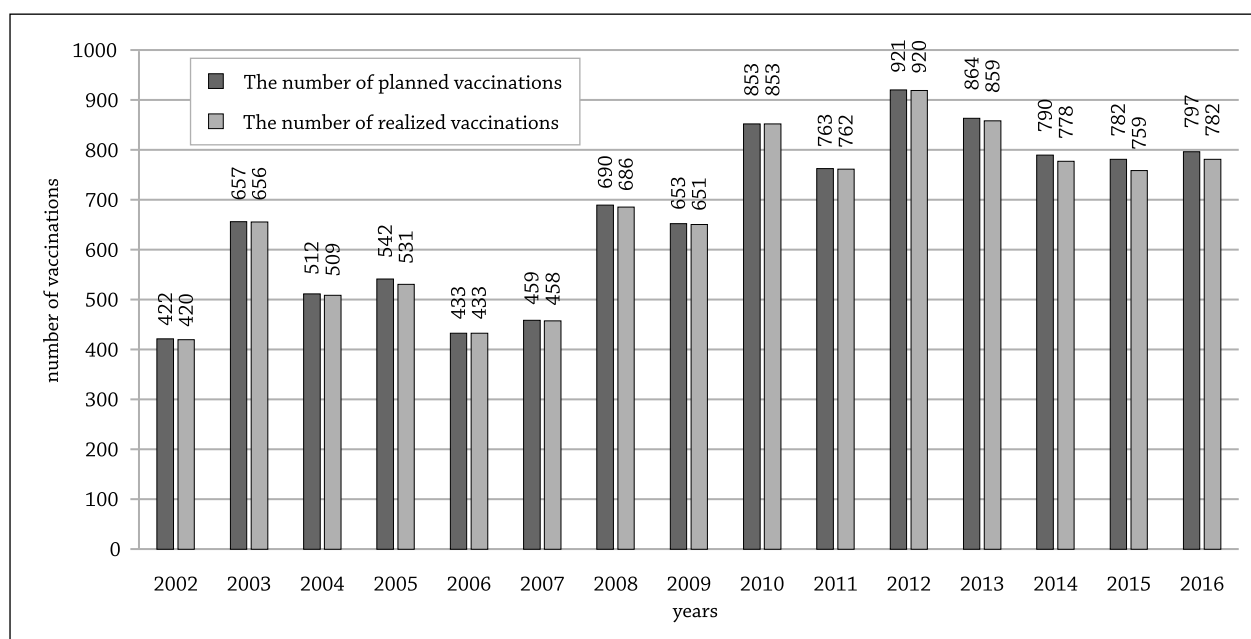


Figure 1. Total number of vaccinations planned and implemented in the years 2002-2016.

Table 1. Percentage of vaccinations unrealized in the years 2002-2016 in the study of the Non-Public Health Care Unit.

Year of implementation	Percentage of unrealized vaccinations
2002	0.47 %
2003	0.15 %
2004	0.59%
2005	2.03%
2006	0.00%
2007	0.22%
2008	0.58%
2009	0.31%
2010	0.00%
2011	0.13%
2012	0.11%
2013	0.58%
2014	1.52%
2015	2.94%
2016	1.88%

myelitis (13.6%) and 11 against diphtheria and tetanus ('Td'; 13.6%).

In seven cases, parents/guardians confirmed with a written signature their refusal to subject children to the following types of vaccinations:

- in 2008 – against measles, mumps and rubella using the MMR vaccine;
- in 2013 – against DTP and poliomyelitis;
- in 2014 – against DTP, Hib, poliomyelitis, hepatitis B;
- in 2015 – against measles, mumps and rubella (MMR), DTP, poliomyelitis, Hib;

- in 2016 – against hepatitis B, DTP, poliomyelitis, Hib.

The reasons for abandoning compulsory preventive vaccinations were: not reporting with a child for vaccination (48.1%), deliberate refusal to subject a child to the vaccination (28.4%) or postponement of vaccination due to contraindications (23.5%).

The median age of parents whose children were not subjected to mandatory vaccinations was 36 years (range: 25-46 years). In the group of parents who documented their decision to deliberately refuse to subject a child to the vaccination, the median age was 31 years (range: 27-36 years). The parents of unvaccinated children were usually the residents of cities (87.77%), with a minority of four cases (12.12%) residing in a village. The declaration on the deliberate refusal of the vaccination was signed by mothers (95.65%) in most cases, with fathers (4.35%) signing the remainder.

DISCUSSION

The fashion for abandoning vaccination in children reached Poland after Western European countries and the USA, and may contribute to the return of many illnesses eliminated with compulsory vaccinations. Research conducted in recent years showed that the percentage of unvaccinated children is increasing constantly [7]. Our study confirms this finding, and the outcomes obtained by Dáňová et al. in the Czech Republic in 2004-2014 [9].

From a public health perspective, the phenomenon discussed may constitute a potential epidemic threat. According to Paweł Grzesiowski, a specialist from the Experts' Team for the Protective Vaccine Program that operates at the Ministry of Health, vaccination evasion can lead to disappearance of collective resistance and emergence of limited epidemic outbreaks [10].

Collective resistance (collective protection) refers to the immunity of the entire population obtained with mass scale vaccination. Due to the high percentage of immunized people, the probability of contact between a susceptible person and an infected person decreases, as noticed by Rashid et al. [11]. Implementation of vaccination programs influences development of collective resistance. According to the National Consultant on Epidemiology, Iwona Paradowska-Stankiewicz, the risk of disease decreases in a non-immunized person if the percentage of immunized persons in a given population increases. Therefore, we conclude that vaccinations reduce the incidence of disease through direct protection of vaccinated people and indirect protection of non-immunized individuals [12]. According to the post-control conclusions on the implementation of preventive vaccinations provided by the Supreme Chamber of Control, vaccination of at least 95% of the population is sufficient to achieve population resistance against most infectious diseases [13].

Our study showed that the problem of avoiding preventive vaccinations was particularly visible in the years 2011-2015. These data correspond with the results of the audit carried out by the Supreme Chamber of Control concerning the children's preventive vaccination system in Poland from 2011-2015 [13]. According to this report, the number of children not subjected to obligatory vaccinations has grown systematically in Poland and although it is not an epidemiological threat currently, it requires constant supervision.

Analysis of our research material showed that the vaccination coverage level of children in the Non-Public Health Care Unit ranged from 97.06% to 100%. According to the data available, the vaccination coverage level against most infectious diseases covered by mandatory vaccinations until 2014 was at the similar level of 99.4% to 97% [13]. The percentage of vaccinations unrealized in individual years observed in our study is therefore acceptable. Further, vaccination performance indicators can be considered sufficient to achieve population resistance against most infectious diseases. Jan Bondar, a spokesman for the Chief Sanitary Inspectorate, described the current vaccination coverage level in children, in Poland, as sufficient protection against the spread of infectious diseases [14].

Analysis of medical records from the Non-Public Health Care Unit in Opole demonstrated that the highest percentage of unrealized vaccinations involved the hepatitis B vaccine (23.4%). For comparison, in the period considered, unrealized vaccinations against measles, mumps and rubella accounted for 14.8%. This situation could have been influenced by the necessity to administer three doses of basic type B hepatitis vaccination required by the Protective Vaccine Program provisions. In contrast, the measles, mumps and rubella vaccination schedule includes one dose of primary vaccination and one booster dose. Single cases of children not reporting for administration of hepatitis B vaccine were documented in the Non-Public Health Care Unit as

early as 2004, 2005 and 2007 i.e. before emergence of the anti-vaccine trend in Poland. The first cases of non-compliance with mandatory vaccinations against measles, mumps and rubella were reported in 2005, while the first deliberate refusals of this vaccination were observed in 2008. According to the literature, at the same time in Poland, the intensity of anti-vaccine movements increased [6]. Rudkowski pointed out the possibility of an outbreak of infectious diseases epidemics in the population having no acquired immunity [15].

Three basic types of reasons for not subjecting children to vaccinations were identified in this study. These were not reporting with a child for vaccination (48.1%), deliberate refusal confirmed by written signature of the parents/guardians (28.4%), and postponement of vaccination (23.5%). A survey from the Centre for Public Opinion Research (2013) concerned the opinion of Poles' on the subject of vaccination showed that only 2% of respondents admitted to abandoning compulsory vaccination of children. The most common reason cited was poor health of the child on the vaccination day. Occasionally, the reason indicated by the parents was concern about the adverse effects of vaccinations. Neglect to report for the vaccination also occurred [16].

In this work, we identified 23 people who avoided preventive vaccinations over 15 years. In 2016, 18 such people were identified in reports prepared for the District Sanitary-Epidemiological Station in Opole. In five cases, the parents did not report with children for vaccinations. In six, the parents signed the statement of informed decision not to vaccinate children. In the remaining seven cases, vaccinations were postponed due to contraindications. In the "Protective vaccinations in Poland in 2015" bulletin issued by the Polish Institute of Hygiene, indicators describing individuals who evaded vaccinations were presented per 1000 people in the 0-19 years age group. The highest values for these indicators were obtained in the following provinces: Pomorskie (5.6%), Śląskie (3.8%), Wielkopolskie (3.4%), Mazowieckie (2.6%) and Opolskie (2.1%), while the lowest value was in Podlaskie (0.4%) [8].

In the light of these results, the percentage of unrealized vaccinations (0.8% of the total number scheduled for the last 15 years) in the Non-Public Health Care Unit study indicates the discipline and positive attitude towards vaccination of most parents/guardians who submitted declarations of choice of the primary health care doctor and nurse for their children to this medical facility.

CONCLUSIONS

The vaccination coverage level in this study area is satisfactory and comparable to the result obtained for the entire country. The scale of refusals for preventive vaccinations is not an epidemiological threat currently. However, it requires constant monitoring and educational and information actions directed towards parents and guardians.

REFERENCES

1. Kalendarz szczepień i programy szczepień ochronnych w Polsce wczoraj i dziś. *Essentiamedica* 2009; 4: 16–18. (in Polish).
2. Ustawa o zapobieganiu i zwalczaniu zakażeń i chorób zakaźnych u ludzi z 2008, Dz.U. Nr 234, poz. 1570 z dnia 5 grudnia 2008. (in Polish).
3. Augustynowicz A, Wrześniewska-Wal I. Aspekty prawne obowiązkowych szczepień ochronnych u dzieci. *Pediatr Pol* 2013; 88(1): 120–126. (in Polish).
4. Hirte M. Szczepienia za i przeciw. Warszawa: Wydawnictwo Certa; 2014. (in Polish).
5. Bedford H, Elliman D. Współcześni przeciwnicy szczepień. Jak działają i jak na to reagować? *Med Prakt Szczepienia* 2013; 3(7): 15–20. (in Polish).
6. Andrzejewska D. Odmowa szczepień ochronnych. Aspekty zdrowotne, etyczne i prawne. *Mag Pielęgni Położ* 2013; 9: 9–11. (in Polish).
7. Najwyższa Izba Kontroli. NIK o szczepieniach ochronnych [online] [cit. 17.11.2016]. Available from: <https://www.nik.gov.pl/plik/id,10407,vp,12736.pdf>. (in Polish).
8. National Institute of Public Health. Vaccinations in Poland [online] [cit. 05.01.2018]. Available from: http://www.old.pzh.gov.pl/oldpage/epimeld/2015/Sz_2015.pdf. (in Polish).
9. Dáňová J, Šálek J, Kocourková A, Čelko AM. Factors associated with parental refusal of routine vaccination in the Czech Republic. *Cent Eur J Public Health* 2015 Dec; 23(4): 321–323.
10. Grzesiowski P. Rodzic odmawiający szczepienia dziecka. Komentarz. *Pediatr Dypl* 2014; 18(2): 61. (in Polish).
11. Rashid H, Khandaker G, Booy R. Vaccination and herd immunity: what more do we know? *Curr Opin Infect Dis* 2012 Jun; 25(3): 243–249.
12. Paradowska-Stankiewicz I. Szczepienia a odporność zbiorowa – komentarz. *Med Prakt Szczepienia* 2013; 1(5): 99–100. (in Polish).
13. NIK. Informacje o wynikach kontroli. System szczepień ochronnych dzieci. Nr ewid. 209/2015/P15/080/LKR [online] [cit. 5.01.2018]. Available from: <https://www.nik.gov.pl/plik/id,10407,vp,12736.pdf>. (in Polish).
14. Markiewicz M, Wysocka M. Obowiązkowe szczepienia ochronne trzeba rozszerzać a nie ograniczać. *Puls Medycyny* 2016; 7(7): 4. (in Polish).
15. Rudkowski Z. Pouczające doświadczenia. Dlaczego należy się szczepić? *Medium Biul Dolnoslask Izby Lek* 2015; 10(303): 4–5. (in Polish).
16. CBOS. Opinie na temat szczepień ochronnych dzieci. Warszawa 2013 [online] [cit. 5.01.2018]. Available from: http://www.cbos.pl/SPISKOM.POL/2013/K_172_13.PDF. (in Polish).

