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Ladies and Gentlemen, Faculty, Graduates and Students of Universities, Readers and Enthusiasts of *Medical Science Pulse*!

We are pleased to announce issue 4/2020 has been published!

Nine novel research articles, one case report, one review and at the end an opinion paper. We encourage you to discover for yourself these new medical findings: relationship of frequency and severity of perimenopausal symptoms on the quality of sexual life of postmenopausal women, study of nursing students physical activity levels, analysis of parents' satisfaction with caring for children hospitalized in a pediatric ward, organ transplantology – opinions and attitudes of medical and humanities students, assessing of patients' knowledge of anaphylactic shock and allergies, knowledge and opinions of patients attending a hospital emergency, college students' attitudes towards prohealth behavior and alcohol consumption during pregnancy planning and pregnancy, the frequency of select adaptation disorders in preterm newborns, body structure and physical fitness assessed by the Senior Fitness Test, pregnant woman with circumvallate placenta and suspected fetal hypotrophy caused by placental insufficiency, medication and diet adherence in patients with type 2 diabetes and depressive disorder and the last diagnosing death and resurrecting the myth or reality of catalepsy.

The Editorial Board has worked intensely over the last two years on executing a publishing strategy that encompasses further improvement of the academic standard of the journal and extending the international scope of the published articles. These objectives were completed within, among others, the first programme of the Ministry of Science and Higher Education de minimis programme within the framework of "Support for scientific journals" project – grant number 147/WCN/2019/1, and the considerable financial support gained during this programme, which amounted to 66460 PLN.

We managed to achieve virtually all the goals set, namely gaining new and scientifically valuable manuscripts from authors affiliated with renowned Polish and international research institutes, expanding the team of reviewers, increasing the availability of journal's scientific contents in the international academic environment, mainly through Open Access and reaching a wider readership (including potential authors writing for the quarterly) due to our technologically advanced editorial management system, publishing the contents on the journal's website, and professional promotion of the journal within the international academic community. We have improved professionalism of the quarterly by associating each manuscript with the authors' ORCID number, streamlining and accelerating the automatic review process, facilitating the decision-making process in cases of detected abuses of publication standards as a result of perfecting the internal regulations of the Editorial Board in terms of the recommended COPE procedures and the anti-plagiarism system for verifying publications in the English language. We also ensure the highest standard of medical proofreading of English texts, leading to printed editions of the journal (since 2019, the journal has been published Open Access in electronic version only), sharing the entire quarterly free-of-charge in the electronic version (current and archival annuals have been given the DOI number). Virtually all objectives we met, but due to the global pandemic for the first time

in seven years, we were not able to organise the International Medical Science Pulse conference which previously has been attended by internationally renowned researchers including those who have published in the first issue of Medical Science Pulse. Apart from being active researchers, many members of our scientific and review boards work as medical practitioners in various healthcare centres in Poland, Europe, Asia and the USA. Their engagement in the battle against COVID-19 and treating the infected population made it difficult and sometimes impossible to maintain their usual, systematic contact with the Editorial Board. Furthermore, on 15 July 2020, Opole Medical School, the founder and first publisher of Medical Science Pulse, merged with the University of Opole. The new University effortlessly took over the duties of the publisher, but the merger required us to change the status of the journal, adopt new University procedures and regulations, which took some time and imposed essential, especially technical, changes in the composition and manner of working of the Editorial Board. These perturbations slightly prolonged the completion of the assumed strategy, which will finally be realised in the first quarter of 2021.

For this reason, we are particularly happy to share the news of our achievements. In 2020, the Medical Science Pulse journal became the media patron of an important scientific event, namely the First EURIPA Rural Health Forum, September 18 and 19, 2020. The European Rural and Isolated Practitioners Association is "a representative network organisation founded by family doctors to address the health and wellbeing needs of rural communities and the professional needs of those serving them across Europe. It represents a growing network of rural practitioners and organisations across Europe working together to disseminate good practice, initiate research and influence policy" (https://euripa.woncaeurope.org/). Cooperation with such a prestigious organisation brought to life the first supplement in the history of the journal; it took the form of a collection of conference abstracts that dealt almost exclusively with the COVID-19 pandemic. It is our hope that this publication will not only spread the knowledge and practices related to the pandemic, but also increase the prestige of the quarterly in the international scientific discourse. Another EURIPA supplement with be issued in 2021! We are optimistic with regard to the journal's academic and editorial future.

We would also like to draw the attention of young scholars, including medical university students, that Medical Science Pulse is open to publish their first writing attempts. Our journal belongs to the small group of Polish academic journals which include a section entitled "Papers from early stage researchers". In 2021, we want to introduce another, more practical section concerning CME – Continuing Medical Education!

With the end of the year we would like to thank all those involved in popularization of science. We wish all of you a Merry Christmas and happy, and successful new Year 2021!

We would like to thank all our authors, reviewers, editors, friends and Opole Medical School and Opole University authorities for the last year full of unexpected challenges but also full of work and gratification.

Enjoy reading the issue (all articles available on the website, free) and we welcome you to opinion, review and cooperate with our editorial board! (medicalsciencepulse.com)

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Original papers

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RELATIONSHIP OF FREQUENCY AND SEVERITY OF PERIMENOPAUSAL SYMPTOMS ON THE QUALITY OF SEXUAL LIFE OF POSTMENOPAUSAL WOMEN LIVING IN URBAN AND RURAL AREAS

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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 changes that occur in a woman's body during the perimenopausal period may influence feelings of attractiveness and perception of status in an intimate relationship, which may play a role in overall sexual satisfaction.

Aim of the study: The present study aimed to analyze the influence of selected perimenopausal symptoms on the perception of satisfaction with sexual life in urban and rural women.

Material and methods: This study included 224 women from urban areas and 106 women from rural areas who were using general practice services. Inclusion criteria were women who had not menstruated for 2–5 years. The measures used were the Menopause Rating Scale (MRS) and the Sexual Quality of Life-Female questionnaire (SQoL-F). Spearman's rank correlation coefficient was used to assess the relationship between the severity of perimenopausal symptoms and satisfaction with sexual life.

Results: A greater proportion of urban women reported symptoms in the perimenopausal period than rural women. Statistically significant correlations were observed for irritability (P = 0.03) and sexual problems (P = 0.01). However, rural women reported a greater degree of symptom severity. There was a statistically significant difference in severity of somatic and psychological symptoms between urban and rural women. In urban women, the average score for general satisfaction with their sexual life was 62 ± 19.96, whereas the average score for rural women was slightly less, 59 ± 23.56. A statistically significant inverse relationship was observed between the severity of perimenopausal symptoms and quality of sexual life, with values of Spearman's rank correlation coefficients ranging from –0.490 to –0.064.

Conclusions: Urban or rural residence had a slight influence on the frequency and severity of perimenopausal symptoms, and severity of symptoms had a significant influence on women's satisfaction with their sexual life.

KEYWORDS: menopause, symptoms, sexuality, climacteric period, perimenopause

Background

The climacteric or perimenopausal period is a natural transition phase for women between the reproductive period and older age. Menopause itself is a result of many changes, which begin to take place several years prior, due to a slow decline in ovarian function. These changes are related to the gradual failure of the ovarian endocrine function, and may trigger many psychological and physical problems. Simultaneously, the risk of the occurrence of metabolic and cancer diseases also increases at the same time. The characteristic psychosocial changes constitute an inherent element of the postmenopausal period [1].

Recently, clinical research has increasingly directed attention to women's quality of life in the perimenopausal period. In the context of current demographic and social changes, this has become an important concern, as with an aging global population, the number of

perimenopausal women is increasing. At present, it is estimated that in developed countries, postmenopausal women constitute 30–35% of the total population [2,3]. For many of these women, menopause may result in an increased interest in sexual intercourse due to not having to worry about unintended pregnancy. However, the sexual behaviors of perimenopausal women often undergo changes, particularly with regard to libido and attention to satisfying their needs [4,5].

The physical changes in a woman's body that occur during the perimenopausal period are widely recognized as having an influence on feelings of attractiveness and perceptions of status in an intimate relationship. Although today, perimenopausal women generally still feel accepted by and attractive to their husbands or partners, their evaluation of their own attractiveness may have diminished [4].

The main causes cited for marital breakdown in the menopausal transition period are the woman's lower interest in sex, and the man's "middle-age crisis". During this phase in life, women are often in need of additional psychological support, which may be from their partners. However, this is only an option if the man himself feels good and is able to enjoy life, having adapted to his own bodily changes due to the process of ageing.

Aim of the study

The present study aimed to analyze the influence of selected perimenopausal symptoms on the perception of satisfaction with sexual life in urban and rural women.

Material and methods

Participants

A total of 371 women using the services of a general practitioner in six outpatient clinics selected at random in the region of Lubelskie Voivodeship, Poland, were invited to participate. Data from 224 urban women and 106 rural women were included in the present analysis. The study was conducted with approval from the Ethics Committee of the Medical University of Lublin. Inclusion criteria were women who consented to participate, had not menstruated for 2–5 years, and did not have any chronic disease. Women undergoing treatment for cancer or who were in a remission period, and those receiving hormonal therapy were excluded.

Measures

Two questionnaires developed by the present authors; the Menopause Rating Scale (MRS) and the Sexual Quality of Life-Female questionnaire (SQoL-F), were used to collect data. The questionnaires developed by the authors included questions regarding participants' socio-demographic profile, coexistent disease, and menstrual status.

Prior to completing the questionnaire, each respondent was instructed how to complete it, and was informed that the collected data would be anonymous and used exclusively for scientific purposes. Data regarding participants' menstrual status and sociodemographic information were obtained through a structured face to face interview performed by specially trained interviewers. The remainder of the questionnaires were distributed to the women to complete on their own, and were returned via e-mail.

Menopause Rating Scale (MRS)

The MRS comprises questions about 11 common perimenopausal symptoms, each of which is assessed on a scale from 0 to 4, depending on the degree of severity; 0 signifies a lack of that symptom, while 4 represents significant burden of severity [6]. The questions are distributed across three independent domains (subscales) of perimenopausal symptoms: psychological (low mood, irritability, anxiety, physical and mental exhaustion); somatic (hot flushes, sweating, heart problems, sleep problems, musculoskeletal discomfort); and urogynecological (sexual problems, urinary problems, vaginal dryness). The total score for each domain is the sum of the scores for each symptom in that domain. A total MRS score was obtained by summation of the three domain scores, proportionate to the weight of the subjectively perceived symptoms [7].

Sexual Quality of Life-Female questionnaire (SQoL-F)

The SQoL-F questionnaire comprises 18 statements pertaining to the participants' feelings of attractiveness, relationship with her partner, and emotional state with regard to her relationship and sexual activity. Responses for each statement are recorded on a scale ranging from 0–6: totally disagree, rather disagree, disagree to a small degree, agree to a small degree, rather agree, and totally agree. To evaluate participants' satisfaction with their sexual life, the SQoL-F scores were standardized (in accordance with the key). The lowest possible result was 0, signifying a complete lack of satisfaction with sexual life, and the highest possible score was 100, signifying the highest level of satisfaction with sexual life. A greater average score reflects greater satisfaction [8,9].

Statistical analysis

Values of quantitative parameters were presented as percentage, average value and standard deviation (SD). Chi squared and Student's t-tests were used to examine the differences or correlations between characteristics. Spearman's rank correlation coefficients were used to assess the relationship between the severity of perimenopausal symptoms and satisfaction with sexual life. We used a level of statistical significance of $P < 0.05$. Statistical analyses were performed with SPSS Version 21 (IBM SPSS Statistics for Windows, Version 21.0. Armonk,

NY: IBM Corp.). For the purpose of the present study, the terms transition period, perimenopausal period and climacteric period were used interchangeably.

Results

The average age of the participants was 52.8 ± 2.09 years. The occurrence of participants' perimenopausal symptoms by their place of residence (urban or rural) is presented in Tab. 1.

A greater proportion of urban women reported the occurrence of perimenopausal symptoms compared with rural women, with the exception of physical and mental exhaustion and urinary/bladder problems. The place of residence had a statistically significant influence on the frequency of irritability (P = 0.03) and sexual problems (P = 0.01) (Tab. 1).

The degree of severity of perimenopausal symptoms experienced by participants is presented in Tab. 2.

Women living in rural areas experienced more severe perimenopausal symptoms than those living in urban areas, with the exception of heart problems and sexual problems. In both groups, the symptoms reported to be most burdensome were: vaginal dryness (average scores: urban women 1.82 ± 1.54; rural women 1.86 ± 1.45), hot flushes or sweating (average scores, analogical evidence: urban women 1.58 ± 1.16, rural women 1.71 ± 1.25) and sleep problems (average scores, analogical evidence: urban women 1.62 ± 1.05, rural women 1.77 ± 1.23).

The average scores obtained for perimenopausal symptoms in the psychological, somatic and urogynecological domains, by place of residence are presented in Tab. 3.

The average scores for the severity of perimenopausal symptoms in the somatic, psychological and urogynecological domains, and the total average for rural women were higher than that of urban women. This

Table 1. Occurrence of perimenopausal symptoms by participants' place of residence (urban or rural).

Domains and symptoms		Urban n = 224		Rural n = 106		Statistical analysis	
		n	%	n	%	χ^2	P
Somatic domain	Hot flushes, sweating	161	71.88	74	69.81	0.15	0.699
	Heart problems (irregular heartbeat, rapid heartbeat, tightness in the chest)	151	67.41	68	64.15	0.34	0.558
	Sleep problems	164	73.21	70	64.15	1.79	0.180
	Discomfort associated with joints and muscles	184	82.14	82	77.36	1.05	0.304
Psychological domain	Depressive moods	158	70.54	77	70.00	0.01	0.919
	Irritability	169	75.45	68	64.15	4.53	0.033
	Anxiety	168	75.00	78	73.58	0.07	0.782
	Physical and mental exhaustion	173	77.23	84	79.25	0.16	0.680
Urogynecological domain	Sexual problems	167	74.55	65	61.32	6.03	0.014
	Bladder problems	111	49.55	62	58.49	2.30	0.129
	Vaginal dryness	115	51.34	50	47.17	0.50	0.479

Table 2. Average scores for the degree of severity of perimenopausal symptoms, by place of residence (urban or rural).

Domains and symptoms		Urban n = 224	Rural n = 106
		M ± SD	M ± SD
Somatic	Hot flushes, sweating	1.58 ± 1.16	1.71 ± 1.25
	Heart problems (irregular heartbeat, rapid heartbeat, tightness in the chest)	1.40 ± 1.10	1.32 ± 1.06
	Sleep problems	1.62 ± 1.05	1.77 ± 1.23
	Discomfort associated with joints and muscles	1.43 ± 1.09	1.59 ± 1.29
Psychological	Depressive mood	1.44 ± 1.01	1.56 ± 1.25
	Irritability	1.22 ± 1.05	1.34 ± 1.28
	Anxiety	1.42 ± 0.98	1.53 ± 1.13
	Physical and mental exhaustion	1.45 ± 1.09	1.86 ± 1.18
Urogynecological	Sexual problems	1.16 ± 1.17	1.12 ± 1.69
	Bladder problems	0.95 ± 1.05	1.12 ± 1.15
	Vaginal dryness	1.82 ± 1.54	1.86 ± 1.45

M – average, SD – standard deviation.

Table 3. Average total scores for perimenopausal symptoms within each domain, by place of residence (urban or rural).

Domains	Urban n = 224	Rural n = 106	Statistical analysis Student's t-test
	M ± SD	M ± SD	
Somatic	6.03 ± 3.15	6.39 ± 3.69	t = 2.139 P = 0.045
Psychological	5.53 ± 3.07	6.28 ± 3.24	t = 2.310 P = 0.001
Urogynecological	3.93 ± 2.23	4.01 ± 2.95	t = 0.950 P = 0.256
Total	15.19 ± 6.54	16.69 ± 7.58	t = 1.981 P = 0.051

M – average, SD – standard deviation.ć

suggests that women living in rural areas experience perimenopausal symptoms as more burdensome. Statistically significant differences were observed in the somatic and psychological symptoms for women in both urban and rural areas.

In urban women, the average score for general satisfaction with their sexual life was 62 ± 19.96, compared with rural women where the average score was 59 ± 23.56. Tab. 4 presents the influence of the severity of symptoms (MRS scores) on satisfaction with sexual life (SQoL-F scores) for rural and urban women.

We identified a relationship between the severity of perimenopausal symptoms and the perceived satisfaction with sexual life, with correlations between –0.490 and –0.064. This suggests that greater severity of symptoms results in a decrease in the level of sexual satisfaction experienced. There was no significant relationship between sleep problems and the quality of sexual life observed in either of the groups. There was no relationship between symptoms of hot flushes and night sweats and sexual satisfaction in rural women.

Discussion

Endocrine changes taking place in the perimenopausal period contribute to the occurrence of characteristic perimenopausal symptoms. These symptoms include hot flushes, drenching sweats, sleep disorders, irritability, low mood, depression, vertigo and headaches, palpitations, paresthesia, joint and muscle pains, general weakness and urogynecological problems [2,10]. Epidemiological data has shown that approximately 80% of women experience some symptoms during the perimenopausal period, although the degree of severity may differ [11].

In this study, the authors defined the frequency of occurrence of specific symptoms associated with the perimenopausal period in urban and rural women. Results showed that a greater proportion of urban women reported experiencing these symptoms than rural women. However, the place of residence showed a statistically significant influence only on irritability (P = 0.03) and sexual problems (P = 0.01). Commonly reported symptoms for both urban and rural women were joint and muscle discomfort, physical and mental

Table 4. Correlation between the severity of perimenopausal symptoms and satisfaction with sexual life in urban and rural women.

Symptoms of the perimenopausal period (MRS scale)	Evaluation of satisfaction with sexual life: SQoL-F scores			
	Urban n = 224		Rural n = 106	
	R	P	R	P
Hot flushes, sweating	–0.273	< 0.01	–0.118	0.09
Heart problems	–0.307	< 0.01	–0.277	0.01
Sleep problems	–0.064	0.40	–0.097	0.17
Depressive mood	–0.247	< 0.01	–0.273	< 0.01
Irritability	–0.311	< 0.01	–0.267	< 0.01
Anxiety	–0.216	< 0.01	–0.245	< 0.01
Physical and mental exhaustion	–0.244	< 0.00	–0.146	0.04
Sexual problems	–0.490	< 0.01	–0.216	< 0.01
Bladder problems	–0.254	< 0.01	–0.218	< 0.01
Vaginal dryness	–0.393	< 0.01	–0.277	< 0.01
Discomfort associated with joints and muscles	–0.255	< 0.01	–0.267	< 0.01

MRS – Menopause Rating Scale, SQoL-F – Sexual Quality of Life-Female questionnaire, R – Spearman's rank correlation coefficient.

exhaustion, anxiety, and irritability. These results are consistent with those reported in other studies [12–15]. Our findings that fewer rural women experienced sexual problems and low mood than urban women are consistent with studies by Sharm and Mahajan [13] and Yohanis et al. [14]. A more frequent occurrence of perimenopausal symptoms in urban women has also been observed in a Spanish study, with the exception of hot flushes, depression and musculoskeletal pain [13]. Other researchers found that rural women complained of hot flushes and a decrease in sexual desire more often than urban women, however urban women reported psychological problems more frequently [16].

Despite the frequency and the degree of severity of perimenopausal symptoms (in various cultures) having been well researched and documented [17–19], comparisons are difficult due to methodological differences [17]. It is also worth noting that the severity of symptoms experienced depends on individual reactions to the decrease in estrogen levels as well as race, lifestyle, culture, diet, coexisting diseases and education, as confirmed by an analysis of the relevant literature by Melby et al. [10].

Our analysis indicates that women living in rural regions experienced the majority of perimenopausal symptoms more intensely compared with those living in urban areas, with the exception of heart problems and sexual problems. The symptoms of greatest severity experienced by both urban and rural women included vaginal dryness, hot flushes, sweating and sleep problems. These observations are consistent with the findings of Sharma and Mahajan [13]. However, in terms of urogynecological symptoms, particularly vaginal dryness, Sharma and Mahajan [13] found that urban and rural women experienced only slight discomfort caused by vaginal dryness, while our findings indicated a greater level of discomfort. Martinez et al. [15] noted that rural women found symptoms to be less burdensome than in those urban women, while we found the reverse, with our results approaching statistical significance ($P = 0.051$).

The influence of perimenopausal symptoms on female sexuality has been frequently investigated in the literature. However, the majority of research has focused on the evaluation of female responsiveness in particular phases of intercourse [20–22]. The present study intended to define the relationship between perimenopausal symptoms and satisfaction with sexual life, on the assumption that sexual satisfaction was based on the perception of attractiveness, relationship with a partner and emotional state associated with sexual activity.

Many perimenopausal women manifest greater than normal irritability, mood swings (sometime depressive moods), and decreases in concentration, physical performance and self-confidence. These might result in a lower satisfaction with their intimate relationship [20–24]. Our results showed that severity of perimenopausal symptoms was negatively correlated with sexual satisfaction.

An element of satisfaction with sexual life is the perception of attractiveness. Many women experience reduced physical and mental wellbeing during the perimenopausal period, which often results in lower self-esteem. In addition, difficulties in accepting physical changes in their body might lead to disruption in their intimate relationships and lower overall satisfaction with relationships [25].

The present results regarding female sexuality in the perimenopausal period are consistent with those of Marsiglo and Donnelly [26], who investigated causes of disorders in relationships by subjectively evaluating psychological and physical health. They observed that perimenopausal symptoms had an impact on a woman's general wellbeing; and that symptom severity was correlated with the deterioration of marital ties and sexual satisfaction. Dennerstein et al. [27] showed that the quality of sexual life was influenced by the relationship between the couple and functioning in their sexual sphere. Other authors have also highlighted the influence of partner relationships on the quality of sexual life [6].

Avis et al. observed a relationship between the feeling of fulfilment within a relationship and sexual satisfaction, and noted a decrease in one of these characteristics entailed a decrease in the other and vice-versa [25]. In the present study, participants reported an average level of satisfaction with their sexual life, although rural women reported more variation.

Previous studies have found that a majority of women also reported that their sexual life plays an important or very important role in their lives overall [6,22]. Some women associate the physical symptoms of aging with the loss of femininity and attractiveness, and as a result, create a negative perception of their own bodies [28]. This might lead to the avoidance of sexual contact and the development of feelings of guilt due to the inadequate nature of the sexual aspects of their relationship. This suggests that evaluating sexual behaviors should be an integral part of general health examinations, as these factors have an impact on a woman's quality of life and overall state of health [6,24].