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EFFECT OF DIAMOND MICRODERMABRASION ON OILY SKIN: A CASE REPORT

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A – study design, B – data collection, C – statistical analysis, D – interpretation of data, E – manuscript preparation, F – literature review, G – sourcing of funding

ABSTRACT

Background: The history of microdermabrasion dates back to ancient Egypt. The first treatment in Europe occurred in 1985 and has since become a popular method of exfoliation of the superficial layers of skin. Microdermabrasion is an effective method of taking care of the skin of the face and body, bringing about immediate effects in the treatment of deep scars and stretch marks.

Aim of the study: To determine the effectiveness of diamond microdermabrasion on a person with hyperuricemia of the sebaceous glands.

Materials and methods: Based on interviews, a case analysis, and the impact of diamond microdermabrasion on the structure of the skin's surface, the level of hydration, oiliness and epidermal exfoliation were analyzed.

Case report: The subject was a 22-year-old woman struggling with oily skin. A few acne lesions and a large number of blackheads were observed in her nasal area. An interview was conducted prior to the procedure to eliminate any contraindications. The study was conducted within a period of 4 months at 3-week intervals. The Nati Skin Analyzer was used to determine the skin parameters of the patient.

Results: After applying a series of treatments using the microdermabrasion apparatus, satisfactory results were obtained in the form of reduced peeled sebum and improved skin hydration in the T and U zones.

Conclusions: The study shows that diamond microdermabrasion treatment has a beneficial effect on the patient's skin condition. Photographs before and after the surgery document the positive effects this series of treatments had. There was a decrease in the level of sebum secretion and the elimination of skin changes in the form of acne or open comedones.

KEYWORDS: diamond microdermabrasion, oily skin, cosmetology

BACKGROUND

Microdermabrasion is a cosmetic treatment involving the mechanical exfoliation of superficial layers of epidermis [1]. The treatment brings instant effects and is efficient in the treatment of deep wounds, pigmentation patches, and stretch marks. It works perfectly in seborrhea skin care. Proper treatment does not cause any damage to the skin barrier and thus, post-treatment regeneration is fast. Microdermabrasion is also applied to increase penetration of active substances deep into the skin [2]. To increase the depth of absorption of cosmetic substances, the microdermabrasion method can be combined with needleless mesotherapy, sonophoresis or iontophoresis [3]. The level of depth of the microdermabrasion depends on many factors including the chosen pressure, the diameter of the head, the level of gradation of the diamond, and the time of work in a given place [4].

Mechanical exfoliation of the superficial layers of epidermis helps in taking care of oily skin by decreasing secretion of sebum, which is the substance secreted by sebaceous glands [5]. The work of these glands is affected by adrenal hormones, estrogen, and most androgens, which stimulate its secretion. Seborrhea may increase due to stress, smoking, and air pollution [6].

Oily skin is primarily characterized by excessive secretion of sebum and can be treated as a transient condition, often associated with a younger age group, but it can persist into adulthood. It is characterized by gray-yellow coloring and a tendency to pollution and inflammatory changes. Initially, open and closed blackheads appear, which later lead to inflammatory pustules and papules. Oily skin at a young age is firm, tense, and supple, covered with a protective water-lipid coat, which prevents excessive dehydration [7]. The intensity of sebum production depends mainly on the size

of the sebaceous glands and is related to genetic conditions; it is often proof of a family tendency to inherited seborrhea. The average amount of sebum secreted by the human body per day is about 1-2g. The activity of the sebaceous glands changes depending on age [5].

Treatment of oily skin is very complex because a balance should be maintained between the removal of the appropriate amount of sebum to avoid glittering and the transient dehydration of the skin [6]. Cosmetic care consists of reducing the thickness of the stratum corneum. One should not use care products with a strong irritant effect, because they may cause damage to the natural bacterial flora, changing the acidic environment to an alkaline one [7]. In the treatment of oily skin, hygiene rules should be strictly adhered to in order to avoid infection and acne complications [8].

The ingredients of cosmetics used in treatment should be multidirectional. They should be sebostatic and bacteriostatic and should inhibit sebaceous lipid oxidation, alleviate irritation, and have a matting effect to allow for a small aesthetic improvement [6].

AIM OF THE STUDY

The aim of the study is to assess the effect of diamond microdermabrasion on the parameters of oily skin (exfoliation, hydration, oiling of the skin) using the example of the case study.

MATERIAL AND METHODS

The presented work used a special device for diamond microdermabrasion. For the measurement of skin parameters, a Beauty of Science computer device was used, called the Nati Skin Analyzer, which measured levels of exfoliation, the degree of hydration, and the degree of skin lubrication both before and after the treatment series was performed. The treatment was performed for 4 months, at intervals of 3 weeks. Measurements were obtained both before and after the series of treatments and were compared using the values presented in tab. 1-3.

CASE REPORT

A 22-year-old patient with oily skin problem was the subject of the research. The areas presenting with the problem are the T zone (forehead, nose, and beard) and the U zone (cheeks). There were numerous open comedones and post-acne scars.

The study was conducted at the Public Higher Medical Professional School in Opole with the consent of the Bioethical Commission. The entire treatment series lasted 4 months. The first examination occurred in November 2016 and the subsequent treatments were carried out at intervals of 3 weeks.

In order to carry out the research, the patient was informed about its time and course and agreed to participate in the project. All contraindications were elimi-

Table 1. The range of values for the level of oiling of the skin.

Measurement	Unit	Range		Description
		From	To	
Greasiness	%	0	10	Dry skin
Greasiness	%	11	14	Skin with a tendency for drying
Greasiness	%	15	20	Proper greasiness of the skin
Greasiness	%	21	25	Skin with a tendency for oiling
Greasiness	%	26	100	Oily skin

Table 2. The range of exfoliation measurement values.

Measurement	Unit	Range		Description
		From	To	
Exfoliation	%	0	14	Normal range
Exfoliation	%	15	20	Unsettled
Exfoliation	%	21	100	Excessive

Table 3. Range of values of measurement of hydration.

Measurement	Unit	Range		Description
		From	To	
T zone hydration	%	0	24	Alarming
T zone hydration	%	25	40	Incorrect
T zone hydration	%	41	65	Normal range

nated and the patient was informed about possible side effects and home care recommendations.

Skin analysis was performed with the Nati Skin Analyzer device at the start. Analysis included an observation of the level of skin hydration, oiling, and exfoliation, and the structure of its surface. Skin parameters were measured before and after the series of treatments. Before the examination, the patient did not prepare the skin in any way or apply any cosmetics. All treatments were performed in the morning for a reliable result.

DISCUSSION

The diamond microdermabrasion treatment had a positive effect on the regulation of sebum production and the skin condition of the patient. Treatment eliminated all imperfections in the form of acne scars and open comedones. The skin became firm, elastic, and smooth. The color of the skin was uniform and bright. After analysis with the Nati Skin Analyzer, it can be concluded that the treatment brought about the expected results. The degree of exfoliation of the epidermis had changed. Initially, the epidermal exfoliation level was at 19.09%. After the series of treatments, the level of exfoliation decreased to 17.91%. The oiling of the skin before the test was 30.25%. After the treatment, it decreased sharply to 5.44%. The results

showed that the surface of the skin was free from sebaceous secretions. That was the reason why the patient felt unpleasant skin pulling. In the U zone the level of hydration before the test was 24%. After the series of treatments, it rose to 42%. Due to proper care, the stratum corneum maintained an appropriate level of hydration. Moisturization of the T zone was initially at 12%. After the treatment it increased to 20%. While higher, it remained in the alarming range. The study had beneficial effects overall because the patient complied with the provided home care recommendations. An important component was to avoid highly irritating and exfoliating measures.

On the basis of other research presented by Katarzyna Kordus and Barbara Potempa in the article entitled "Study of the motives of choosing types of microdermabrasion and opinions about their effectiveness in practice," it can be stated that the respondents expressed satisfaction with the effects of the treatment depending on the perceived removal of discolorations, the narrowing of the pores, and reduced roughness. However, they did not notice any changes in skin density. Diamond microdermabrasion was assessed as effective in removing discoloration and fine wrinkles. 69% of respondents who underwent this procedure considered the intensity of the diamond microdermabrasion as sufficient for their needs, while 31% considered the method to be not intense enough. Postoperative complications in the form of erythema and skin sensitivity have been rarely observed [9].

On the basis of the research it can be concluded that water-oxygen microdermabrasion relieved oily and mixed skin as well as stabilized sebaceous glands.

Corundum microdermabrasion was a less frequently performed treatment among cosmetologists, perhaps due to the fact that the treatment was perceived by the respondents as a medical procedure.

The next article, "The effect of diamond microdermabrasion on the functioning of oily skin," presented the results of microdermabrasion performed on 16 women between the ages of 18 and 30. Each of them had a problem with oily skin. Seven treatments were carried out at intervals of 10–14 days. After the examinations, the condition of the skin was assessed as very good, and as many as 81% of the participants who had undergone treatment reported improvement in terms of brightening discolorations, reducing scars, or reducing comedones. For most people, the effects were noticeable after 3–4 treatments. Many patients did not report side effects and 94% of people said they would undertake microdermabrasion in the future to improve the condition of their skin [10].

CONCLUSIONS

Several conclusions can be drawn on the basis of the presented case and the analysis of the results:

1. The diamond microdermabrasion treatment had a positive effect on the regulation of sebaceous glands.
2. The cosmetic treatment improved the patient's skin condition in terms of the level of oiling and exfoliation.
3. The cosmetic treatment improved the skin's condition in terms of the rise of the hydration level of the U zone.

REFERENCES

1. Wróblewska I, Maj J, Chilicka-Jasionowska K, ed. Aparatura kosmetyczna i metodyka zabiegów. Opole: Państwowa Medyczna Wyższa Szkoła Zawodowa w Opolu, Studio IMPRESO Przemysław Biliczak; 2013. (in Polish).
2. Dylewska-Grzelakowska J. Kosmetyka stosowana. Warszawa: Wydawnictwo WSiP; 1999. (in Polish).
3. Kamińska A, Jabłońska K, Drobnik A, ed. Praktyczna kosmologia krok po kroku. Warszawa: Wydawnictwo Lekarskie PZWL; 2014. (in Polish).
4. Ignaciuk A. Kosmeceutyki. Wrocław: Wydawnictwo Elsevier Urban&Partner; 2011. (in Polish).
5. Wisniewska I, Kuskowska K, Łukasiewicz B. Kosmetologia współczesna – nowoczesne urządzenia. Warszawa: Wydawnictwo Atena; 2012. (in Polish).
6. Ożarowski A, Jaroniewski W. Rośliny lecznicze i ich praktyczne zastosowanie. Warszawa: Instytut Wydawniczy Związków Zawodowych; 1987. (in Polish).
7. Goliszewska A, Gromek M, Padlewska K, et al. Kosmetologia pielęgnacyjna. Warszawa: Wydawnictwo WSZKiPZ; 2010. (in Polish).
8. Jaroszevska B. Kosmetyka dawniej i dziś. Warszawa: Wydawnictwo Atena; 2005. (in Polish).
9. Kordus K, Potempa B, Śpiewak R. Badanie motywów wyboru rodzajów mikrodermabrazji oraz opinii o ich skuteczności w praktyce kosmologicznej. *Estetol Med Kosmetol* 2011; 1(1): 21–26. (in Polish).
10. Zduńska K, Markiewicz A, Turniak M, Glinka M. Wpływ mikrodermabrazji diamentowej na funkcjonowanie skóry tłustej. *Cosmetol* 2013; 16(4): 326–329. (in Polish).