The majority of contemporary women do not accept that menopause signifies the end of their sexual needs [4,6]. Therefore, it is necessary to include education about the perimenopausal period and female sexuality in the field of physiology. This will help women to accept the changes taking place in their bodies and continue to engage in a beneficial sexual life.

Limitations of the study

This study has some limitations. The sample size was small, which makes it impossible to extrapolate the results to the general population. Additionally, we did not study the past medical history of the participants, nor their previous sexual behaviors, which makes it difficult to compare and analyze changes that may have occurred in this regard. Therefore, the fur-

ther research is recommended in a larger group, with the inclusion of data regarding the past medical history and previous sexual behaviors of postmenopausal women to delineate the impact of perimenopausal symptoms on sexual behaviors and satisfaction with sexual life.

Conclusions

The place of residence (urban or rural) had a slight influence on the frequency and severity of perimenopausal symptoms, and severity of symptoms had a significant influence on women's satisfaction with their sexual life.

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STUDY OF NURSING STUDENTS PHYSICAL ACTIVITY LEVELS

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ABSTRACT

Background: Numerous connections between physical activity (PA) and health clearly indicate that nowadays conscious and purposeful PA is essential.

Aim of the study: To determine PA levels reported by University nursing students and to indicate the dominant activity areas.

Material and methods: A diagnostic survey which included the International Physical Activity Questionnaire – Short Form (IPAQ) was used to examine 419 students of nursing.

Results: The reported total PA of the students under investigation was 3443.9 MET-min/week. Walking activities were the dominant area of PA (mean = 1557.6 MET-min/week), whereas vigorous activities were the least common. Compared to women, men accumulated higher values of MET-min/week in the area of total PA and its components, with the exception of vigorous activities. Significant differences in PA were only shown when place of residence was factored in.

Conclusions: The IPAQ showed that one in four participants demonstrated high levels of PA. More than one-third of the respondents did not meet the criteria for moderate or high activity levels, thus exhibiting low levels of PA. The participants from urban areas were more active than those from rural areas. Out of the three areas of PA (vigorous, moderate and walking), walking was the most dominate activity.

KEYWORDS: physical activity, students, IPAQ, nursing

Background

The development of civilisation has brought numerous conveniences that make our everyday and professional life easier. Simultaneously, it has contributed to a considerable reduction in conscious and purposeful physical activity (PA), which was one of the engines of evolution [1]. Regular physically active is important for positive overall health [2], including psychophysical wellbeing [3–5]. Furthermore, it is one of the most effective ways of preventing lifestyle diseases such as coronary heart diseases, diabetes, obesity or hypertension [2,6,7]. In general, all forms of PA are beneficial; however, considerations on the volume, frequency and intensity of activities, and the individual capabilities of a person should be accounted for. Several studies have shown that individuals are less likely to take up PA specifically for leisure or health-oriented purposes [1,8,9]. Study results also show a general tendency of reduced PA levels with age, starting at school age and decreasing throughout one's lifetime [10–15]. This decreasing activity level trend is particularly prominent for vigorous activity volume and frequency [11]. Although, several studies did not include relative changes in subjective assessment of intensity of efforts that occur through the course of involutional processes [11]. Reductions in the amount of PA may lead to systemic inadequate levels achieved which could have adverse health and social implications on societies. As PA is considered a key condition for maintaining and improving health at all stages of life [4,16,17], determining PA levels and learning which of its forms are taken up by people may constitute a meas-

ure of leisure time consumption as a part of everyday routine [18].

Being informed on and taking a proactive approach with PA culture plays an important role in promoting health within society. University students, in particular students of medical courses who will intellectually be at the forefront in promoting future health related positions, should be aware of the effects of certain lifestyle behaviours on maintaining and improving health [19–21]. Research results on the levels of physical activity of nursing students are currently in-conclusive to a degree and there are both indications of low levels of PA in this group [22–26], and high levels [27].

Engaging in regular physical activity can be a challenge for students and despite the awareness of the positive benefits associated with this behaviour knowledge alone is not associated with maintaining healthy lifestyle habits [28]. Therefore, further investigation of the spontaneous daily physical activity levels particularly with medical students is required [22]. Furthermore, it is worth remembering that the students of nursing are future promoters of community health, and their own PA behaviours may undermine the credibility of knowledge they will transfer [29].

Aim of the study

The study aimed to determine PA levels reported by University nursing students and to indicate the dominant activity areas.

Material and methods

Study design and participants

The study participants involved 419 students: 70 nursing students from Pope John Paul II State School of Higher Education (SSHE) in Biala Podlaska and 349 students from the University of Medical Sciences in Bialystok. The age of the respondents ranged from 19 to 37 years, and mean age was 21 years. Detailed characteristics of the studied group are shown in Tab.1. The criteria for inclusion in the research were the field of study, age and reported daily PA. The advisability of selecting the studied group was supported by the fact that the International Physical Activity Questionnaire (IPAQ) allows to determine the PA of people aged 15-69 years. Among the respondents, there were no participants reporting to undertake PA of more than 16 hours per day. The IPAQ Committee recommends eliminating results above this level of PA [30].

Settings

The research was conducted using the *International Physical Activity Questionnaire – Short Form* (*IPAQ-SF) – last seven days* questionnaire. The study began after obtaining approval from the administration of University and the Bioethical Commission at Pope John Paul II State School of Higher Education in Biala Podlaska. The study participants remained anonymous and the consent to participate was voluntary. The research was conducted in accordance with the clinical practice requirements of the 1975 Helsinki Declaration revised in 2000.

Table 1. Demographic characteristics of the study participants (N=419)

Gender		
Women	Men	
329 (78.5%)	90 (21.5%)	
Place of residence		
Urban area	Rural area	
215 (51.4%)	204 (48.6%)	
Study year		
Year 1	Year 2	Year 3
233 (55.6%)	70 (16.7%)	116 (27.7%)
Body Mass Index (BMI)*		
Overweight	Normal weight	Underweight
73 (17.4%)	326 (77.8%)	20 (4.8%)

*body mass [kg]/body height [m]^2

Data sources/measurement

A diagnostic survey which included the International Physical Activity Questionnaire – Short Form (IPAQ-SF) was applied in the study. The participants completed the questionnaire individually at their respective Universities. The main aim was to identify students' general PA levels performed in their everyday life, studies, work and leisure time. Self-evaluation of PA weekly levels, expressed in metabolic equivalent of task units (MET-min/week), were identified in three areas of effort intensity. *Metabolic Equivalent of Task* (MET) is the ratio of the work metabolic rate to the resting metabolic rate. One MET is defined as 1 kcal/kg/hour and is equivalent to the energy cost of sitting still. A MET is also defined as oxygen uptake in ml/kg/min with one MET equal to the oxygen cost of sitting still equating to approximately 3.5 ml/kg/min [31]. The IPAQ makes it possible to classify respondents into one of three levels of activity: high, moderate or low [32].

Statistical analyses

The data were analysed using Statistica 13.0 PL (StatSoft, USA). Data distribution deviated from a normal distribution of variables and was analysed by means of the Shapiro-Wilk test. The groups of students were compared using non-parametric tests, a Mann-Whitney U test and Kruskal-Wallis test. Statistical comparisons between qualitative characteristics were made

with the use of a chi-square test (χ^2). Statistical significance was set at $p<0.05$.

Results

The group total PA average was 3443.9 MET-min/week; this indicates that their PA levels were satisfactory. Efforts associated with walking were the dominant activity area, group median = 1557.6 MET-min/week, and vigorous activity was the least common (Fig. 1).

The comparison between values of MET-min/week in terms of gender revealed that men were overall more physically active, except in vigorous activity where women showed slightly higher levels (Fig. 2). No statistically significant differences were found between values of MET-min/week within total PA and PA types.

Taking into account the place of residence, considerably higher values of MET-min/week were observed among the study participants from urban areas (Fig. 3). Statistically significant differences were found in total

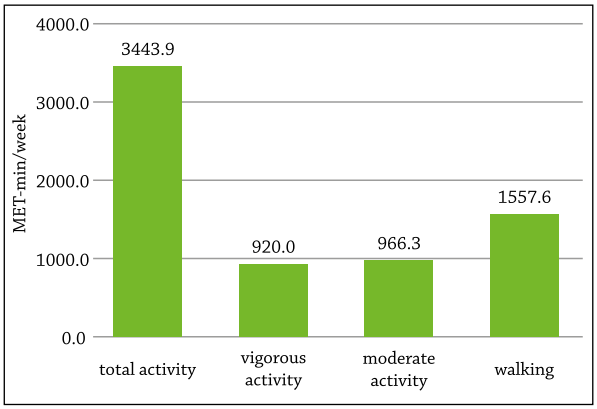
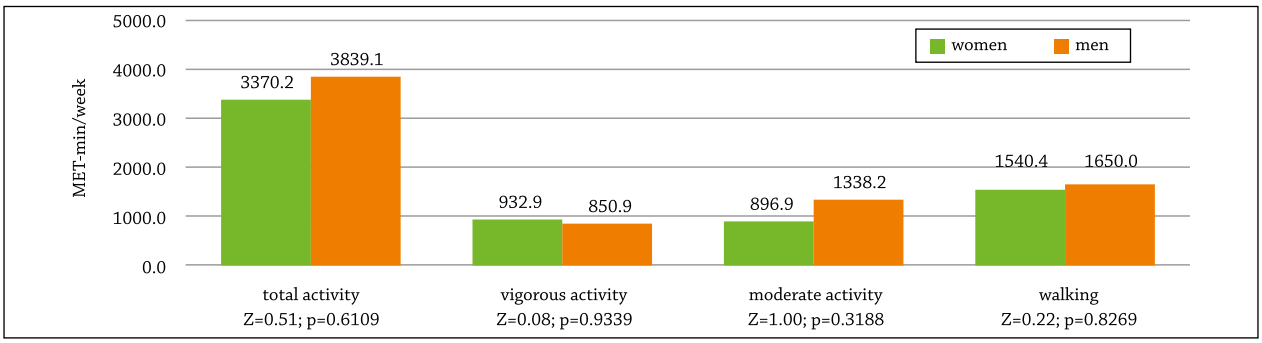
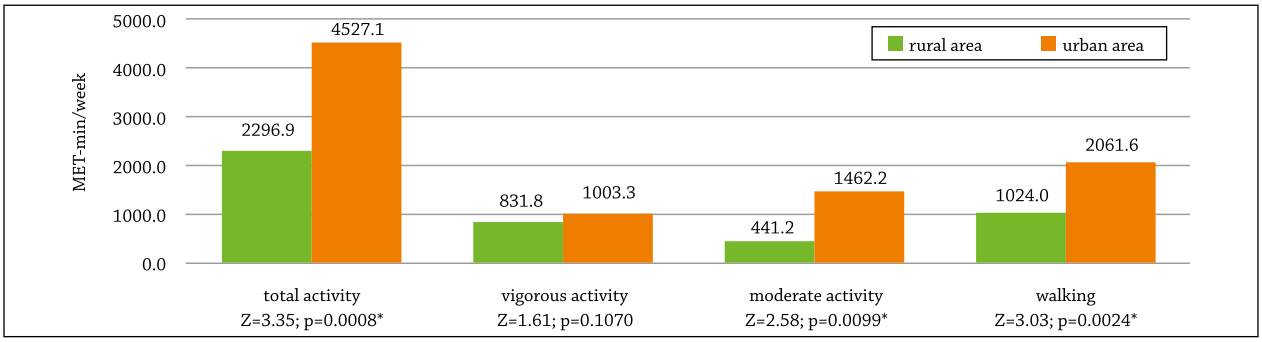


Figure 1. Total physical activity and its components (median) – MET-min/week.



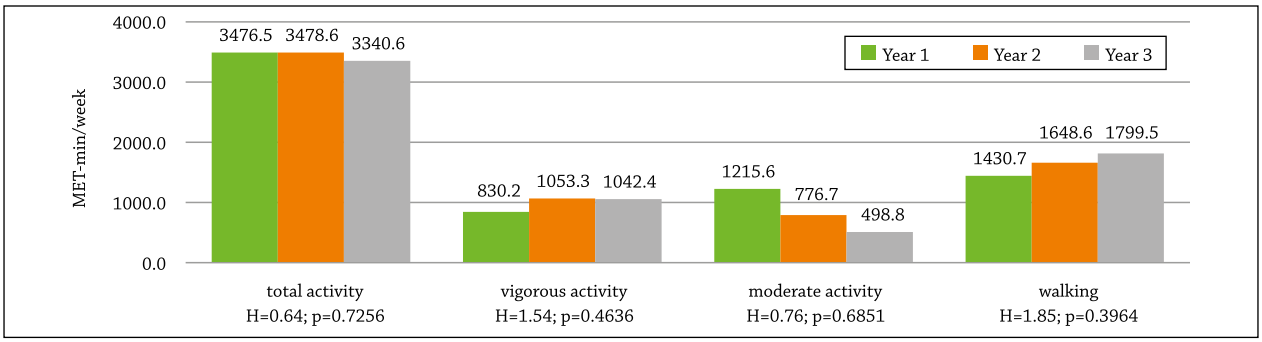
Z – value of U Mann-Whitney test.

Figure 2. Total physical activity and its components in relation to gender (median).



Z – value of U Mann-Whitney test; * – statistical significance at $p<0.05$

Figure 3. Total physical activity and its components in relation to the place of residence (mean) – MET-min/week.



H – value of Kruskal-Wallis test.

Figure 4. Total physical activity and its components in relation to the year of studies (median) – MET-min/week.

PA (p=0.0008) as well as moderate activity (p=0.0099) and walking (p=0.0024).

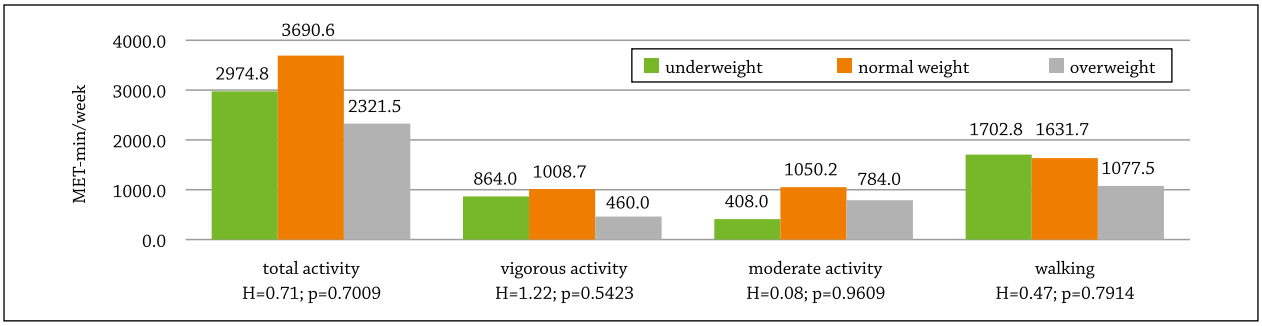
As far as the year of studies are concerned, no statistically significant differences were noted in the values of MET-min/week. Second-year students turned were slightly more active as evidenced by the values of mean total PA. The analysis of PA areas showed that second-year students also participated in more vigorous activity. When it came to moderate activity, first-year students were the most active. While in the case of walking, the highest values of MET-min/week were observed among third-year students.

In the case of BMI, no statistically significant differences were found (Fig. 5).

The highest values of MET-min/week were accumulated by students whose BMI ranged from 18.5 kg/m^2 to 24.9 kg/m^2. The only exception was walking where the highest values of MET-min/week in this area were accumulated by underweight categorised students.

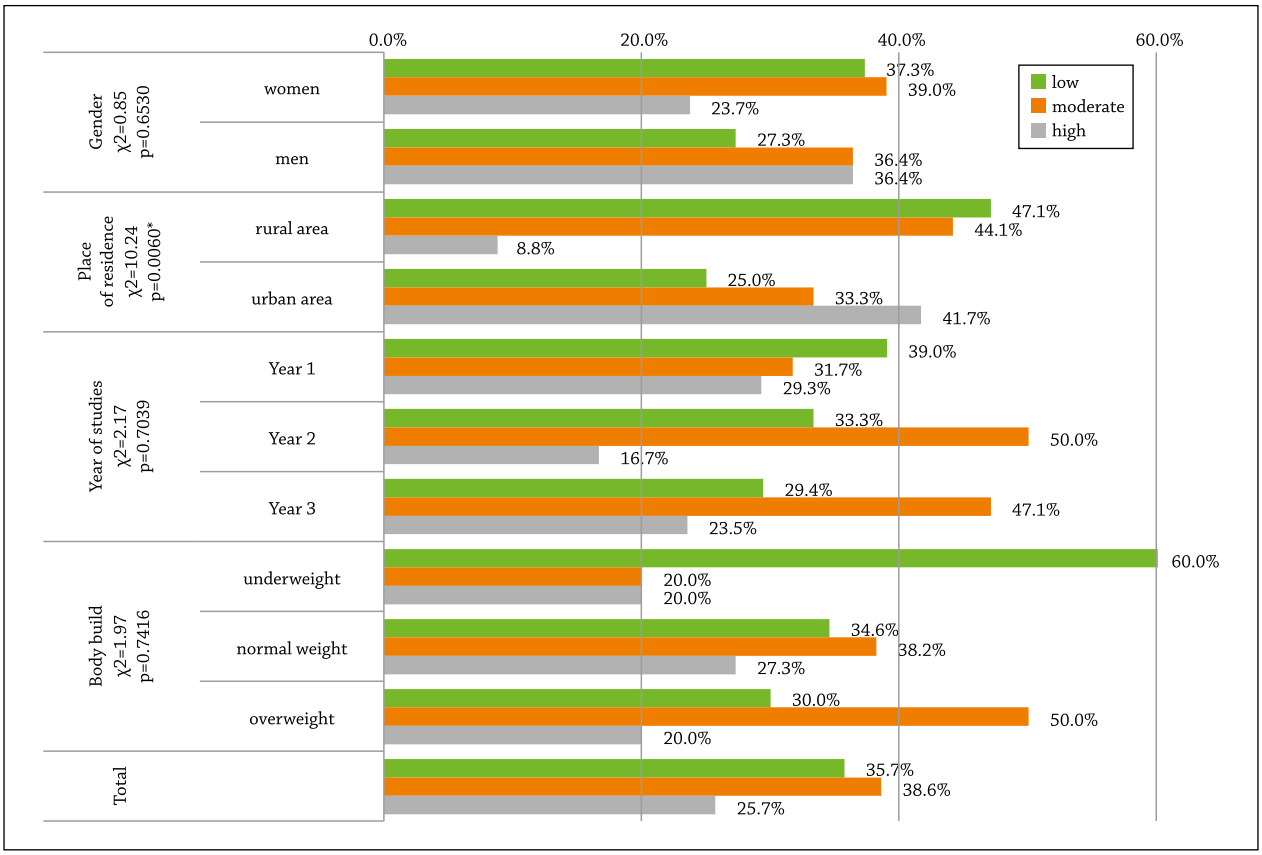
Following the IPAQ methodology, the level of PA in the current research group was determined [22]. Taking into account the criteria established by IPAQ Scientific Committee, the respondents were classified into one of three PA levels: high, moderate or low. The highest proportion of the examined students was moderately active (Fig. 6). One in four participants met the criteria of high PA levels. A total of 35.7% of the respondents demonstrated low levels of PA.

The analysis of PA levels in terms of selected variables revealed that statistically significant differences were found only in the case of the place of residence. The participants from urban areas were more active than their



H – value of Kruskal-Wallis test

Figure 5. Total physical activity and its components in relation to BMI (median).



χ^2 – value of Chi square Pearson's test; * – statistical significance at p<0.05

Figure 6. Physical activity in relation to selected variables

counterparts from rural areas, with 41.7% of the students from urban areas meeting the criteria of high levels, compared to 8.8% of the students from rural areas.

Discussion

The research was carried out using the IPAQ. This questionnaire is considered to be useful in terms of assessing PA levels in larger populations [33] and comparing research results.

PA of University students often depends on their study course as individuals attending health-related courses do physical exercise much more often [22]. It may stem from the fact that these students are obliged to attend a number of curriculum-based physical activity classes. Furthermore, those who choose to take courses in the field of health or physical culture sciences are aware of the requirements associated with a given profession. In order to be well-prepared to promote health-oriented patterns of behaviour and healthy lifestyle, students need to maintain physical fitness by attending extra-curricular PA classes [34]. Through regular practice that enhances their performance, they can exert a considerable positive influence on their functioning and life quality at an older age [21]. However, University students are involved in a wide variety of curricular classes that entail a lot of responsibilities and learning [31]. Despite the fact that students are a social group that have a broad knowledge and increased awareness of positive effects of PA on health, young people tend to take it up less often [35]. Research results in the USA, Brazil, Great Britain and Slovenia show extremely low levels of physical activity among nursing students [19,22,36–38]. The presented results of our research indicate that more than one-third of the nursing students did not meet the criteria for moderate or high activity levels.

Low physical activity was also reported among Malaysian nursing students [39]. This study involved 66 student nurses who are currently pursuing a Bachelor degree in the local Government Universities. The results showed strong signs of low physical activity level among nursing students across the two universities in Malaysia which recommended immediate attention by the healthcare authorities.

Nursing students in the UK did not meet the recommended physical activity guidelines of the World Health Organization (WHO) [37]. The main barriers reported for UK nursing students to carry out physical activity were lack of free time and energy, the physical effort, and a busy learning schedule [40,41]. The literature on physical activity levels in student nurses varied from 22% to 61% for those meeting physical activity guidelines of at least 30 minutes or more of moderate-intensity physical activity 5 days/week or 20 minutes of vigorous-intensity physical activity on three days per week [22,26]. FitzGerald [22] examined 85 nursing students and overall categorised 37.8% undertaking low activity, 36.5% moderate activity and 25.9% high activity based on the IPAQ. The Bachelor students comprised 68.4% of the low activity category and advanced practice nurse students comprised 62.5% of the moderate activity category.

The study of Górski et al. [42] showed that students from Poland were significantly more active than their counterparts from Ireland. Their investigation included 159 students of physical education. The differences between the groups were revealed for both women and men. As many as 93% of all the participants were classified into the group accumulated high levels of PA, which is not in line with the findings of the present study. In the case of nursing students from SSHE in Biala Podlaska and SMS in Bialystok, high levels of PA were demonstrated by 36% of the respondents only. Pastuszak et al. [43] compared PA of physical education students from the University of Physical Education (UPE) in Warsaw and Charles University (CU) in Prague. Their study revealed that Polish students were nearly half as active as students from the Czech Republic. The criteria of high levels of PA were fulfilled by 54% of the Polish students and as many as 95% of the students from CU. Walentukiewicz et al. [44], who examined 214 students of physical education from Gdansk University of Physical Education and Sport as well as students of public health from Olsztyn University, noted satisfactory levels of PA among the study participants. It was found that the majority of the respondents (56%) accumulated high levels of PA, and 39% exhibited PA levels that were satisfactory, while only 5% of the participants had their PA levels classified as unsatisfactory. The study revealed that a high level of health-related knowledge gained by the students in the course of their studies did not correspond to their levels of PA.