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THE ROLE OF THE NURSING TEAM IN THE CARE OF PATIENTS WITH KABUKI SYNDROME

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ABSTRACT

Background: Kabuki syndrome is a rare genetic condition characterised by pathological changes within all the systems of the body, but with variable gene expression. All the patients described in the literature so far have specific facial features resembling the masks of actors from the Japanese Kabuki Theatre and mild to moderate mental impairment. Diagnosis is made based by genetic testing for mutations of the KMT2D and KDM6A genes. Therapy is mainly based on symptomatic alleviation of the effects of mutation, rehabilitation and improvement of the quality of patients' life. Then prognosis of patients with Kabuki syndrome is closely related to the severity of symptoms, which is very variable.

Aim of the study: The purpose of the study is to present the nursing problems based on the case report and to present complications caused by the disease entity.

Material and methods: The criterion for including the patient in the study was the legal guardian's (parent's) consent for the child to participate in the study. Qualitative research was conducted using analysis of medical records, interview with the child and the child's legal guardian, direct and indirect observation of the child for psycho-social changes related to the disease and interpretation of the data in the context of the theoretical knowledge and our own observations.

Case report: The report is based on the case of a 16-year-old girl, diagnosed (at the age of fourteen) with rare genetic disorder – Kabuki syndrome. The patient experiences some characteristic symptoms – big, red lips, low-set and sticky-out ears, drooping eyelids and short fingers and toes. One of the first symptoms suggesting Kabuki syndrome were: spitting up during breastfeeding, problems with swallowing, motor clumsiness and epilepsy. The role of the nursing team during hospitalization was to take care because of habitual dislocation of patella, and to provide psychological support. At present time the girl uses a wheelchair or she moves on her knees

Results: The manifestations of chronic disease contribute to the feeling of excessive stress, regardless of the patient's age. An adequate diet enriched with proteins contributes to the prevention of bedsores among individuals with Kabuki syndrome, immobilised to various degrees. Regular consultations with specialists, such as cardiologist, neurologist, gastroenterologist, orthopaedist, ophthalmologist, psychologist, orthodontist, speech therapist, immunologist, endocrinologist and dietician reduce the risk of complications associated with the disease in the patient with Kabuki syndrome. Early implementation of rehabilitation, focused to increase muscle tension, contributes to maintaining autonomy and self-care in patients with Kabuki syndrome.

KEYWORDS: Kabuki syndrome, child, care, nursing team

BACKGROUND

Kabuki syndrome is a rare genetic disease diagnosed for the first time in Japan in 1981 by two independent Japanese physicians, Norio Niikawa and Yoshikazu Kuroki [1,2]. To date, only 300 cases of people with Kabuki syndrome have been reported worldwide [2]. In Japan, this disease occurs as often as 1:320,000–86,000 people [3,4]. The condition is caused by a mutation in the KMT2D and KDM6A genes. Niikawa–Kuroki syndrome is a multisystemic disease, characterized

by specific facial features, which resemble the faces of Japanese actors of the Kabuki Theatre, namely, large, red, prominent lips, drooping eyelids, arched eyebrows, long eyelid fissures and a short nasal septum [3,5,6].

The clinical picture of the Kabuki syndrome includes bone abnormalities, such as growth retardation, brachydactyly (shortening of fingers), clinodactyly (bending of the fifth finger of the hand) and spine abnormalities [5]. Pathological changes occur in other body systems, but with different intensity. The most commonly diagnosed

and described conditions in Niikawa-Kuroki syndrome are defects in the left side of the heart, abnormalities in the functioning and structure of the genitourinary tract, frequent recurrent infections of the respiratory tract, vision and hearing impairment, dental changes, mobility and speech problems [7]. The Kabuki syndrome is also characterised by a mental impairment of varying degrees and social-emotional retardation. Because of these numerous systemic changes, patients with Kabuki syndrome need frequent consultations, rehabilitation and surgical interventions in many cases [3].

THE ROLE OF THE NURSE IN THE CARE OF A PATIENT WITH KABUKI SYNDROME

The concepts of nursing theory form the basis of professional care. Using these concepts and the practical actions of the nursing staff and combining them with their own experience is a measure of highly specialised care. In the case of rare genetic diseases, which include the Kabuki syndrome, there are no universal models of management, requiring the therapeutic team to be innovative in taking therapeutic action. Since the Niikawa-Kuroki syndrome is a newly identified disease involving multiple conditions and disorders within all organs of the body, each patient requires a highly individual care plan.

The number of symptoms and their different intensities necessitates that the therapeutic team constantly acquires new knowledge on the Kabuki syndrome in order to help the patient and his/her family effectively.

Among the state institutions that help and support patients with genetic diseases are foundations and associations such as "Wspólnie" [Together] – Association for Children with Rare Genetic Diseases and Their Families [8], and "Neuron" Foundation [9]. As mentioned by Florek-Łuszczki M. and Lachowski S. in the article "Institutional activities for the disabled people", the State Fund for Rehabilitation of the Disabled (PFRON) [10] also provides great support for the disabled.

A common feature of patients affected by the Kabuki syndrome mutations is facial dysmorphism, which attenuates with age, with the facial features become less striking, comparable to those of healthy people [11]. Different appearance and the feel of isolation may be connected with psychological stress for both the patient and his or her family. Stress among individuals with chronic genetic diseases was addressed in the work by Ziarko M. titled "Struggling with stress in the chronic disease" [12]. The destructive impact of stress on making therapeutic decisions in genetic diseases, a critical event that is the chronic disease and its somatic symptoms do have an effect on the quality of life because they impair the physical fitness [13].

The goal of the nursing team caring of the Kabuki patient is to provide comprehensive consultancy to find support and assistance from state institutions and to propose possible modifications and facilities for self-

care and self-help. Due to the possibility of motor problems in patients with Kabuki syndrome, it is important, depending on the severity of the disease, to ensure a sense of safety during locomotion, by providing give physical support. One of the goals of care for a person with a genetic disease is to offer methods for coping with stress that help maintain good quality of life in the face of an incurable chronic disease, financial problems and a fear of losing autonomy [14,15].

It is important to ensure the continuity of nursing care both during hospitalisation and at home. In most cases, the burden of caring for a chronically ill child falls on the family's shoulders. In order to prevent burn-out of caregivers of a child with a genetic disease, it is necessary to assist the patient and his or her caregivers in the home environment by providing a long-term care or palliative care [7,16]. The role of the therapeutic team in the care of a patient with Kabuki syndrome is primarily to educate caregivers and patients about the need for regular specialist consultations, shaping correct habits, such as taking an upright posture while sitting, and avoiding crossing legs to minimize the risk of posture defects. Early implementation of rehabilitation procedures (daily exercises at home adjusted by physiotherapists to patient's abilities, corrective exercises, correct body posture during everyday activities) is also of great importance in order to maintain autonomy and prevent contractures [17,18].

AIM OF THE STUDY

The purpose of the study is to present nursing issues based on a case report, to propose implementation of nursing interventions for a child with Kabuki syndrome, and to present complications caused by the disease.

MATERIAL AND METHODS

This is a case report of a 16-year-old girl patient, 157 cm in height and 65 kg in weight. Her BMI of 26.37 indicates that she is overweight. The study was conducted using medical records analysis [19]. The tools used in the analysis of records were a nurse's observation sheet, laboratory testing results, case history and outcomes of examinations and consultations with the psychologist, speech therapist, neurologist, endocrinologist and physiotherapist.

A scheduled interview with the patient was used to gather additional information on the current state of her physical health, mental well-being, as well as on the symptoms as a result of the Kabuki syndrome. An interview with the child and her legal guardian focused on active listening and creating a current, written record.

Doctors, directly and indirectly, observed the child for psycho-social changes related to the disease. The observations were made at home as well as during rehabilitation activities. Doctors directly observed her for disease-specific, dysmorphic facial changes, unnatural appearance of hands and feet, body structure, and

difficulties that may result from the necessity to use a wheelchair. Indirect observation by the rehabilitation team and the family provided information on the progress, the patient's involvement in the rehabilitation as well as her responses to the disease. All information was recorded and further analysed by comparing it with reports in the published literature. The recorded data were interpreted in the light of theoretical knowledge and our own observations. The study was granted the approval no. 68/2016 by the Bioethical Commission of the State Medical Vocational School. The legal guardians of the child provided informed consent

SPECIFIC CASE REPORT

Health interview and analysis of the patient's medical records

The patient was born by spontaneous labour in the 38th week of pregnancy with a birth weight of 3300 grams, a height of 54 cm, head circumference of 33 cm, and assigned an Apgar score of 10. During pregnancy, the mother suffered from viral infections of the upper respiratory tract. After the delivery, the newborn was diagnosed with general swelling, bruising of the thumb of the left hand and the pit (dimple) in the coccygeal skin.

The girl's psychomotor development was normal as she started sitting at 9 months, walking at around 1.5 years, speaking at 2 years. The patient had motor clumsiness manifested by waddling, running with a huddled posture, and dropping objects from her hands. Her main problem as an infant were frequent, recurrent infections of the upper respiratory tract and the need for hospitalization due to episodic febrile convulsions at the age of 2, 5.5 and 9.

The patient also had epilepsy. The first epileptic seizure occurred when she was 5.5, while the most recent one in 2010 lasted for 4 hours.

During hospitalization in 2010, a neurological consultation was conducted, which showed a disturbing characteristic, namely dysmorphic lesions of the skull, face, hands and feet, and as a result, the patient was referred to for extended neurological, genetic and endocrinological diagnostics. The examination also showed a generally reduced motor efficiency, walking disorders and obesity. As part of the neurological consultation, Romberg's test was performed to assess static balance.. Deep reflexes were poorly symmetrical but expressed.. There was poor coordination of the upper and lower limbs. Strength and muscle tone were normal. In order to confirm the suspicion of epilepsy, a transverse MR imaging of the head was performed with intravenous contrast agents.

The first genetic testing was performed in 2010 in the Medical Genetics Laboratory in Łódź. During the physical examination, a strong, yet obese body structure was noted. The following features attracted the

consultant's attention: large, square forehead; large, protruding, low-set ears; flat root of the nose; short, prominent philtrum, large mouth, widely spaced teeth, small chin, and drooping eyelids. The patient's palms were very soft with tapered fingertips. Her feet were wide with shortening of the second to the fifth toes, while the hallux was large. Due to dysmorphic changes in the face, hands and feet, peripheral blood lymphocytes were taken and used for an in vitro cell culture. The test was aimed to determine patient's karyotype. The test resulted in normal female 46, XX karyotype. There was no chromosome abnormalities that could explain the dysmorphia observed. However, a change in the number of copies of genes, that is a duplication below 1 Mb, was detected in the patient's genome, which may be a risk factor for the emergence of diseases with recessive inheritance patterns. On the basis of the above examination, no diagnosis or a suspicion of Kabuki syndrome was made.

The first alarming symptoms that might have indicated a rare genetic disease were noted by an orthopaedist who thereafter referred the patient for genetic consultation. A test for changes in the number of copies of genes by the aCGH method was carried out in 2014 and revealed the most likely clinically insignificant micro-duplications: duplication of 2q31.1 (HOXD9 gene) and duplication of 7q11.23 (WBSCR16 gene). In ongoing diagnostics, the patient was referred to the Genetic Clinic with a referral from her family practitioner. Considering the entire medical history and clinical symptoms, the dysmorphic syndrome called Niikawa-Kuroki syndrome was suspected. On the Makrythanas scale, 3/10 points were assigned to patient's Kabuki syndrome and molecular testing of the KMT2D gene was ordered. The results of the genetic test confirmed the suspicion of Kabuki syndrome by showing a pathogenic mutation of p.Gln3905.

Since she was 4 years old, patient's main problems have been habitual dislocations of the patellae leading to difficulty in walking and gradually impaired physical fitness. Due to the lack of stability within the knee joint, the patient has had difficulty walking since the age of 9 years. She moved on her knees and in a wheelchair. At the age of 10, the patient underwent MR imaging of her right knee joint in the fibular, anterior and transverse planes. The imaging revealed complete patellar dislocation with features of cartilagino-osseous necrosis in the lateral condyle of the right femur. In addition, dislocation was accompanied by swelling, reduced thickness of patella cartilage, an increased amount of fluid in the recesses of the knee cavity and signs of damage to the patellar retinacula.