Another example is the investigation carried out by Sochocka and Wojtyłko [21]. The study sought to determine PA levels and to identify reasons for taking it up by full-time students of medical and non-medical courses. The research involved 553 students from six universities in Poland. Students of medical courses accounted for 57.68% of the sample group, while non-medical students constituted 42.32% of the population under examination. As many as 79.5% of the respondents claimed they were physically active; however, it turned out that 57% of the students did not do regular physical exercise. Gender and study course proved to be significant when it came to taking up physical activity. The study showed that the place of residence was significant as well.

Taking into account the discrepancies in the obtained results to the literature, consideration to adding an objective measure such as an accelerometer to the research methodology may be warranted. When planning to conduct research with the use of IPAQ, an interview is recommended in order to avoid inaccurate interpretation of the questions. As other researchers also note, the presence of a trained interviewer may be useful should any doubts regarding question comprehension arise [42,45,46].

Limitations of the study

The research was carried out using the International Physical Activity Questionnaire, which meant the students' subjective declarations were analysed. In future research on PA levels, it is worth considering the implementation of an objective measurement tool such as an accelerometer. It would enable researchers to compare respondents' weekly energy expenditure based on results obtained with the accelerometer and IPAQ. However, such research would require receiving funds for purchasing more measurement devices.

It is worth highlighting the fact that IPAQ is a recognised and recommended research tool for use in large population-based studies. Uniform methodology rules applied when administering the questionnaire make it possible to compare results.

Conclusions

1. According to the methodology of IPAQ, one in four study participants accumulated high levels of PA. Unfortunately, more than one-third of the respondents (nursing students) did not meet the criteria for moderate or high activity levels, thus exhibiting low levels of PA.
2. The place of residence was the only variable within which significant differences in PA levels were observed. The participants from urban areas were more active.
3. Out of the three areas of PA (vigorous, moderate and walking) walking was the most dominant.

It appears necessary to increase activities aimed at promoting pro-health behaviours among University nursing students, including the need to spend leisure time in an active manner.

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ANALYSIS OF PARENTS' SATISFACTION WITH CARING FOR CHILDREN HOSPITALIZED IN A PEDIATRIC WARD – PART 1

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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 quality of medical services offered is a factor that strongly determines patient satisfaction.

Aim of the study: The aim of the study was to evaluate parent's satisfaction with the care and conditions experienced during their child's stay in a Pediatric Ward.

Material and methods: The study involved 293 parents from two pediatric wards of the Clinical Provincial Hospital No. 2 in Rzeszow. The PASAT PEDIATRIA package was used as a research tool.

Results: The functioning of the admission room was good. Parents of children on the Pediatric Ward ranked medical and nursing friendliness the highest (mean = 4.34 and 4.37, respectively), followed by the availability of doctors (mean = 3.97) and the amount of time they devoted to the patient's family (mean = 3.97). Respondents assessed the ward best in terms of the cleanliness of the room (mean = 4.12) and the possibility of spending free time in an interesting way (mean = 4.07).

Conclusions: Parents of children hospitalized in the Pediatric Ward were slightly more satisfied with nursing than medical care. Doctors should make every effort to improve the availability and amount of time devoted to the child's family. The overall assessment of the conditions in the ward was "fairly good", indicating the need for monitoring and improvement.

KEYWORDS: personal satisfaction, parents, delivery of health care, patient care management

Background

Satisfaction (Latin saris) is a word meaning enough, that is, as much as is needed to fully satisfy the needs, expectations, and aspirations, so that there is no room for complaint [1]. On the other hand, the PWN dictionary of the Polish language defines satisfaction as the pleasure felt when a person achieves something they care about or as compensation for offending someone or causing harm [2]. Definitions of the term "satisfaction with care" significantly differ in terms of the level of generality and content, ranging from the feeling of neglect and deficiencies in the scope of provided care to general satisfaction with life. The vast majority of authors agree that patient satisfaction is a multidimensional phenomenon, but there is no consensus as to the type and number of these dimensions [3].

Hospitalization is a difficult experience for a child, requiring them to adapt to their new environment. The continuous examinations and procedures that a child undergoes may be very stressful and traumatic for the child, despite the proper approach of medical personnel. Therefore the functioning of

a modern pediatric hospital requires a comprehensive approach to the child's health problems, developmental problems, and family situation [3, 4]. The priority has been to provide medical services at the highest possible level, because the quality of medical services offered is a factor that strongly determines patient satisfaction [5]. Parents' sense of satisfaction with the care provided for their child is determined by their individual needs, experiences from previous hospitalizations, and changing external factors, including systemic factors [6, 7]. Such external factors include, but are not limited to, the child's health and its impact on the functioning of the family, the emotional state of the child, the clinical state of the disease, and the maintenance of continuity of care from admission to hospital to discharge, including the preparation of parents for further nursing care under domestic conditions [8]. Parents' satisfaction is an important part of a pediatric patient's overall medical care as it is a strong indicator of parents' attitudes to the services provided to them. This is important because it can be assumed that a satisfied patient is more likely to follow medical and nursing recommendations. Moreover, high patient satisfaction with nursing care may determine the course of the disease [9].

In Poland, the assessment of parental / guardian satisfaction with pediatric care is a relatively new area of research; at the same time, it is one of the priority recommendations for healthcare professionals. Therefore, there is a need for research utilizing standardized tools for assessing parental satisfaction with medical care in pediatric departments, in order to improve conditions and optimize activities focused on the needs of the child and their family.

Aim of the study

The aim of the study was to evaluate parents' satisfaction with the care and conditions experienced by the family during their child's hospitalization on a Pediatric Ward.

Materials and methods

Location and duration

The study was conducted at the Provincial Clinical Hospital No. St. Jadwiga Królowej in Rzeszow from March 2014 to June 2014.

Study population

A group of 293 parents of treated children was included in the survey in the Provincial Clinical Hospital No. 2 im. St. Jadwiga Królowej in Rzeszow from the following pediatric departments: 1) Orthopedics and Traumatology of the Children's Motor System, 2) Pediatrics with the Children's Neurology Sub-Department.

The study involved parents of hospitalized children who met the following inclusion criteria: signing an informed consent form, the child's stay in the hospital lasted for 3 days, and completing the questionnaire completely. The exclusion criteria included: no consent to participate in the study, the child's stay in hospital was shorter or longer than 3 days, and partial completion of the questionnaire.

Ethical considerations

The study design was submitted to the Bioethics Committee of the University of Rzeszow. It was accepted without reservations and consent was obtained (no. 4/01/2014, dated January 15, 2014). All parents were informed about the subject of the research, the purpose, and their right to withdraw from the research; they were also assured of complete anonymity.

Data sources/measurement

This study used the PASAT PEDIATRIA package, a research tool developed by the Center for Quality Monitoring in Healthcare. The package was purchased from funds received as part of a competition for young scientists at the Medical Faculty of the University of Rzeszow. The questionnaire consisted of the following sections: admission to hospital, emergency room, hospitalization, medical care, nursing care, other aspects of hospital stay. Respondents rated multiple aspects within each section on a scale from 1 to 5 (1 = very bad, 2 = bad, 3 = fairly good, 4 = good, and 5 = very good), on the basis of which a general assessment for each section was made. When asked about the information they received during their stay in hospital, the respondents answered: yes, rather yes, no, or I didn't need it.

Statistical analysis

The statistical analysis of the collected material was performed in the Statistica 10.0 package by StatSoft. The basic statistical description of the analyzed material included: standard deviation, median values, minimum and maximum values, and mean values.

Results

Characteristics of the study group

The mean age of children hospitalized in the hospital was 8.68 years (SD = 4.08, range = 1–18 years). Half of the children were under 9 years of age, and 75.0% of them were under the age of 12. The mean age of the surveyed parents was 35.22 years (SD = 5.62) and ranged from 23 to 55 years. Half of the parents were no more than 35 years old, and 25.0% of them were under 30. The majority of the children were hospitalized in the department of Orthopedics and Traumatology of the Children's Movement System (n = 202, 68.7%), with only 92 (31.3%) in the Pediatrics with the Pediatric Neurology Division.

Analysis of parents' satisfaction with their child's care

Tab. 1 displays the descriptive statistics for every feature rated within each section. The general assessment of the functioning of the Admission Room received an average rating of 4.18 SD = 0.67). Within this section staff kindness was rated the highest (mean = 4.27, SD = 0.74) and the organization of ward admission was the lowest (mean = 4.05, SD = 0.86). Most of the respondents declared that in the Admission Room they had obtained sufficient or rather sufficient information about the rules of staying on the ward (n = 155, 52.7% and n = 98, 33.3%, respectively).

The respondents assessed the functioning of the Pediatric Ward similarly. The general assessment of nursing care in the pediatric ward was received a mean rating of 4.25 points (SD = 0.72). The friendliness

Table 1. Analysis of parents' satisfaction with care and the conditions in the ward during children's hospitalization.

	Descriptive statistics				
	$\bar{x}$	Me	Min	Max	SD
Assessment of the admission room operation					
Organization of admission to the ward	4.05	4.00	1.00	5.00	0.86
The kindness of the staff	4.27	4.00	1.00	5.00	0.74
Care and concern for the child	4.19	4.00	1.00	5.00	0.75
Conditions in the admission room (cleanliness, sitting, hangers)	4.20	4.00	1.00	5.00	0.77
Overall	4.18	4.00	1.00	5.00	0.67
Assessment of nursing care					
The kindness of the nurses	4.37	5.00	1.00	5.00	0.85
The amount of time a child devotes to caring for	4.17	4.00	1.00	5.00	0.81
Delicate when caring for a child	4.25	4.00	1.00	5.00	0.92
Availability of nurses when needed	4.23	4.00	1.00	5.00	0.86
The speed of response to the requests of the child's parents	4.20	4.00	1.00	5.00	0.87
Evaluation of courtesy of attendants	4.31	4.00	1.00	5.00	0.75
Overall	4.25	4.33	1.00	5.00	0.72
Assessment of medical care					
The amount of time devoted to the child	4.13	4.00	2.00	5.00	0.84
Medical kindness	4.34	5.00	2.00	5.00	0.77
Availability of a doctor if needed	3.97	4.00	1.00	5.00	0.90
The amount of time devoted to the family	3.97	4.00	2.00	5.00	0.88
Express yourself in an understandable way	4.12	4.00	1.00	5.00	0.81
Overall	4.11	4.00	2.00	5.00	0.75
Assessment of conditions in the department					
Cleanliness of the room	4.12	4.00	1.00	5.00	0.77
Room equipment	3.78	4.00	1.00	5.00	0.86
The aesthetics of the room make the stay in the hospital more pleasant for the child	3.95	4.00	1.00	5.00	0.83
The cleanliness of the toilets	3.78	4.00	1.00	5.00	0.93
Adaptation of toilets to the needs of children	3.55	4.00	1.00	5.00	1.06
Conditions for sleep and rest	3.81	4.00	1.00	5.00	0.85
Access to the telephone	4.03	4.00	1.00	5.00	0.86
Possibility of spending free time in an interesting way	4.07	4.00	1.00	5.00	0.87
Overall	3.89	4.00	1.00	5.00	0.72
Assessment of other aspects of hospital stay					
Variety of meals	3.59	4.00	1.00	5.00	1.04
The amount of food	3.74	4.00	1.00	5.00	0.98
Meal temperature	3.85	4.00	1.00	5.00	0.98
Overall	3.73	4.00	1.00	5.00	0.91

$\bar{x}$ – arithmetic mean; Median; Min – minimum; Max -– maximum; SD – standard deviation.

of nurses and the courtesy of attendants were both rated highly (mean = 4.37, SD = 0.85 and mean = 4.31, SD = 0.75, respectively). The lowest scores were for the amount of time a nurse devotes to the care of a child (mean = 4.17, SD = 0.81) and the speed of nurses' responses to requests from the child's parents (mean = 4.2, SD = 0.87).