No more than a year after surgery of the right patella, an MRI of the left knee joint was performed. A correct amount of fluid was found in the left knee joint cavity, however, the examination revealed a complete dislocation of the left patella that was located next to the lateral condyle of the femur. The case had features of severe dysplasia of the right patellofemoral joint and

a non-developed intercondylar line of the femur. The cartilage of the lateral condyle of the femur and tibia was thinner, which is a feature of chondromalacia. In 2012, the patient underwent further surgery for the habitual left patella dislocation, which also took place without complications.

In 2014, the patient underwent another MRI of the lumbosacral region because of the flaccid paraparesis of lower limbs. The examination showed physiological lumbar spinal lordosis, moderate right-convex scoliosis and normal morphology of lumbar vertebrae. No clear pathological changes were found in the soft tissues around the spine. Other than minor disorders of statics, the MR image of the L-S section of the spine was normal. The next hospitalization was due to unspecified paralytic syndrome, central nervous system disorders, cryptogenic encephalopathy, epilepsy, generalised muscle hypotonia, hypothyroidism, psychomotor retardation and upper respiratory tract infection. The programme of neurological speech therapy included exercises of the articulatory organ, introduction of correct speech patterns for “s, z, c, dz” sounds in sentences, words, expressions, strengthening of introduced speech patterns, getting used to systematic exercises, and motivating for effort.

Based on psychological and pedagogical examination, it was found that the development of the patient was slightly below normal in relation to her age. The patient also became demotivated quickly when facing difficulties and rehabilitation exercises and easily avoided attempts to achieve goals. In addition, doctors found normally developed verbal functions, wide general knowledge and concepts, the ability to express her thoughts and feelings, the willingness to make verbal contact. The biggest difficulty was arithmetic reasoning, acquiring knowledge and skills in mathematics, even in elementary addition and subtraction of numbers up to 10. As regards visuo-motor coordination, her learning ability was at a level lower than expected, which may contribute to poor motor ability and activity, controlled by visual perception, resulting in reduced lower manual dexterity. Based on the observation of patient's social functioning in the area of emotions and social behaviour, it was found that she correctly made emotional contact and had a positive relationship with people around her. The “Describe yourself” test also indicated a tendency to experience negative emotions, sadness, anxiety, agitation, unrest, tension and fears, which the patient seemed to be suppressing, seeming to not want to be considered better than she was in reality. The therapeutic programme included psychological assistance and supportive conversations addressing her strong anxiety and fears of standing on her own two feet. The patient also participated in rehabilitation holidays due to generalised muscle hypotonia, motor clumsiness and poor motor coordination. Additional difficulties were flexural contractures of the group of ischiotibial muscles of the right and left leg due to a long-term immobilisation.

Description of the patient's current health situation

Muscle hypotonia, contractures and elastic subcutaneous tissue are some of her prevailing problems. In the dysmorphological examination, we observed features of facial dysmorphism distinctive for Kabuki syndrome: thick hair; wide root of the nose; slanting, upward-facing eyelid fissures; thinned eyebrows on both sides; long eyelashes; prominent, relatively large ears; hypertelorism; high cheekbones; short column; wide end tip of nose; wide, prominent mouth; corners of lips facing downwards; widely spaced teeth and hypodontia.

In the upper extremities, the 5th bone is shortened, so the hands and feet are relatively small. Although most patients with Kabuki syndrome have mild to moderate intellectual disabilities, the patient's intellectual level is normal for her age.

The patient's body feels doughy, which gives the impression of being overhydrated. The girl has a difficulty in daily routines such as combing and dressing, with which she needs help. All activities requiring precise manual skills, such as tying shoelaces, putting on shoes, using cutlery, combing, were problematic for the patient and she often dropped objects. The patient requires regular rehabilitation and multi-profile support of her development. She is now a 16-year-old patient, who, from the age of 9, moves on her knees or in a wheelchair.

DISCUSSION

The Kabuki syndrome is a disease entity diagnosed very rarely in Poland, as evidenced by the limited number of publications in the Polish literature [20]. Therefore, it is necessary to publish new case reports in order to increase awareness and knowledge of the disease among healthcare professionals. As the first diagnoses of Kabuki syndrome were made more than 40 years ago, it can be concluded that patients with Niikawa-Kuroki syndrome can live to an old age [21,22]. For this reason, early diagnosis of coexisting diseases and intervening with surgery and rehabilitation is a priority for improving the patient's quality of life and extending it. This is related to the necessity for frequent hospitalizations, which are associated with increased anxiety and stress, both of which the medical staff should alleviate, providing patients with peace of mind and a sense of security. It is also necessary to carry out a population study based on a precise estimation of the prevalence of Kabuki syndrome in Poland. Due to multi-system abnormalities in patients with Kabuki syndrome, cooperation of specialists from various fields of medicine is required [23,24].

In the presented case of a 16-year-old patient who was diagnosed as having Kabuki syndrome at the age of 14, the prevailing problem is weakening of muscle tone, which was also observed and reported by Cheon, Ko and team in the paper on the clinical and molecu-

lar features of Kabuki syndrome [4]. According to the authors, muscle tone becomes weaker mainly in the neonatal period among 51–98% of patients. Moreover, the article highlighted the relationship between the type of mutation and phenotype. It has been shown that in patients with KMT2D mutation, hypotonia is more frequent than in individuals with KDM6A mutation. With the introduction of systematic rehabilitation procedures, satisfactory results were obtained, allowing patients to perform activities without the assistance of other people [4].

The article by Haller, Kruk presents a case report of a patient with epilepsy, which manifested itself at age of 13 years [21]. Based on record analysis, the authors pointed out that epilepsy is one of the dominant symptoms in Kabuki syndrome and occurs at a frequency of 10–80% in all of the 300 cases reported so far [18,22]. The research showed that epilepsy seizures were manifested only in children aged from 12 months to 12 years, which was also observed in this case report.

The problem of anxiety and stress caused by the presence of multiple conditions and the patient's different appearance was also addressed by Badenci and Cengiz [26]. The authors of the article presented the case of a 5-year-old patient, paying particular attention to her and her family's mental state. The patient had significant separation anxiety and fear of death and invasive medical procedures. In order to alleviate the excessive fear of the care and medical activities, a method was used, where patient enacted brief scenes with dolls and toys imitating medical tools, having the opportunity to play the role of a doctor or nurse. The measures had a positive effect. Additionally, the patient received psychotherapy. Thanks to the role playing technique, the psychologist could learn about the emotions and fears that the patient was experiencing. Due to the age at which this patient was diagnosed as having Kabuki syndrome, the above methods were not applied. However, psychological assistance was implemented for both the patient and the closest family members.

According to the published data, obesity occurs in children increasingly frequently. In some cases,

increased body weight is caused as diabetes or hypothyroidism. Lack of physical activity can also have a direct impact on weight. In the article by Skowrońska and Fichna, the case of a 16-year-old boy patient with obesity, type II diabetes and metabolic syndrome was reported. The nursing care included taking sample materials for laboratory tests, observation of the patient, checking the blood glucose level. A low-fat diabetic diet and pharmacotherapy were also implemented. The patient also consulted with dietician and diabetologist. He was also educated on changing his lifestyle and nutrition habits [27,28]. Preventive measures proposed by Skowronska, Fichna et al. were also applied in the case report of a girl patient with Kabuki Syndrome, who was diagnosed as obese. As in the case reported in this paper, the following issues have been highlighted – the need to perform regular laboratory check-up tests and to observe the patient for symptoms of weakness, fatigue, dryness of skin layers, mood worsening as these may indicate a decrease in thyroid hormone levels [24–27].

CONCLUSIONS

1. Early implementation of rehabilitation, focused on increasing muscle tone, contributes to maintaining autonomy and self-care in patients with Kabuki syndrome.
2. The manifestation of a chronic disease contributes to feelings of excessive stress, regardless of the patient's age.
3. An adequate diet enriched with proteins contributes to the prevention of bedsores among individuals with Kabuki syndrome, who may be immobilised to varying degrees.
4. Regular appointments with consultants, such as cardiologist, neurologist, gastroenterologist, orthopaedist, ophthalmologist, psychologist, orthodontist, speech therapist, immunologist, endocrinologist and dietician reduce the risk of complications associated with the disease in patients with Kabuki syndrome.

REFERENCES

1. Miyake N, Koshimizu E, Okamoto N, Mizuno S, Ogata T, et al. MLL2 and KDM6A mutations in patients with Kabuki syndrome. *Am J Med Genet A* 2013 Sep; 161A(9): 2234–2243.
2. Sobreira N, Brucato M, Zhang L. Patients with a Kabuki syndrome phenotype demonstrate DNA methylation abnormalities. *Eur J Hum Genet* 2017 Dec; 25(12): 1335–1344.
3. Armstrong L, Abd El Moneim A, Aleck K, Aughton DJ, Baumann C, et al. Further Delineation of Kabuki Syndrome in 48 Well-Defined New Individuals. *Am J Med Genet A*. 2005 Jan 30; 132A(3): 265–272.
4. Cheon CK, Ko JM. Kabuki syndrome: clinical and molecular characteristics. *Korean J Pediatr* 2015; 58(9): 317–324.
5. Dentici ML, Di Pede A, Lepri FR, et al. Kabuki syndrome: clinical and molecular diagnosis in the first year of life. *Arch Dis Child* 2015; 100: 158–164.
6. Sakata S, Okada S, Aoyama K, Hara K, Tani C, et al. Individual clinically diagnosed with CHARGE syndrome but with a mutation in KMT2D, a gene associated with Kabuki syndrome: a case report. *Front Genet* 2017 Dec 11; 8: 210.
7. Jamsheer A. Genetyczne podłoże izolowanych wrodzonych wad dłoni. *Med Wieku Rozw* 2008; 12(3): 729–737. (in Polish).
8. Maksymowicz A. Internet jako wsparcie dla chorych na choroby rzadkie. *Media i Społeczeństwo*. 2016; 6: 113–117. (in Polish).
9. Stowarzyszenie „Neuron” Pomocy Dzieciom i Osobom Niepełnosprawnym [online] 2001 [cit. 21.10.2018]. Available from URL: http://ngo.dabrowa-gornicza.pl/baza/baza_ngo/organizacja/136/stowarzyszenie_neuron_pomocy_dzieciom_i_osobom_niepelnosprawnym.html. (in Polish).