The general assessment of the medical care showed an average level of 4.11 points (SD = 0.75). Respondents rated medical friendliness the highest (mean = 4.34, SD = 0.77), while the lowest rating was for the doctors' availability when needed (mean = 3.97, SD = 0.90) and the amount of time they spend with the patient's family (mean = 3.97, SD = 0.88).

The conditions prevailing in the department were rated at an average level of 3.89 points (SD = 0.72). The respondents rated the ward the best in terms of room cleanliness (mean = 4.12, SD = 0.77), opportunities for interesting leisure time activities (mean = 4.07, SD = 0.87), and access to a telephone (mean = 4.03, SD = 0.86). On the other hand, the worst rated features were the adjustment of toilets to the needs of children (mean = 3.55, SD = 1.06), room equipment (mean = 3.78, SD = 0.86), and toilet cleanliness (mean = 3.78, SD = 0.93).

Other aspects of the child's stay in the hospital were also assessed, with an average rating of 3.73 points (SD = 0.91). These aspects were related to the quality of the meals the child received. In this part of the survey, the highest rating was the temperature of the meals served (mean = 3.85, SD = 0.98.), then the amount of food (mean = 3.74, SD = 0.98), and finally their variety (mean = 3.59, SD = 1.04).

The study also looked at information parents received while in hospital (Tab. 2).

Table 2. Assessment of informing parents by medical staff during children's hospitalization.

	n	%
Receiving information about the rules of staying in the department		
Yes	155	52.7%
Probably yes	98	33.3%
No	22	7.5%
He did not need	19	6.5%
Together	294	100.0%
Receiving information about the dates of planned treatments / tests		
Yes	169	57.5%
Probably yes	97	33.0%
No	13	4.4%
He did not need	15	5.1%
Together	294	100.0%
Receiving information on how to prepare the child for the procedure / tests		
Yes	169	57.5%
Probably yes	78	26.5%
No	19	6.5%
He did not need	28	9.5%
Together	294	100.0%
Receiving information about the child's health		
Yes	172	58.5%
Probably yes	116	39.5%
No	4	1.4%
He did not need	2	0.7%
Together	294	100.0%
Help in reducing pain and stress in a child during diagnosis		
Yes	186	633%
Probably yes	96	32.7%
No	3	1.0%
Hard to say	9	3.1%
Together	294	100.0%

n – number of observations; % – percent.

Discussion

Key results

The present research shows that parents of hospitalized children were slightly more satisfied with nursing than medical care. Parental satisfaction with the care their child received may depend on various factors. The problems with the availability and amount of time devoted to the child's family contributed to the lower assessment of doctors. The overall assessment of the conditions in the ward was "fairly good".

Interpretation

In specialist pediatric care, the opinions and satisfaction ratings of patients and their parents (or legal guardians) are important. They make it possible to see the most 'neglected' areas in care, creating an opportunity for change [10]. Moreover, thanks to the constant monitoring of service users' opinions, the quality of healthcare services can be improved. The present study showed that highest staff friendliness ratings were measured for staff in the Admission Room; the worst assessment concerned the manner of admission onto the ward. Conversely, Kazimierczak et al. reported 86.0% of parents described admitting a child to the ward as smooth and only taking 30 minutes [11]. Over half of respondents in the current declared that at the Admission Room they received sufficient information about the rules of staying on the ward. Similar results were obtained by Kochman et al., who found that 79.0% of a group of 100 parents were informed

about the topography and rules of the children's ward by nursing staff [12].

Nurses constitute a professional group without which the health care system is unable to function efficiently [13]. The present results show that in the children's ward the friendliness of nurses was rated the highest, while the lowest was the amount of time the nurse devoted to the care of the child and the speed of the nurses' response to the requests of the child's parents. Similar results were obtained by Kazimierczak et al., where 100.0% of respondents categorized the nurses as caring and kind during admission of the child to the ward. Nurses' professional approach during procedures was also been rated very highly. Furthermore caregivers expressed a very positive opinion on the tendency of nurses to solve problems; 60 respondents (95.0%) indicated that nurses proactively addressed children's problems [11]. Similar results were obtained by Bednarek et al. [14] and Kochman et al., who found that the majority of parents described the nurses' attitude as either friendly (52.0%) or very friendly (44.0%), whereas only 4.0% described their attitude as inert. The vast majority of parents (80.0%) stated that their child had a sense of intimacy, personal dignity, and security [12]. Bednarek et al., however, reported that among parents of hospitalized children, only 48.3% indicated that they were treated with respect by nurses [14]. The high quality assessment of nursing care is undoubtedly influenced by the availability of a nurse and the time devoted to them. Sochocka et al. reported more than half of the respondents (56.3%) assessed this availability positively. In the opinion of 41.7% of parents participating in the study, the availability of nurses was at an optimal level [15]. Similar results were obtained by Wańkowicz et al., where the availability of nursing personnel during shifts was categorized as "very good" (59.4%) and "good" (40.6%). Patient care was rated "very good" (53.1%) and "good" (46.9%) by the respondents [16]. Also according to Smoleń et al., pediatric nurses spend too little time on patient care. This may be due to parents / guardians staying with children and therefore performing activities related to direct nursing. Nurses' work time is dominated by documenting activities related to direct nursing and preparation for direct nursing, as well as treatment and diagnosis [17].

More than half of the parents in the present research received sufficient information about the dates of the planned treatments and the method of preparing the child for surgery and tests. According to Kazimierczak, the quality of information caregivers obtained from the doctor was poor. Furthermore, nearly one third of the children stated that either no one talked to them or they did not understand anything from the conversations conducted with them [11, 18]. Qualitative research conducted by Konstantynowicz et al. from the Department of Paediatrics and Developmental Disorders within the Children's Hospital in Białystok shows that both parents and children expected clear information about the disease and the treatment process from doctors, but did not always obtain it. Respondents suspected the doctors' use of medical jargon when talking to a patient may be purposeful, serving to avoid detailed explanations and discourage patients from asking further questions. It is worth noting, however, that participants described discussing a communication problem with the doctor, who tried to justify his behavior with a lack of time [10, 18]. According to Mazur et al., parents of hospitalized children usually received instrumental and evaluative support from nurses, and instrumental, evaluative, and informative support from doctors. Unfortunately, only occasionally did parents receive emotional support from doctors and nurses [19].

It is worth noting that most of the respondents declared that they received help from nurses in the form of reducing pain and stress experienced by their child during diagnostic activities. Zięba et al. also found that the majority of parents (91.0%) were "very satisfied" or "rather satisfied" with their children's pain therapy, although a large proportion of them experienced moderate or severe pain, and almost half of them had sleep problems [20]. Similar results were obtained in a survey conducted in Turkey, where 93.0% of the respondents categorized the level of pain therapy as satisfactory, despite the fact that most children experienced high intensity pain [21]. It is important that doctors and nurses use simple methods of pain relief as well as basic medications [22].

An important element of increasing the parents' / guardians' satisfaction with the care of their hospitalized child is the condition of the premises. In their own work, the parents rated the department best in terms of the cleanliness of the room, the possibility of spending free time in an interesting way, and access to the telephone. In turn, the respondents rated the worst assessments of the adaptation of the toilets to the needs of children, room equipment and cleanliness of the toilets. In turn, the respondents gave poor ratings to the adaptation of the toilets to the needs of children, room equipment, and cleanliness of the toilets. The obtained results are similar to findings by Smoleń et al., where ensuring cleanliness in the child's environment was rated highly [6]. The present results coincide with Kazimierczak et al.'s finding that parents positively assessed the pediatric ward, indicating that although the ward is old, it is clean and the children's rooms are cozy. The respondents also highly rated the conditions of the caregiver's stay in the ward together with the child. Among the respondents, 98.0% had the opportunity to use the break room and 90.0% were provided with suitable conditions to stay with the child overnight. As many as 98.0% indicated that parents have a bathroom and toilet provided. The ability to purchase meals was also highly rated [11].

The members of the therapeutic team, who influence both the child's and parents' sense of safety, are also doctors, especially in surgical wards. In the current

study, medical friendliness was rated highly but staff availability when needed and the amount of time spent with the patient's family were rated low. According to Sochocka et al., over half of the respondents (55.3%) assessed the quality of services provided by doctors as high, 38.3% of the respondents assessed it optimally, and 6.4% low. However 95.7% of the respondents the member of the therapeutic team who devoted the most time to their child was a nurse [15]. Similar results were obtained by Kazimierczak et al. at the Department of Pediatric Surgery of the Medical Center in Gliwice in 2015, which found that children highly rated the cordiality, sensitivity, and professionalism of the staff. However, half of them did not know the identity of their doctor [11]. Antoszewska reported that respondents trusted the doctors in charge and had a sense of being treated on an equal footing with other patients. In the treatment of cancer in pediatric patients, the trust that parents place in the doctor is very important. It is also important for parents to be able to observe the physician's involvement in establishing and maintaining contact with the patient, as it promotes cooperation and increases satisfaction with the help obtained [18].

Research limitations

This study was conducted on a small group of parents. A larger population would be ideal in future research. Another limitation of the study was the use of only one tool to measure patients' opinions.

Conclusions

1. Parents of children hospitalized in the Pediatric Ward were slightly more satisfied with nursing than medical care.
2. Physicians should make every effort to improve the availability and amount of time devoted to the child's family.
3. The overall assessment of the conditions on the ward was 'fairly good', indicating the need for monitoring and improvement.

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ORGAN TRANSPLANTOLOGY – OPINIONS AND ATTITUDES OF MEDICAL AND HUMANITIES STUDENTS

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ABSTRACT

Background: Transplantology is one of the fastest-growing branches of medicine and is the treatment of choice for many patients with end-stage organ disease, giving them a chance to recover.

Aim of the study: The aim of the study was to examine the attitudes and opinions of medical and humanities students regarding organ transplant.

Material and methods: Based on the assumed random selection criteria, 200 students of the University of Rzeszów (164 women and 36 men) qualified for the study. Dedicated proprietary research tools were used to assess their knowledge of the following: issues related to organ transplantation, registration as a donor, attitudes to organ donation after the respondent's death, and objections to the intention to donate organs in the event of the death of a loved one who did not object during their lifetime.

Results: A higher level of knowledge about transplantology was found among students of medical faculties ($p<0.001$). Humanities students were more skeptical about the intention to donate organs in the case of the death of a close relative who did not object during their lifetime ($p<0.001$). In total, 44% confirmed their consent to be an organ/tissue donor.

Conclusions: The level of students' knowledge of transplantology is insufficient. Familiarity with issues related to organ transplantation translates into the attitude towards organ donation; therefore, it is necessary to increase awareness and spread knowledge in this field in order to popularize it in society.

KEYWORDS: transplantology, organ donation, students

Background

There has been a dynamic development of clinical transplantation in recent. Transplantation is an elective surgery to transfer cells, tissues, or organs within one organism or between two organisms in such a way that, after the transfer, they resume vital functions and maintain their renewal capacity. As such, tissue and organ transplants have become the treatment of choice for many patients with end-stage organ disease; highly specialized post-transplant care contributes not only to extending recipients' lifespan, but also improving its quality [1]. An organ donor can either be a living person (ex vivo donation) or a deceased one (ex mortuo donation). The most commonly transplanted tissues and organs include: blood, bone marrow, kidneys, the heart and its valves, liver, lung, intestines, skin, bones, cartilage, cornea, nerves, and blood vessels [2,3].

In 2018, approximately 147,000 parenchymal organ transplants were performed worldwide, which covered only about 10% of the global demand for such procedures [4]. In Polish transplantology, 2014 holds the record for the most transplants, with 1,619 procedures

performed. In 2019, 1,630 organs were transplanted in Poland – 122 more than in 2018. 1,557 organs were from deceased donors and 73 from living donors. The lowest donation rate was recorded in the Podkarpackie Province – 1.9 donors per 1 million inhabitants. Despite the constant increase in educational resources, the development of experience, and the involvement of transplant teams in Poland, the level of donors remains low (13.1 donors per 1 million inhabitants) compared to countries such as Spain (approximately 49 donors per million inhabitants), France, the Czech Republic, Austria, and Great Britain [5,6].

Despite the wide accessibility of the Internet, the subject of transplantation is still little known and rarely discussed. There is still a vast discrepancy between the number of patients awaiting a transplant and the number of potential donors in Poland, despite the increased interest and acceptance of transplants [5].

The priority of the National Program for the Development of Transplant Medicine for 2011–2020, approved in Poland, is to increase the number of transplants, promote transplantology, and promote the idea of organ donation by educating pupils, students, medical staff, and other social groups [7]. There is a great need to spread knowledge about transplants throughout the society, in order to raise awareness of the positive effects of such surgery and the need to become a registered donor [8,9].

The idea of organ transplantation in order to save a life or restore health is widely approved in Poland [10]. However, several negative stereotypes about organ donation are still present, mainly due to inadequate knowledge of the subject. Therefore, studying the level of knowledge and attitudes towards transplantation medicine, especially among young people, is extremely important. Knowledge is a factor determining informed consent, which may directly translate into prolonging the life of a patient awaiting transplant, as well as increasing the number of donors and organ transplants carried out in the longer term [11].

Aim of the study

The aim of the study was to learn about medical and humanities students' attitudes and opinions regarding organ transplantation.

Material and methods

Study design

The research was carried out using the diagnostic survey method in a randomly selected group of Master's students. Students were in their 4th and 5th year in medical and humanities fields of study at the University of Rzeszów.

Ethical considerations

The study was carried out in compliance with the ethical norms set out in the relevant version of the Declaration of Helsinki (64th WMA General Assembly, Fortaleza, Brazil, October 2013) and in line with Polish legal regulations. The study design was approved by the Bioethics Committee at the University of Rzeszów (2018/01/07a).

Settings and participants

The research was conducted in January and February 2019 in a group of 200 medical and humanities students at the University of Rzeszów (164 women, 36 men). The majority of respondents defined their religion as Roman Catholic. The following inclusion criteria were adopted: Master's student (4th and 5th year of study) in medical or humanities fields of study, informed consent to participate in the study. Failure to meet either of these criteria was tantamount to an exclusion from the study. The characteristics of the study group are presented in Tab. 1.

Data collection

Using dedicated proprietary research tools, the following attitudes and opinions were collected: knowledge of issues related to organ transplantation, registration status in the donor registry or bank, e.g. bone marrow, opinions on the collection of the organs after their death, and objections to the intention to donate organs in the event of the death of a loved one who did not object during their lifetime. Knowledge of the basic issues related to transplantation was tested using the proprietary knowledge test, consisting of 10 true/false questions. Each participant's results fell into one of three categories: low level of knowledge (0–4 points), average level of knowledge (5–7 points), and high level of knowledge (8–10 points). Attitudes towards organ

Table 1. Characteristics of the studied group.

Parameter N=200		Medical fields of study		Humanistic fields of study		Total	
		n	%	n	%	n	%
Sex	Female	93	93.0%	71	71.0%	164	82.0%
	Male	7	7.0%	29	29.0%	36	18.0%
Place of residence	City	42	42.0%	33	33.0%	75	37.5%
	Village	58	58.0%	67	67.0%	125	62.5%
Age	Up to 24 yrs	41	41.0%	46	46.0%	87	43.5%
	Over 24 yrs	59	59.0%	54	54.0%	113	56.5%

N – number of subjects; n – number of observations.

donation after death, both of respondents and a loved one, were assessed using the proprietary questionnaire, which contained 11 statements, scored on a scale from 1– I strongly disagree to 5 – I strongly agree. The following key for assessing attitudes towards organ transplantation was adopted in the study: active attitude (35–55 points), no opinion on the subject (25–34 points), and negative attitude (11–24 points). A pilot study verified that these tools demonstrate no structural defects. Questionnaires were collected by a person with relevant medical knowledge and training in the use of these research tools.

Statistical analysis

The IBM SPSS Statistics 20 was used for statistical analysis. The intergroup variations were verified using the Mann-Whitney test and the Kruskal-Wallis test. The differences were considered statistically significant at $p<0.05$ for a confidence interval of 95%.

Results

The level of knowledge about transplantology was significantly different between groups ($p<0.001$). Medical students showed a high and average level of knowledge about transplantology (44% and 42% respectively). As many as 53% of the humanities students had low knowledge in this field (Tab. 2).

Eighty-eight respondents (49 medical students and 29 humanities students) stated they were registered as a donor, e.g., of bone marrow (Tab. 3).

Most of the respondents expressed a willingness to donate their organs for transplant, regardless of who the recipient was. Only 21% of the students would donate their organs only to close family members. In turn, 19 respondents were against donating their organs, and four of them reported this fact in the register of objections. Medical students expressed their consent to organ donation significantly more often ($p<0.001$) than humanities students (Tab. 4).

Table 2. Knowledge of transplantology among the students

Level of knowledge	Medical students		Humanities students		Total	
	n	%	n	%	n	%
Low	14	14.0%	53	53.0%	67	33.5%
Average	42	42.0%	34	34.0%	76	38.0%
High	44	44.0%	13	13.0%	57	28.5%
Total	100	100.0%	100	100.0%	200	100.0%
p	$\chi^2=40.40$; $p<0.001$					

n – number of observations; p – the level of statistical significance; χ^2 – chi-square distribution.

Table 3. Registration of students in the donor registry or bank, e.g., of bone marrow

Registration	Medical students		Humanities students		Total	
	n	%	n	%	n	%
Yes	49	49.0%	29	39.0%	88	44.0%
No	51	51.0%	69	61.0%	112	56.0%
Total	100	100.0%	100	100.0%	200	100.0%
p	$\chi^2=2.02$; $p=0.154$					

n – number of observations; p – the level of statistical significance; χ^2 – chi-square distribution.

Table 4. Students' opinions on donating organs after their death

Opinion	Medical students		Humanities students		Total	
	n	%	n	%	n	%
Accept donating organs regardless of who the recipient is	87	87.0%	45	45.0%	132	66.0%
Accept donating organs only to close family	5	5.0%	37	37.0%	42	21.0%
Object to donating organs – reported in the register	0	0.0%	4	4.0%	4	2.0%
Object to donating organs – not reported in the register	1	1.0%	14	14.0%	15	7.5%
Lack of opinion	7	7.0%	0	0.0%	7	3.5%
Total	100	100.0%	100	100.0%	200	100.0%
P	$\chi^2=60.01$; $p<0.001$					

n – number of observations; p – the level of statistical significance; χ^2 – chi square distribution.

Three in four respondents declared their willingness to fulfill the will of a loved one – and consent to organ donation after their death. 11.5% of respondents opposed to donating the organs of the dead loved ones that did not express objections towards donation in their lifetime.

Statistically, the students of humanities were more skeptical about the intention to donate organs in the event of the death of a loved one who did not oppose donation ($p<0.001$). The results are presented in Tab. 5.

Based on the evaluation system adopted in the study, the vast majority of students showed an active attitude (91%). Only one subject demonstrated a negative attitude, and 8.5% of all participants held no opinion (Tab. 6).

Discussion

The present study concerned the assessment of opinions and attitudes to organ transplantation in students of medical and humanities-related courses. The analysis covers the knowledge of issues related to transplants, registration as a donor, e.g., bone marrow, opinions on the collection of the organs after their death, and expressing objections to the intention to donate organs in the event of the death of a loved one who did not object during their lifetime.

Irving et al. showed that the level of knowledge and information was the greatest influencing factor on the decision to donate organs for transplantation [12]. In our study, medical students showed a high and average level of knowledge about transplantology (44% and 42% respectively). However, 53% of humanities students had little knowledge in this respect – which may affect their possible decisions regarding organ donation. Research conducted by Alex et al. showed a considerable lack of information on organ donation – only 22.4% of Indian students gave correct answers to questions assessing their level of knowledge in the field of organ donation and transplantation [13]. Therefore, the lack of information is measurable and indicates a need for increased education.

Becoming a potential donor is a difficult and responsible decision. Nearly half of the surveyed students (44%) were registered as a potential donor. In studies by Kobus et al., 20% of respondents completed such a declaration and carried it with them [8]. Soylar et al. carried out their research on Turkish students of nursing and theology. Only 0.5% of the respondents had organ donor card, a surprisingly low number considering these were medical students [14]. Lei et al. highlight that out of 1,589 students from five Chinese universities, only seven signed an organ donation form [15]. In a German study by Radunz et al., university students who considered themselves sufficiently knowledgeable about organ donation were significantly more likely to hold an organ donor card [16].

Our study showed that among all respondents, the highest number of people would donate their organs, regardless of whom the recipient was (66%), whereas 21% would only donate their organs to members of their immediate family. Only 19 respondents were against donating their organs – four of whom reported this fact in the registry. Romanowska et al. conducted a similar study among nursing students, 92% of whom declared their willingness to donate their organs if a loved one needed them. As many as 79% of respondents consented to transplantation when they were diagnosed with brain

Table 5. Objection to the intention to donate organs of a deceased loved one, who did not oppose organ donation.

Objection	Medical students		Humanities students		Total	
	n	%	N	%	n	%
Yes, the very fact of death is a shocking experience	5	5.0%	18	18.0%	23	11.5%
No, since the deceased has not objected, I will respect the will of the loved one	88	88.0%	55	55.0%	143	71.5%
Lack of opinion	7	7.0%	27	27.0%	34	17.0%
Total	100	100.0%	100	100.0%	200	100.0%
p	$\chi^2=26.73$; $p<0.001$					

n – number of observations; p – the level of statistical significance; χ^2 – chi-square distribution.