10. Florek-Łuszczki M, Lachowski S. Działania instytucjonalne na rzecz osób niepełnosprawnych. *Medycyna Ogólna i Nauki o Zdrowiu* 2013; 4(19): 480–484.
11. Liu S, Hong X, Shen C, Shi Q, Wang J, et al. Kabuki syndrome: a Chinese case series and systematic review of the spectrum of mutations. *BMC Med Genet* 2015 Apr 21; 16: 26.
12. Ziarko M. Zmaganie się ze stresem choroby przewlekłej. *Poznań: UAM*; 2014: 31–47. (in Polish).
13. Schulz Y, Freese L, Mänz J, Zoll B, Völter C, et al. CHARGE and Kabuki syndromes: a phenotypic and molecular link. *Hum Mol Genet* 2014; 23(16): 4396–4405.
14. Sun XX, Li SS, Zhang M, Xie QM, Xu JH, et al. Association of HSP90B1 genetic polymorphisms with efficacy of glucocorticoids and improvement of HRQoL in systemic lupus erythematosus patients from Anhui Province. *Am J Clin Exp Immunol* 2018; 7(2): 27–39.
15. Szelaż J, Strzałkowska A, Ślęzak R. Zespół Kabuki – opis przypadku. *Pediatr Pol* 2005; 80(9): 817–821. (in Polish).
16. Boss RD, Falck A, Goloff N, Hutton N, Miles A, et al. Low prevalence of palliative care and ethics consultations for children with chronic critical illness. *Acta Paediatr* 2018 Oct; 107(10): 1832–1833.
17. Błoch M, Śmigiel R. Heterogenność kliniczna zespołu Kabuki (zespół Niikawy i Kurokiego) na podstawie opisu przypadku 15-letniej pacjentki z nawykowym zwichnięciem rzepek. *Pediatrica Polska* 2017; 92(6): 758–763. (in Polish).
18. Szczepaniak E, Obersztyn E, Kruk M, Jastrzębska-Janak K. Zespół Kabuki z padaczką ujawniającą się w 13 roku życia. Opis przypadku. *Neurol Dziec* 2006; 15(30): 69–74. (in Polish).
19. Lenartowicz H, Kózka M. Metodologia badań w pielęgniarstwie. Warszawa: Wydawnictwo Lekarskie PZWL; 2011: 97–108. (in Polish).
20. Caciolo C, Alfieri P, Piccini G, Digilio MC, Lepri FR, et al. Neurobehavioral features in individuals with Kabuki syndrome. *Mol Genet Genomic Med*. 2018 May; 6(3): 322–331.
21. Haller J, Kruk MR. Normal and abnormal aggression: human disorders and novel laboratory models. *Neurosci Biobehav Rev* 2006; 30(3): 292–303.
22. Cudzilo D, Czołchowska E. Orthodontic treatment of a Kabuki syndrome patient. *Cleft Palate Craniofac J* 2018 Sep; 55(8): 1175–1180.
23. Teranishi H, Koga Y, Nakashima K, Morihana E, Ishii K, et al. Cancer management in Kabuki syndrome: the first case of Wilms tumor and a literature review. *J Pediatr Hematol Oncol* 2018 Jul; 40(5): 391–394.
24. Lepri FR, Cocciadiferro D, Augello B, Alfieri P, Pes V, et al. Clinical and neurobehavioral features of three novel Kabuki syndrome patients with mosaic KMT2D mutations and a review of literature. *Int J Mol Sci* 2017 Dec 28; 19(1): 82.
25. Roma D, Palma P, Capolino R, Figà-Talamanca L, Diomedici-Camassei F, et al. Spinal ependymoma in a patient with Kabuki syndrome: a case report. *BMC Med Genet* 2015 Sep 5; 16: 80.
26. Bademci G, Cengiz FB, Foster Li I, et al. Variations in multiple syndromic deafness genes mimic non-syndromic hearing loss. *Sci Rep* 2016; 26(6) [online] 2016. [cit. 26.08.2016]. Available from URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4999867/>.
27. Skowrońska B, Fichna P, Majewska K, Stankiewicz W, Niedziela M. Zespół metaboliczny i cukrzyca typu 2 u 16-letniego chłopca – opis przypadku. *Endokrynologia, Otyłość i Zaburzenia Przemiany Materii* 2005; 3(1): 40–44. (in Polish).
28. Vajravelu ME, De León DD. Genetic characteristics of patients with congenital hyperinsulinism. *Curr Opin Pediatr* 2018 Aug; 30(4): 568–575.

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THE EVOLUTION OF NATURAL ALIMENTATION

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A – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

ABSTRACT

Advances in medicine and the evolution of health-related behaviors through time and across cultures have contributed to changes in attitudes toward natural alimentation. In the past, women who breastfed their babies were educated by word of mouth and family traditions passed on by their female relatives and communities, and the act of breastfeeding itself constituted a socio-cultural process.

The health-related benefits of breast milk for infant nutrition have long been known. Throughout the ages, the image of the breastfeeding woman has inspired many artists and promoted natural alimentation. Ancient beliefs and religious practices were combined with the teachings of the church as well as alchemy principles, and lactation counseling was based on popular belief rather than scientific or medical knowledge. In modern times, breastfeeding has experienced a rise in popularity and is recommended to mothers during pregnancy and as part of contraception education. Anecdotal beliefs regarding the beneficial effects of breastfeeding on children's overall psychological wellbeing have become a subject of scientific investigation. Within the current pregnancy-related standards, the modern promotion of breastfeeding encompasses nutritional, immunological and psychological aspects. In this paper we have summarized the evolution of the beliefs that have surrounded breastfeeding from antiquity to the present day.

KEYWORDS: breastfeeding, historical outline, lactation

BACKGROUND

Worldwide, breast milk is recommended as the first choice of nutrition for newborns. Research demonstrates that breast milk provides the best balanced diet for a growing infant [1,2]. Archeological findings and skeletal analyses of our ancestors serve as a source of information on past nursing practices, and age of weaning can be determined by examining the calcium content of teeth and bone matter as well as strontium and nitrogen isotopes [3]. In prehistoric times, the validity of nursing was supported by examples of mythological heroes as well as the rules set in place by local authorities; scientific knowledge was not taken into account [4].

ANTIQUE TIMES AND MYTHOLOGY

In the Bronze Age (c. 1600 BC), the image of the breastfeeding woman was widely popularized by sculp-

tures and papyrus inscriptions. Commemorations of the act of breastfeeding throughout that time and until the Iron Age can be found in the form of statues, for example those depicting the ancient Egyptian goddess Isis nursing her son Horus (VI–III BC). Goddesses were then set as examples for women to nurse their infants until age two or three years, even if the child had already been given solid foods [5]. A mother's milk was considered the most appropriate, convenient and cleanest form of feeding, and breastfeeding could act as a contraceptive. At that time, the relationship between infertility and nursing was already known; it is unclear, however, whether that was a result of religious restrictions regarding abstemiousness during the time of nursing or the contraceptive properties of that period [5]. The Ebers papyrus (1550 BC) compares the smell of a woman's milk to the smell of dried manna, distinguishing it from the sour smell

of fish. Early mentions can be found in that period of the healing qualities of breast milk for ailments such as rashes, burns, eye diseases and pediatric urological problems [6].

The topic of breastfeeding can also be found in Greek mythology from the age of Homer (c. IX–VIII BC). The image of breastfeeding mothers can be found in the *Iliad*, where Hecuba nursed her son Hector [I, XXII, 82–83] and in the wrath of Achilles [I, XVI, 203]. Nursing was recommended in the Hellenic world, however the trend to employ wet nurses was already on the rise [7].

In Roman mythology, the most prominent example is the founding of Rome and the she-wolf nursing the brothers Romulus and Remus. Several events surrounding a newborn were attributed to minor goddesses; for example, the creation of milk within the woman's breast was the responsibility of Rumina, the child learning to suck was attributed to Educa, and Vaginatus was in charge of opening a child's mouth for their first scream [8]. Philosophers such as Tacit, Aulus Gellius, Plutarch and Plinius argued for the necessity of breastfeeding by the child's biological mother. They postulated that a mother's milk is the most natural source of nutrition for a newborn and therefore the best, which is also due to the bond formed between the child and the mother during the act of feeding [4].

Arabic medicine, at the time, relied on knowledge accumulated by the Greeks. Around the 9th century AD, the works of Ibn Sina (Avicenna 980–1036) and Al Razi (Rhazes 850–932) were translated into Arabic from Persian, and became the most popular handbooks used in Arabic medicine. In his book *The Canon of Medicine*, Avicenna included several passages on natural alimentation. He listed the benefits of breastfeeding and, for the first time, recommended feeding a newborn two or three times a day, especially in the days directly following delivery. Arabic society was under immense influence of the teachings of the Koran [4,8].

Among Jewish people, children were considered a blessing from God and a reason for jubilation. Despite the fact that a greater value was attributed to male offspring, infanticide, which at that time was quite common among other cultures, was forbidden in the Judaic world. Feeding the newborn was considered a mother's duty to her child as well as her husband. The newborn was latched onto the breast directly after delivery, sometimes even before the umbilical cord was severed, or within the first 24 hours of life. According to the *Talmud*, the child may remain on the breast for the entire day, with one feeding at night. No information on artificial feeding was made available [6]. The recommended period for breastfeeding an infant, as proposed by Rabbi Josha, was set between a minimum of 18–24 months and up to five years, depending on necessity. *The Books of the Maccabees* contains a passage describing that process: "I carried you in my womb for nine months and nursed you for three years. I have taken care of you and looked after all your needs up to the present day" [5, 2Mch 8,9].

FROM THE MIDDLE AGES TO THE AGE OF ENLIGHTENMENT

In the Middle Ages, medicine was based on the ancient scriptures (Soranus and Galen, modified by Avicenna and Rhazes), folk beliefs and rituals, as well as the teachings of the Church and alchemist principles. Breastfeeding and women's diseases were studied by the Italian physician Trotula of Salerno [4]. In his book *De proprietatibus* (1230), which was based on Aristotle's *Historia animalium*, Bartholomeus Anglicus describes a mother as the best source of nourishment for her child, while also stressing the concept of motherly love and sacrifice. Breast milk was considered best for the child. The issues surrounding lactation began to be popularized and the stasis of breast milk was associated with diseases of the breast (Theorems by Konrad of Byczyna). It was noted that breastfeeding established a stronger bond between the mother and child [11]. In the period between the 5th and 14th centuries AD, the average breastfeeding time was three to four years and up to six years in Arabic countries [8].

New discoveries, a change of mindset and the popularization of medical novelties in print contributed to a greater understanding of the subject of lactation, not only among physicians, but also society in general. In 1544 AD, English lawyer and pediatrician Thomas Phayer published his *Booke of Chyl dren*, which came to be known as the first book of pediatrics written in the English language. In 1565, the first information regarding the alimentation of newborns and the possibility of disease transmission was documented by Simon de Vallambert [7], with a case study of a mother suffering from syphilis. For nearly the entire duration of the Classical period, the belief was that a woman's milk held little to no value during puerperium, as the woman was incapable of producing high-quality milk after an exhausting labor. It was not until 1699 that colostrum and its laxative qualities for helping the infant pass meconium was recommended by German surgeon and clinician Michael Ettmüller. In 1719, French surgeon Pierre Dionis pointed to colostrum as more nourishing than later milk, and in 1776 Swedish clinician Rosen von Rosenstein claimed colostrum could act as a protective agent against several diseases [4,8].

The authority of the Pope and the Roman Emperor contributed to the frequent depiction of the image of the nursing mother in Christian sacral art in an attempt to promote natural alimentation. The Flemish artist Peter Paul Rubens (1577–1640) applied his unconstrained style to sacral art, interpreting Christian as well as mythological themes. At the turn of the century, new ideas and medical discoveries inspired Rubens' works, and his 1612 painting *Caritas Romana* depicts a daughter (Pero) breastfeeding her father (Cyron) in a dungeon, in order to save him from a gruesome death by starvation [10].

In that period, the expression of western standards also manifested in the production of the first breast-related garment: the brassiere [11].

In the 19th century, natural alimentation was advised by physicians across Europe and scientific studies were conducted. Breastfeeding was considered a religious and national duty that encompassed the emotional and medical aspects of the process. However, the higher classes of society, especially in France and England still preferred to employ wet nurses, and women who wanted to breastfeed their own infants had to overcome disapproval from their families. In Germany, the Protestant religion heavily emphasized the benefits of breastfeeding, citing the mother's duty to their offspring. In Scandinavian countries, breastfeeding was common among all social classes, which resulted in a markedly lower infant mortality rate compared to other European countries at the time. At the end of the 19th century, many Polish physicians began to advise latching the newborn onto the breast between four and eight hours after delivery, and in exceptional cases (should lactation be delayed) the use of warm water and chamomile enemas were recommended to enable the passage of the meconium [12,13].

MODERN TIMES AND HISTORY OF POLISH BREASTFEEDING

In the first half of the 20th century, the nutritional value and digestibility of colostrum were publicly acknowledged. In 1892, Paul Ehrlich demonstrated that immunities to certain diseases are passed through breast milk from the mother to her child [14].

In Poland, breastfeeding was encouraged. During the second half of the 20th century, Poland was a predominantly rural country with large farming communities. The number of women from rural areas who gave birth in hospitals was quite low. In the cities, industries were slowly growing and the people from working class districts usually had poor living conditions and a low income. A system of childcare stations developed slowly.

During the interwar period, physicians recommended breastfeeding on a set time regimen with a couple of hours rest at night. Breastfeeding was recommended for a duration of 12 months, and a child's diet included fish oil and fruit juices for scurvy and rickets prophylaxis, starting between four and six months of age. The contraindications for breastfeeding were tuberculosis, wasting syndrome, renal failure and severe heart defects, but not syphilis [15–18].

Due to the prevailing famine in the interwar period, breastfeeding was often the only source of nourishment for infants. Infant mortality rates rose (coefficient > 150), mostly due to pneumonia, infectious diseases, and infectious diarrhea [19].

At the turn of the 19th and 20th centuries, much research emerged comparing the composition of human and animal milk. Beliefs about the beneficial aspects of colostrum were prevalent in circles of physicians and midwives; nonetheless, many still recommended hir-

ing wet nurses or feeding the newborn artificially for the first days or weeks after delivery. In 1805, the *Vilnius Journal* published the treaty 'About the physical upbringing of children' by Jędrzej Śniadecki (1768–1838), which became the first work of the developing field of Polish pediatrics. Śniadecki, an advocate for natural alimentation, underlined the relationship between lactation and postpartum diseases and mortality. He described the laxative properties of colostrum, which helps in passing meconium. In 1867, Ludwik Władysław Rzepecki, based on the experiences of hospitals in London, Paris and Stockholm where infant mortality rates grew after feeding with animal milk, recommended exclusively breastfeeding for the first 6 months and afterwards a progressive inclusion of solids in the diet [20].

In 1864, the faculty of pediatrics of the Jagiellonian University was founded, with a popular children's polyclinic headed by Dr Maciej Leon Jakubowski (1837–1915) [21]. *Tips on nutrition and childcare during the first year of life*, the first handbook for the public with guidelines regarding nutrition and child-alimentation, recommended breastfeeding. It stated that the frequency of feeding should be every two hours during daytime and every three hours at night. The handbook recommended that children are breastfed for the first year and that supplementary nutrition should be introduced during that period [22]. Sznabl (1838–1912), a Polish doctor and teacher, promoted breastfeeding and believed that artificial alimentation is a necessary evil. The belief during this time was that, apart from the benefits to the child, breastfeeding may also be advantageous to the mother [16].

Neither the efforts of physicians nor midwives had any effect on the practices of the rural environment: the main reason for the rural mother to dismiss breastfeeding was her absence from the home. On average, the infant was nursed in the morning, evening and once at night [22].

After World War II, the medical universities in Poland reopened. Pediatric textbooks and guides for mothers were published that stressed the importance of natural alimentation. In 1956, *La Leche League*, the first organization for the promotion of breastfeeding and education on lactation, was founded in the USA. In the 1970s, midwifery in Poland circled back to separating mothers from their newborns and introduced feeding schedules in accordance with the current regime on maternity wards. Artificial alimentation was back in favor and was regarded as a sign of higher social status [23]. However, modern Polish midwifery is marked by great changes: as in western countries, the current standards on maternity wards allow the mothers to stay with their children on the base of a 'rooming-in' system that provides for constant contact between the mother and child and enables feeding 'on demand'. There are few things considered to be contraindications for breastfeeding: active tuberculosis, HIV, as well as alcohol and substance abuse [24].

In more recent history, anecdotal beliefs regarding the beneficial effects of breastfeeding on children's overall psychological wellbeing have become a subject of scientific investigation. The most commonly reported association between breastfeeding and psychological functioning relate to cognitive function, psychosocial adjustment and the emotional relationship between the mother and child [19,25–29]. Despite the popular assumptions regarding the beneficial effects of breastfeeding on the mother–child relationship, this requires further empirical evaluation. A review by Jansen et al. [19] concluded that these assumptions are not currently supported by empirical evidence and should therefore not be treated as a foundation for the recommendation of breastfeeding. Nonetheless, the current empirical data suggests many other psychological benefits associated with breastfeeding, especially those related to cognitive performance later in life.

There is evidence to suggest that breastfeeding is associated with enhanced cognitive performance in childhood and a cognitive advantage [25,26] as well as higher learning skills in school-aged children [27], compared to children who were not breastfed. A recent seven-year follow-up study conducted on a group of 468 infants in Kraków, Poland, found that breastfeeding in infancy is related to better cognitive development in childhood, and the IQ gain in that group, compared to the reference group, could be observed as soon as at age one year and remained stable throughout preschool [28].

An Australian longitudinal study, following participants for 14 years, also found that longer breastfeeding (past six months) was associated with better psychosocial adjustment in childhood and adolescence and a protective factor against adverse mental health outcomes later in life [29]. These findings directly correspond with the current WHO guidelines on the recommended duration of breastfeeding [23]. In the 1960s, a trend to replace natural alimentation with the artificial alternative emerged in Africa. Due to the use

of watered down solutions and poor hygiene, infants and children showed symptoms of malnutrition and diarrhea, which increased the risk of child and infant mortality. After the worrying statistical data were made public, WHO launched a campaign called 'Breast is Best'.

SUMMARY REMARKS

Throughout the ages, the image of the breastfeeding woman has served as an inspiration for artists as well as for the promotion of natural alimentation. In the 19th century, the death rate among infants during the first year of life was high (20–25%), and hence some countries began to stress the prognoses, mortality rates and survival rates of breastfed infants in contrast to those who were receiving artificial alimentation. In the first half of the 20th century, the beneficial properties of human colostrum were widely recognized. Physicians started to educate women about benefits of lactation and gave them advice about proper lactation techniques. The rapid urbanization from the 17th century to the second half of the 20th century was marked by many scientific discoveries, which became the foundation for changes in society regarding breastfeeding. Scientific and technical inventions influenced social status and the readiness to migrate.

Mother's milk has been deemed the most appropriate source of alimentation for newborns, recommended by specialists in the fields of nutrition, public health and pediatrics. It constitutes the best source of nutritional components, delivered in optimal amounts in accordance with varying caloric demand at different developmental stages. Breastfeeding is now considered the golden standard in the alimentation of newborns and infants by The World Health Organization and various scientific societies. The development of a specific stance on breastfeeding in mothers is currently regarded as a complex process that should begin at the start of pregnancy.

REFERENCES

1. WHO. Global Strategy for Infant and Young Child Feeding. Infant and young child nutrition. Geneva: 27 WHa, World Health Organization 2003; 5–18.
2. American Academy of Pediatrics: policy statement. Breastfeeding and the use of human milk, section on breastfeeding. *Pediatrics* 2012; 129: 827–841.
3. Psouni E, Janke A, Garwicz M. Impact of carnivory on human development and evolution revealed by a New Unifying Model of Weaning in Mammals. *PLoS ONE* 2012; 7(4): e32452.
4. Piontek J, Czerniak L. Prahistoria a paleodemografia. Próba określenia zadań i możliwości poznawczych prahistorii w badaniach nad demografią społeczeństw pradziejowych. In: Piontek J, ed. *Szkice z antropologii ogólnej*. Poznań: UAM; 1988: 103–140. (in Polish).
5. Abt-Garrison history of pediatrics. Reprinted from *Pediatrics*, by various authors. Volume 1. Edited by Isaac A. Abt. With new chapters on the history of pediatrics in recent times. Philadelphia: W. B. Saunders; 1965: 36; 667.
6. Jackson R. Doctors and diseases in the Roman Empire: womens diseases, birth and contraception. London: British Museum Press 1988; 86–111.
7. Wickes I. A history of infant feeding. Part I. Primitive peoples: ancient works: renaissance writers. *Arch Dis Child* 1953 Apr; 28(138): 151–158.
8. Still GF. The history of paediatrics: the progress of the study of diseases of children up to the end of the XVIIIth century. London: Frowde; Hodder & Stoughton; 1931.
9. Kramsztyk J. O karmieniu i sztucznym żywieniu niemowląt. *Zdrowie* 1896; 12: 194–214. (in Polish).
10. Knauer E. Caritas Romana. *Jahrbuch der Berliner Museen* 6, Neue Folge 1964; 9–23. (in German).
11. Büstenhalter aus dem Mittelalter – Der Sonder-Bra [online] 19.

- Juli 2012 [cit. 15.01.2018]. Available from URL: <http://www.biologie-seite.de/Biologie/BuSTenhalter>. (in German).
12. Nawrot-Borowska M. Higiena małego dziecka w świetle poradników z początku XX wieku. *Przegląd Pedagogiczny* 2012; 169–197. (in Polish).
 13. Barański R. Odżywianie niemowląt. In: Jasiński W, ed. *Choroby dzieci*. Warszawa: Ars Medici; 1936: 241–305. (in Polish).
 14. Nawrot-Borowska M. Małek A. Wychowanie zdrowotne i higiena dzieci i młodzieży w świetle poradników dla rodziców z lat 1850–1970 – zarys problematyki. *Przegląd Pedagogiczny* 2015; 2: 85–124. (in Polish).
 15. Jakubiak K. XIX-wieczne wzorce polskiej rodziny i wychowania rodzinnego dziecka oraz ich oświeceniowe inspiracje. *Biblioteka Współczesnej Myśli Pedagogicznej* 2014; 3: 359–370. (in Polish).
 16. Sznabl J. O sztucznym żywieniu noworodków i niemowląt: *Medycyna* 1878: 344. (in Polish).
 17. Karolczak W. Miejskie pijalnie mleka w Poznaniu w latach 1906–1914. *Kronika Miasta Poznania* 1996; 2: 275–292. (in Polish).
 18. Else-Quest N, Hyde J, Clark R. Breastfeeding, bonding, and the mother-infant relationship. *Merrill-Palmer Q* 2003 Oct; 49(4): 495–521.
 19. Jansen J, de Weerth C, Riksen-Walraven J. Breastfeeding and the mother-infant relationship – a review. *Dev Rev* 2008 Dec 1; 28(4): 503–521.
 20. Brzozowski S. Jędrzej Śniadecki jego życie i dzieła. O fizycznym wychowaniu dzieci. Warszawa: M Arcta; 1903; 113–127. (in Polish).
 21. Górnicki B. Zarys historyczny rozwoju myśli pediatrycznej i opieki nad dzieckiem w Polsce. W: Górnicki B, Dębiec B, Baszczyński J. *Pediatrics*. Tom I. Warszawa: Wydawnictwo Lekarskie PZWL; 1995: 1–29. (in Polish).
 22. Sioda T, Krawczyński M. Mamka i jej rola w ewolucji sposobów żywienia niemowląt. Część II. *Pediatr Pol* 2012; 212–219. (in Polish).
 23. Jeleń K, Musiał-Morsztyn D, Bogdał G, Królak-Olejek B. Breastfeeding over the centuries. Part II – Current initiatives and recommendations. *Piel Zdr Publ* 2014; 4(1): 65–68.
 24. Baranowska B. Karmienie piersią jako czynnik chroniący dzieci przed krzywdzeniem. *Dziecko krzywdzone. Teoria, badania, praktyka* 2016; 15(4): 44–64. (in Polish).
 25. Horta BL, Loret de Mola C, Victora CG. Breastfeeding and intelligence: a systematic review and meta-analysis. *Acta Paediatr* 2015; 104(467): 14–19.
 26. Anderson JW, Johnstone BM, Remley DT. Breast-feeding and cognitive development: a meta-analysis. *Am J Clin Nutr* 1999; 70(4): 525–535.
 27. Kim JI, Kim B-N, Kim J-W, et al. Breastfeeding is associated with enhanced learning abilities in school-aged children. *Child Adolesc Psychiatry Ment Health* 2017; 11: 36.
 28. Jedrychowski W, Perera F, Sowa A, et al. Effect of exclusive breastfeeding on the development of children's cognitive function in the Krakow prospective birth cohort study. *Eur J Pediatr* 2012 Jan; 171(1): 151–158.
 29. Oddy WH, Kendall GE, Li J, et al. The long-term effects of breastfeeding on child and adolescent mental health: a pregnancy cohort study followed for 14 years. *J Pediatr* 2010; 156: 568–574.

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WHAT SHOULD A COSMETOLOGIST KNOW ABOUT DERMATOLOGICAL LESIONS ON THE FACE?

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ABSTRACT

In everyday practice, cosmetologists often observe abnormalities on the facial skin of his or her clients. Facial lesions have a diverse clinical picture, although most are benign. However, some lesions may be malignant and demand fast diagnosis and treatment. Among benign lesions are xanthomas, epidermal cysts, milia and seborrheic keratoses. Xanthomas are usually localized on the eyelids and often coexist with dyslipidemia. They appear clinically as yellowish papules that vary in size. Epidermal cysts are the most common type of skin cyst. They typically occur on the head and neck, and usually affect young adults in their 20s. Milia are common skin lesions that are typically numerous in presence and appear as small-sized sebaceous papules. Seborrheic keratoses are another important type of lesion that are localized on the face and may be disturbing for clients. These are benign tumors that usually appear in individuals over 50 years of age and have an incidence that rises with age. Typically, they are brown in color but they can also be other colors including black, yellow, grey or bluish.

Other skin changes include basal cell carcinoma, actinic keratosis, squamous cell carcinoma and lentiginous malignant melanoma. Basal cell carcinoma is a slow-growing, locally malignant epithelial cancer of the skin. This cancer presents mainly in areas exposed to ultraviolet (UV) radiation. Actinic keratosis is a pre-cancerous lesion that is associated with UV radiation. It predisposes to squamous cell carcinoma and other skin cancers rarely. In contrast to basal cell carcinoma, squamous cell carcinoma may cause metastases with high mortality. Melanoma on the head and face usually takes the form of a lentiginous malignant melanoma. This manifests clinically as a brown spot that slowly grows centrifugally. Melanomas vary in size and color. Dermoscopy is an important tool that may help during diagnosis of facial lesions.

Given the severe consequences of some skin lesions, it is very important for cosmetologists to have knowledge of the conditions described above. This is because he or she is often the first person who can persuade the client to undergo further diagnosis.

KEYWORDS: cosmetologists, facial lesions, dermatology

BACKGROUND

In everyday practice, cosmetologists often observe changes on the facial skin of his or her clients. In all cases, the cosmetologist should suggest that the client consults with a dermatologist due to the range of lesions that may appear on the face as well as their diverse clinical picture. It is obvious that facial lesions may be benign or malignant. However, there are also changes that are classified as pre-cancerous where early treatment allows elimination of the threat of cancer. Therefore, it is very important for cosmetologists to have knowledge of the conditions described below because he or she is often the first person who can persuade the client to undergo appropriate further evaluation.

XANTHOMA

Xanthomas are deposits of lipids in the skin that often take the form of a yellowish nodule or clod. The basis of the skin eruptions lies in the accumulation of lipids in the skin macrophages that leads to formation of foam cells and then to Touton giant cells [1]. From a clinical point of view, xanthomas are often associated with acquired or congenital dyslipidemia [2]. There are many types of xanthomas including eyelid xanthelasma, and plane, tuberous, tendinous, subcutaneous, eruptive, tuberoeruptive and palmar xanthomas [1]. The most common type are eyelid xanthomas in the form of flat yellowish discs located symmetrically on the upper eyelids (70% of cases). A minority occur on

the lower eyelids, and rarely both eyelids are affected with an oval shape formed [2].

In children and young adults, the presence of patches of yellow on the eyelids may signal underlying autosomal dominant hypercholesterolaemia. However, eyelid xanthelasma occurs most often after 50 years of age, with dyslipidemia (especially an increase in low-density lipoprotein (LDL) fraction) occurring concurrently in about 50% of patients. For this reason, xanthomas should not be considered only as a cosmetic defect. The patient's serum lipid concentration profile should always be evaluated if xanthomas occur. Lesion treatment involves correcting hyperlipidemia, which may cause regression (sometimes substantially so) of the changes. Other methods of treatment include surgical removal, cryotherapy, laser or chemical ablation with trichloroacetic acid [1,2]. It is worth noticing that visible treatment effects have been reported after use of a pulsating pigment laser, Nd-YAG Q-switched laser or an erbium-YAG laser [3,4].

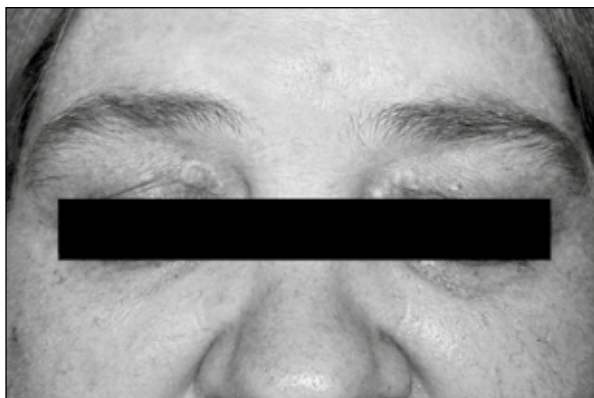


Figure 1. Xanthomas on the eyelids.

EPIDERMAL CYSTS

Epidermal cysts are depressions within the tissue that are filled with liquid or semi-fluid content. They are considered to be true cysts and are the most common type of cyst presenting on the skin. Epidermal cysts are usually located on the skin of the neck (32%), or on the head, face, trunk or limbs [5,6]. Unusual locations such as the mouth, hands, feet, fingers and the breast area have also been observed [6]. Epidermal cysts occur most frequently in young people between 21 and 30 years of age, with an equal frequency in both sexes [6]. The mechanism of their formation is unclear. It is assumed that the most common cause of cyst development in hairy areas is blocking of the hair follicle [7,8]. The diameter of the epidermal cyst usually varies between 3 mm and 2 cm [7]. However, there are literature descriptions of giant cysts with a diameter of more than 5 cm [5,6].

In most cases, the lesions are isolated. However, numerous cysts located on the limbs may suggest Gardner's syndrome or nevoid basal cell carcinoma syndrome [7]. Multiple epidermal cysts have also been reported as a complication during treatment with cyclosporin or

imiquimod [6]. In most cases, epidermal cysts are single-chamber. However, there are also multi-chamber cysts, which are less frequent [7,8]. An epidermal cyst is usually asymptomatic unless it is infected or pressing on adjacent anatomical structures [5]. In the differential diagnosis of an epidermal cyst, tricholemmic cyst, cystic adenoid tumor, cystic basal cell carcinoma or metastasis to the skin should be considered [7]. Epidermal cysts often take the form of benign lesions that do not require treatment. Cosmetic considerations or recurrent infections may be an indication for removal. Treatment consists of a surgical incision and removal of the epithelial lining of the cyst (marsupialisation) [7]. Surgical intervention may cause scarring. Therefore, it is preferable to use non-invasive methods such as removing the lesion with a CO₂ laser [9].

MILIA

A common type of benign lesion that often occurs on the face is a milium. A milium is an epidermal cyst that is white-yellow in color, usually smaller than 3 mm in diameter, and contains a sebaceous and horny mass [10]. Milia can be divided into primary, secondary and other types [7,11]. Secondary milia can be caused by superficial epidermal trauma such as dermabrasion, chemical exfoliation, burns, or following radiotherapy or skin grafting [7,11]. They can coexist with bullous dermatoses such as porphyria cutanea

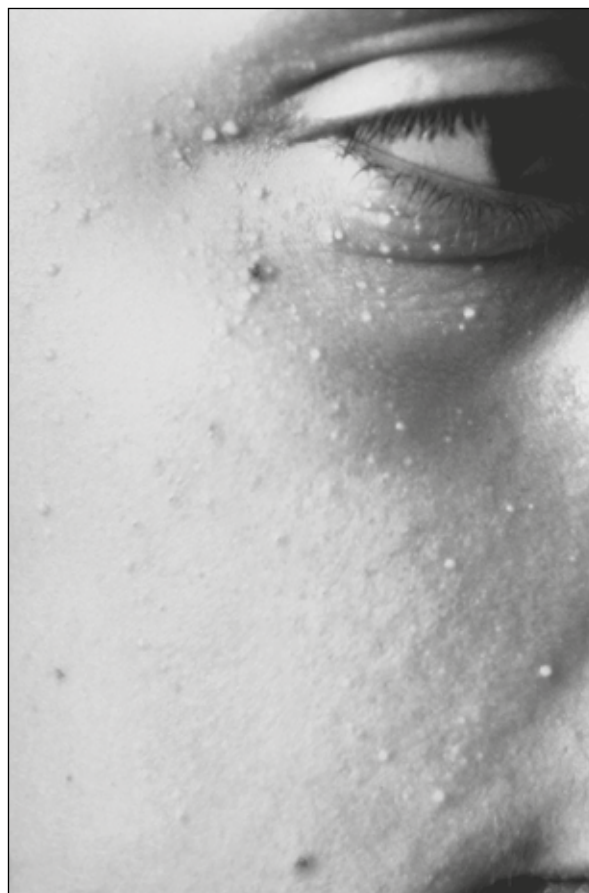


Figure 2. Numerous milia located on the face.

tarda, epidermolysis bullosa, lupus erythematosus, Sweet's syndrome and Dühring's disease [7,11]. Moreover, secondary milia may result from drugs such as 5-fluorouracil, cyclosporin, penicillamine and topical glucocorticoids [11].

Secondary milia may disappear spontaneously but usually persist. A rare variant of milia is milium plaque, which presents clinically as multiple milia grouped on an erythematous plaque located behind the ears and the periocular region [12]. Numerous milia may also accompany genodermatosis. Its coexistence with Bazex-Dupré-Christol, Rombo, Brooke-Spiegler, Gorlin-Goltz and Papillon-Leage-Psaume syndromes has also been reported [11]. Comedones, xanthomas and syringoma need to be considered in the differential diagnosis of milia [7]. Treatment of milia is based on removing the content of the lesions with a scalpel or special extractor for exfoliating the lesion. Local retinoids and electrocoagulation are available for when numerous milia are present [11].

SEBORRHEIC KERATOSES

Seborrheic keratoses are benign, pigmented epidermal tumors that occur quite commonly. They usually develop after the age of 50 years, although they have been described in young adults occasionally. They are without any predilection for sex [13–15]. It is estimated that 80 to 100% of patients over 50 years old have at least one lesion [14]. In most cases, individuals have numerous seborrheic keratoses and the presence of more than 10 lesions in one patient is not uncommon [14]. Most often the lesions are located in the seborrheic area on the back, especially in the interscapular region, and on the neck, face and arms. Clinically, seborrheic keratoses are usually oval in shape and there is a well-defined border between the skin and the seborrheic keratosis, with the appearance of being “stuck to the skin”. They can be flat or exophytic, and sometimes have a papillary structure. They are usually yellow, brown, or blue and gray. Non-typical changes may cause a diagnostic problem. Blue-gray seborrheic keratoses may resemble melanoma whereas others, especially the irritated ones, may resemble squamous cell carcinoma [14]. In these cases, a dermoscopic examination is very helpful. However, the only decisive diagnostic tool is a biopsy followed by histological evaluation [14]. The etiology of seborrheic keratoses is not fully understood, although there may be an influence of genetic factors, human papilloma virus (HPV) infection or ultraviolet (UV) exposure as well as somatic mutations in the gene encoding the fibroblast growth factor receptor 3 (FGF3) receptor [13,15]. Treatment for seborrheic keratoses is not required because they are benign changes. However, patients often decide to remove them for cosmetic reasons. Treatment is based on surgical trimming or curettage of the lesion. Cryotherapy, electrocoagulation, erbium-yag laser or CO₂ laser can also be used. There are also reports on the

beneficial effects of topical medications such as vitamin D analogues, tazarotene and imiquimod in the treatment of seborrheic keratoses [15].



Figure 3. Seborrheic keratosis.

BASAL CELL CARCINOMAS

Basal cell carcinoma (‘BCC’) is a slow-growing, locally malignant epithelial cancer of the skin. It is the most frequent of all malignant tumors in humans [16]. As this cancer is localized mainly in the areas exposed to UV radiation, the face is the most common place where such a change occurs (80% of cases). However, BCCs can also occur in other locations including the anogenital area [16]. Men experience BCCs slightly more often than women [17]. The tumor grows slowly and metastases affect less than 0.5% of all cases [16]. Patients often do not undergo treatment or neglect it completely because of its slow growth. This can lead to local damage of surrounding tissues and permanent disfigurement. Etiological factors include chronic exposure to UV radiation, especially to UVB radiation with a length of 290–320 nm. The influence of mutations in the *PTCH1* gene in the etiology of sporadic cases of BCC and of nevoid BCC syndrome has also been proposed [16]. Other risk factors are represented by ionizing radiation, exposure to arsenic or other industrial chemicals including vinyl chloride, and immunosuppression [16]. Various cases of BCC have been described in the literature including nodular, superficial, scleroderma, cystic, pigmented, micronodular and ulcerative.

It is impossible to describe all BCC types in this publication. Therefore, it is worth focusing on the most common form, which is nodular BCC. This occurs in 60–80% of all BCC cases [16], and presents clinically as an exophytic, convex nodule with pearly or waxy edges. If left untreated, it may turn into a cystic or ulcerative form [16]. In the tumor, telangiectasias are often visible and the central part is sunken or covered with a scab. The differential diagnosis for this type of tumor should consider molluscum contagiosum, overgrowth of sebaceous glands, amelanotic melanoma and trichoepithelioma [17]. Some BCCs are connected with Gorlin-Goltz syndrome (nevoid BCC syndrome), which is

inherited in an autosomal dominant way. Apart from BCC, this syndrome may also result in uneven skin surfaces on the hands and soles of the feet, mandibular cysts, numerous epidermal cysts on peripheral parts of the body and other developmental abnormalities [17]. Dermoscopic examination is useful to diagnose BCC, but only biopsy and histological examination allow unambiguous recognition. There are several possible ways to treat BCC namely surgical removal, Mohs surgery, electrocoagulation, cryotherapy, roentgenotherapy, laser treatment, photodynamic therapy and local treatment with 5-fluorouracil or imiquimod. Moreover, the efficacy of intradermal administration of interferon alfa has also been reported [16].

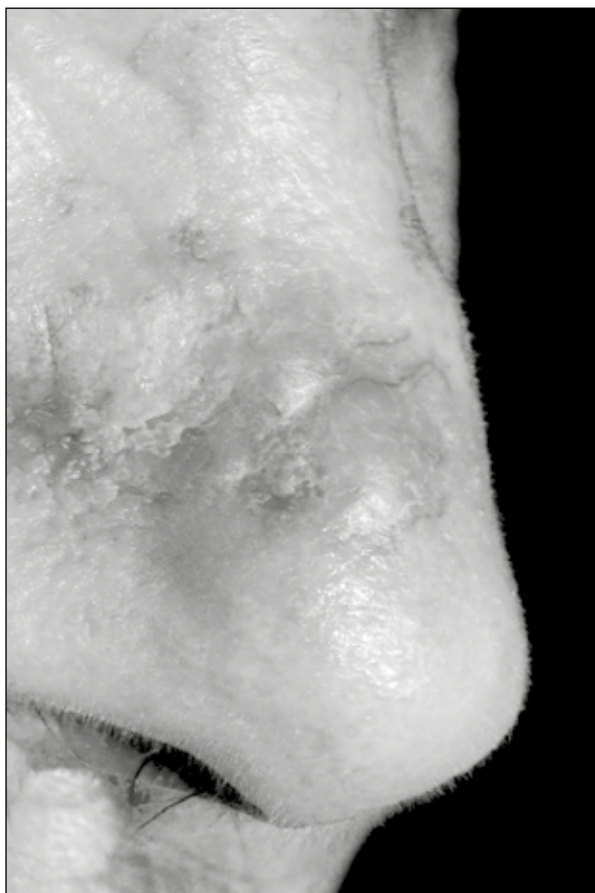


Figure 4. Basal cell carcinoma on the nose. Nodular form.

ACTINIC KERATOSES

Actinic keratosis (AK) is a very common pre-cancerous lesion associated with exposure to UV radiation. It predisposes to squamous cell carcinoma (SCC), and other skin cancers rarely [18]. It is more common in people with fair complexion, the elderly and those who are immunosuppressed [18,19]. AK may undergo remission, persist unchanged for many years or progress to SCC. It is worth noting that AK is considered to be a field disease, which means that it is not limited only to visible clinical changes but the adjoining skin area also suffers from the disease process despite the lack of visible changes [18,19]. Clinically, the lesions

are scaly erythematous plaques, often keratinized, usually on the face and backs of the hands. The treatment options for AK include ingenol mebutate, imiquimod, photodynamic therapy, 5-fluorouracil and 3% diclofenac sodium gel [18,19]. Cryotherapy or surgical removal is also used. Chemical peels and dermabrasions are less likely to be used.

SQUAMOUS CELL CARCINOMA

SCC is a non-melanoma skin cancer that accounts for 20% of all tumors in this group [20]. It derives from the progenitor cells of the basal layer of the epidermis [21]. Its early detection and treatment are important due to its malignancy and potential for metastasis. SCC is more common in men and in people over 75 years of age. It is also more frequent in people with fair complexion, red hair and blue eyes [21]. Risk factors include chronic exposure to UV radiation. Moreover, it can develop from non-healing wounds and scars or chronic inflammatory changes. Currently, AK (described above) is considered to be SCC *in situ* [22]. Most SCCs derive from these types of changes, and they rarely develop *de novo* in unchanged skin. There are a number of other SCC types such as Bowen's disease, erythroplasia of Queyrat or erythroplasia and malignant leukoplakia.

Clinically, ulcerative and verrucous forms are distinguished. The ulcerative form is a perilous ulcer with hard edges. The verrucous form is characterized by exophytic growth and less infiltration than the ulcerous form. With time, the changes become bigger, and undergo necrosis and infection. The increase in size of a SCC is much more destructive than with a BCC. Changes in the skin may be accompanied by paresthesia and enlargement of the lymph nodes [20]. Mortality may be up to 70% in the case of metastases [20]. The recommended treatment is based on surgical excision or Mohs microsurgery.

LENTIGINOUS MALIGNANT MELANOMAS

Melanoma on the head or the face, usually takes the form of a lentiginous malignant melanoma (LMM) [22,23]. Although these lesions appear on skin damaged by the sun, it is thought that the cumulative UV dose is less important than the number of sunburn episodes [23]. Other risk factors include a positive family history of melanoma, genetic burden, low skin phototype, presence of numerous melanocytic traits, freckles and dysplastic nevi [21,23]. The incidence of LMM increases with age, and it is especially frequent in the seventh and eighth decade of life [21]. It manifests clinically as a brown spot that slowly grows centrifugally.

The color of the lesion may range from dark-black through to various shades of brown, and it may also have an amelanotic component [23]. The patient often describes the facial lesion as a new brown spot or indicates that the previously existing lesion has begun to change color, shape or size. Diagnosis of a lentigo is



Figure 5. Lentiginous malignant melanoma.

usually based on dermoscopic examination. Evaluation under Wood lamp or confocal microscopy may also be useful for diagnosis [23]. However, histological examination remains the gold standard diagnostically. Treatment is based on a classic surgical excision with an appropriate margin of tissue, or Mohs microsurgery.

SUMMARY REMARKS

Knowledge of the issues discussed above is important not only for dermatologists, but also for doctors of other specialties, as well as for cosmetologists. The latter discipline may encourage their client to consult a dermatologist for evaluation of any new skin lesion. This type of action can significantly affect skin cancer prevention.

REFERENCES

- Braun-Falco O, Plewig G, Wolf HH, Burgdorf WHC. Braun-Falco – dermatologia. Wyd. 2 polskie. Lublin: Wydawnictwo Czelej; 2011: 1242–1255. (in Polish).
- Zak A, Zeman M, Vecka M. Xanthomas: clinical and pathophysiological relations. Biomed Pap Med Fac Univ Palacky Olomouc Czech Repub 2014 Jun; 158(2): 181–188.
- Pietroleonardo L, Ruzicka T. Skin manifestations in familial heterozygous hypercholesterolemia. Acta Dermatovenereol Alp Panonica Adriatic 2009; 18: 183–187.
- Fusade BT. Treatment of xanthelasma palpebrarum by 1064-nm Q-switched Nd:YAG laser: a study of 11 cases. J Dermatol 2008; 158: 84–87.
- Kang SG, Kim CH, Cho HK, Park MY, Lee YJ, et al. Two cases of giant epidermal cyst occurring in the neck. Ann Dermatol 2011; 23: 135–138.
- Nigam JS, Bharti JN, Nair V, Gargade CB, Deshpande AH, et al. Epidermal cysts: a clinicopathological analysis with emphasis on unusual findings. Int J Trichology 2017; 9(3): 108–112.
- Braun-Falco O, Plewig G, Wolf HH, Burgdorf WHC. Braun-Falco – dermatologia. Wyd. 2 polskie. Lublin: Wydawnictwo Czelej; 2011: 1351–1356. (in Polish).
- Lee KM, Park JH, Min KH, Kim EK. Epidermal cyst on the sole. Arch Plast Surg 2013; 40: 475–476.
- Song SW, Burm JS, Yang WY, Kang SY. Minimally invasive excision of epidermal cysts through a small hole made by a CO2 laser. Arch Plast Surg 2014; 41: 85–88.
- Berk DR, Bayliss SJ. Milia: a review and classification. J Am Acad Dermatol 2008; 59: 1050–1063.
- Hubler WR Jr., Rudolph AH, Kelleher RM. Milia en plaque. Cutis 1978; 22: 67–70.
- Avhad G, Ghatge S, Dhurat R. Milia en plaque. Indian Dermatol Online J 2014; 5: 550–551.
- Phulari R, Buddhdev K, Rathore R, Patel S. Seborrheic keratosis. J Oral Maxillofac Pathol 2014; 18: 327–330.
- Braun RP, Ludwig S, Marghoob AA. Differential diagnosis of seborrheic keratosis: clinical and dermoscopic features. J Drugs Dermatol 2017 Sep 1; 16(9): 835–842.
- Hafner C, Vogt T. Seborrheic keratosis. J Dtsch Dermatol Ges 2008 Aug; 6(8): 664–677.
- Dourmishev LA, Rusinova D, Botev I. Clinical variants, stages, and management of basal cell carcinoma. Indian Dermatol Online J 2013 Jan; 4(1): 12–17.
- Marzuka AG, Book SE. Basal cell carcinoma: pathogenesis, epidemiology, clinical features, diagnosis, histopathology, and management. Yale J Biol Med 2015; 88: 167–179.
- Dodds A, Chia A, Shumack S. Actinic keratosis: rationale and management. Dermatol Ther (Heidelb) 2014; 4: 11–31.
- Goldenberg G, Perl M. Actinic keratosis. Update on field therapy. J Clin Aesthet Dermatol 2014; 7: 28–31.
- Burton K, Ashack K, Khachemoune A. Cutaneous squamous cell carcinoma: a review of high-risk and metastatic disease. Am J Clin Dermatol 2016; 17: 491–508.
- Feller L, Khammissa RAG, Kramer B, Altini M, Lemmer J. Basal cell carcinoma, squamous cell carcinoma and melanoma of the head and face. Head Face Med 2016; 12: 11.
- Röwert H, Patel MJ, Forscher T, Ulrich C, Eberle J, et al. Actinic keratosis is an early in situ squamous cell carcinoma: a proposal for reclassification. Br J Dermatol 2007; 156: 8–12.
- Kasprzak JM, Xu YG. Diagnosis and management of lentigo-maligna: a review. Drugs Context 2015; 4: 212281.

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 - Norman IJ, Redfern SJ, ed. Mental health care for elderly people. New York: Churchill Livingstone; 1996.
 - NHS Management Executive. Purchasing intelligence. London: NHS Management Executive; 1991.
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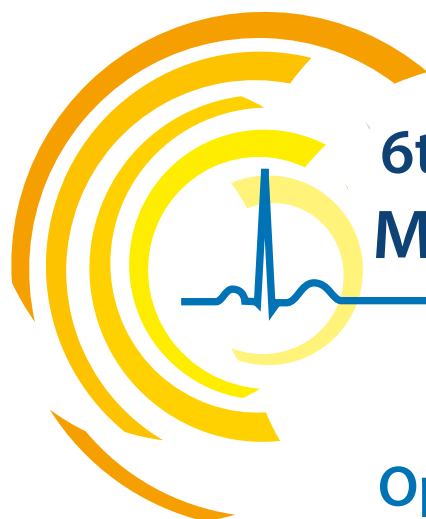


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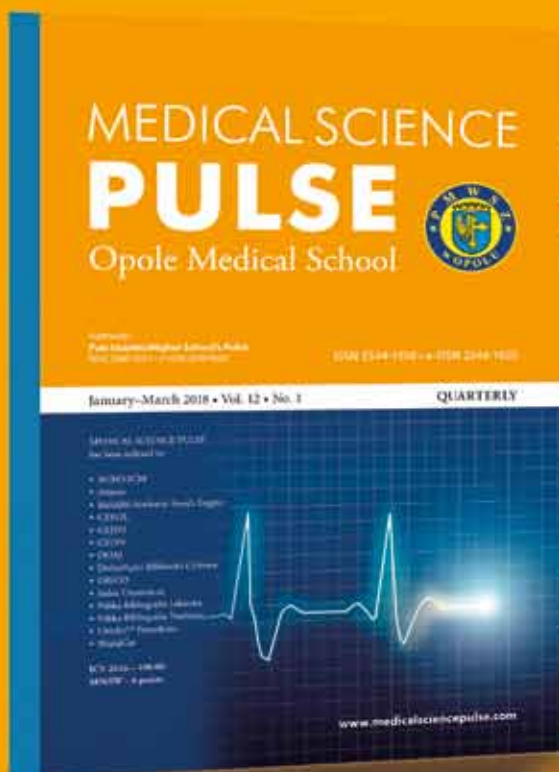
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