Table 6. Students' attitudes towards organ and tissue transplantation

Attitude	Medical students		Humanities students		Total	
	n	%	N	%	n	%
Active	92	82.0%	90	90.0%	182	91.0%
Lack of opinion	7	7.0%	10	10.0%	17	8.5%
Negative	1	1.0%	0	0.0%	1	0.5%
Total	100	100.0%	100	100.0%	200	100.0%
p	$\chi^2=1.55$; $p=0.460$					

n – number of observations; p – the level of statistical significance; χ^2 – chi-square distribution.

death; 9% did not consent, and 10% person were not sure about their decision [17]. In a study conducted by the Public Opinion Research Center, eight out of ten adults agreed to have their organs donated for transplantation after their death, while 11% were against it [10]. In studies conducted on a group of students attending the Medical University and the Technical University in Białystok, the highest percentage of readiness to donate their organs after death was observed in the group of medical university students (94.5%); 4.2% of all respondents declared total objection [8].

In the present study, three out of four surveyed students declared their consent to have their loved one's organs donated after their death. Conversely, 11.5% of respondents objected, even if the deceased did not object before death. Similar results were obtained by Kobus et al.; 81.2% of students would consent to the donation of organs from a loved one after their death. Out of all respondents, 5.7% would object [8]. According to the research conducted by the Public Opinion Research Center in 2016, the vast majority of respondents (89%) would not object to organ donation if it was known that the deceased loved one did not object. If the deceased objected, two-thirds would observe their will, and 22% would be against it [10].

Adequate knowledge and an appropriate level of education are factors influencing the acceptance and willingness to donate organs for transplantation. Both the research presented in this paper and studies within the literature indicate the need for increased education of students, and society as a whole, in the medical and legal aspects of cell, tissue, and organ transplantation. Unfortunately, even the support of such procedures by outstanding moral and ethical authorities still has insufficient effect in society, as the list of patients waiting for transplants grows faster than the number of donors.

Limitations of the study

The study was limited by a relatively small sample size of students, from one university only. Another limitation was the lack of promotion of gender variability. Despite these limitations, the topic covered in the article is of great importance, and it provides a great deal of valuable information.

Conclusions

The current level of knowledge of organ donation and transplantation among the surveyed students was insufficient. Attempts to include content regarding transplantology in the curricula and promotion of organ donation should result in a significant increase in young people's awareness.

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ASSESSING OF PATIENTS' KNOWLEDGE OF ANAPHYLACTIC SHOCK AND ALLERGIES

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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 World Health Organization (WHO) identified allergy as one of the major problems of the 21st century. It was also stated to be a key issue for health protection and public health care activity in the White Book on Allergy published in 2011. An allergy or atopy is called type I hypersensitivity. It may take the form of immediate (anaphylaxis) or late symptoms including allergic rhinitis and eye diseases, atopic dermatitis, food allergies, anaphylactic shock, allergic asthma and hives. Anaphylaxis and anaphylactic shock can occur at any age.

Aim of the study: The goal of the study was to assess patient knowledge about allergies and appropriate actions to take in situations of severe allergic symptoms including anaphylactic shock.

Material and methods: The study was conducted in 2018 among 150 adult patients in a clinic of Allergy at Optima Medycyna SA in Opole. The author's survey questionnaire contained 27 closed single or multiple-choice questions.

Results: A satisfactory level of knowledge of the most life-threatening allergy exacerbations was found in 79.3% (119) of the examinees. 53.3% (80) had correct knowledge of how to act in the case of a severe allergic shortness of breath and symptoms that do not subside despite administering medications. In such instances, 46.7% did not know what to do. Only 84.7% (127) of respondents knew the definition of anaphylactic shock while 10% (15) did not know the concept at all.

Conclusions: Patients showed a significantly higher level of knowledge about allergy complications than about their causes and prevention. Knowledge about the diagnosis of allergy exacerbations, as well as steps to take in life-threatening situations associated with acute allergic disease and anaphylactic shock in home situations was insufficient. In addition, it was found that nursing staff insufficiently educate patients on allergies and associated complications.

KEYWORDS: anaphylaxis, hypersensitivity, nurses, patients

Background

Allergy is the third most common chronic disease in the world. In the White Book on Allergy published in 2011, the World Health Organization (WHO) identified allergy as a major problem of the 21st century and a key issue for health protection and public healthcare activity [1,2]. Allergic diseases have a negative impact on quality of life including reduced physical and professional activity which, consequently, can lower the social status of sufferers [3].

Data resources from the 2008 Epidemiology of Allergic Diseases (ECAP) program and the WHO show that around 40% of people in Poland and worldwide exhibit allergic symptoms. Adults most likely suffer from an inhaled allergy whereas children are most commonly affected by food allergies, atopic dermatitis and scabies [4–6]. In the ECAP studies, B. Samoliński et al. showed that in the Polish population, 40–45% of people have allergic skin lesions, 22% suffer from allergic rhinitis and 12% have asthma symptoms [1].

According to the World Allergy Organization (WAO), the most common allergic diseases include allergic rhinitis (10–25%), allergic conjunctivitis (65–95%), urticaria and angioedema (25%). About 300 million people, including about 5 million of Poles, suffer from bronchial asthma. This condition contributes to the death of 250,000 people each year [7–9]. Asthma was defined by the Global Initiative for Asthma (GINA) as a chronic inflammatory respiratory disease characterized by respiratory over-activity, wheezing attacks, coughing and shortness of breath with variable bronchial obstruction, usually reversible spontaneously or after treatment [10]. Contact with the allergen may cause an instantaneous or delayed asthmatic reaction [11].

An allergy or atopy is referred to as type I hypersensitivity which may take the form of an immediate reaction (anaphylaxis) or late symptoms including allergic rhinitis and eye diseases, atopic dermatitis, food allergies, anaphylactic shock, allergic asthma and hives [12,13]. Anaphylaxis and shock can occur at any age [14,15].-

Anaphylaxis is the severest form of hypersensitivity with a sudden and devastating course. Its objective symptoms include accelerated heart rate, laryngeal edema, redness of the skin, bronchospasm, hives, headache and a decrease in blood pressure. Feelings of anxiety and impending death are subjective symptoms often described by patients [13,16]. The symptoms of early anaphylaxis are often associated with a site that was exposed to an allergen. They may appear a few minutes after exposure to the allergen and may resolve spontaneously, or after administration of antihistamines [17]. The late form (generalized) appears from 6 to 10 hours after contact with an allergen. Symptoms affect the upper respiratory tract and can lead to tissue damage and development of diseases such as asthma. The late form occurs in approximately 50% of people prone to early anaphylaxis and is characterized by strong symptoms [17].

The most severe form of anaphylaxis is anaphylactic shock, which is a violent systemic reaction of the immune system to an allergen that can lead to death [18]. The definition of shock is a sharp and sudden systemic disorder resulting from an immediate reaction. Anaphylactic shock is a life-threatening condition and requires prompt medical attention [19,20]. In people with hypersensitivity, it can be induced by ingested or inhaled allergens or venoms of animals [21].

The gold standard treatment for anaphylactic shock is the intramuscular administration of adrenaline [22]. Patients who experience anaphylactic shock should acquire an EpiPen with 0.3 or 0.15 mg of adrenaline for use in situations at home [23–25]. In the report titled 'Anaphylaxis – health and medical problem,' a threefold increase in the causes of anaphylactic shock causes was observed [26]. The report showed that in 2008, 29,000 patients reported a need for assistance due to anaphylaxis, and in 2015, that number increased to 117,000. European statistics show that 1 in 300 people is affected by anaphylaxis [27]. The Polish National Health Fund reports that the number of patients applying for assistance due to anaphylaxis has increased six-fold in recent years. In 2014, 18,063 absenteeism causes were reported due to anaphylaxis. [28]. According to Prof. Dr Hab. N. Med. J.R Ładny, about 40–100 people die of anaphylactic shock annually [29]. From a safety point of view, people suffering from allergic diseases should be aware of how important education about allergies including how to act in cases of an allergic reaction.

Aim of the study

The aim of the study was to evaluate patients' level of knowledge about allergies, anaphylaxis and appropriate handling of situations associated with allergic severity of symptoms including anaphylactic shock. Since the risk of anaphylactic shock in allergic diseases is higher than in healthy people, patients should be familiar with the risks associated with it. It was, therefore, important to check whether levels of knowledge are sufficient and what role nurses play in education on the subject.

Material and methods

Study design

The study was carried out among patients suffering and being treated for allergic diseases in the outpatient allergology clinic at The Allergy Department in the medical clinic Optima Medycyna SA in Opole.

Settings

The research was conducted using a questionnaire. The study was initiated after obtaining approval from the administration of Optima Medycyna SA and The Bioethical Commission at the State Medical Higher Vocational School in Opole (No. 19/PI/2018). The study was anonymous and consent to participate was voluntary. The research was conducted in accordance with good clinical practice and requirements of the 1975 Helsinki Declaration revised in 2000.

Data sources/measurement

A diagnostic survey was used with an author's survey questionnaire. It contained 27 closed single or multiple-choice questions. Questions 1 to 8 related to socio-demographic data, duration of the disease and treatment in The Allergy Department, as well as the pharmacological therapy used. To obtain data on the respondents' knowledge of allergies, they were asked to define the notion of allergy (q. 9) and the causes of inhaled (q. 10), food (q.11) and contact (q.12) allergies. Knowledge about the most common symptoms of allergies was evaluated in q.13. Question 15 concerned the definition of anaphylactic shock. Question 16 assessed knowledge on how to act in the event of shortness of breath when at home (q. 14). Question 20 concerned the most life-threatening complications of allergies (q.20). The other questions were related to allergy prevention, self-assessment of knowledge, learning about allergies and the importance of health education.

Participants

The research surveyed allergic patients who were between 18 and 65 years old. Criteria for participation in the research, apart from age, included having an allergic disease and voluntary consent to take part in the study. The exclusion criteria included age below 18 or above 65, treatment in a clinic other than the Allergy Department at Optima Medycyna SA or no consent to participate in the study.

There were 150 participants that qualified for the study of whom 46.7% (70) were aged 30–41 and 13.3% (20) were aged 54–65. Most of the respondents were women (61.3%; 90). The largest group of the respondents had higher education (52.7%; 79). 4.7% (7) of the respondents had primary education. Patients treated for allergies over a period of 1 to 3 years constituted the largest group (44.7%; 67). The smallest group was 15.3% (23), consisting of those treated for less than one year for allergies. People who suffered from allergies for over 6 years formed the largest group (39.3%; 59). Only 15.3% (23) were affected by allergies for less than a year. Treatment with tablets was most common and applied to 62.6% (93) of the examinees. Untreated patients constituted 14.7% (22) of all the respondents (Tab. 1). Due to perceived difficulty of some of the questions, two respondents decided not to complete the survey.

Table 1. Study group characteristics

Characteristics of the study group (n=150)		n	%
Age (years)	18–29	35	23.3
	30–41	70	46.7
	42–53	25	16.7
	54–65	20	13.3
Gender	women	92	61.3
	men	58	38.7
Education	basic	7	4.7
	secondary	43	28.7
	vocational	21	14
	higher	79	52.7
Place of residence	village	55	36.7
	city	95	63.3
Duration of allergic disease (years)	< 1	23	15.3
	1–3	54	36
	4–6	14	9.3
	> 6	59	39.3
Duration of allergy treatment (years)	< 1	42	28
	1–3	67	44.7
	4–6	12	8
	> 6	29	19.3
Type of treatment used	pills	93	62
	inhaled steroid drugs	55	36.7
	specific immunotherapy – vaccine	74	49.3
	ointments, skin creams	19	2.7
	eye drops	29	19.3
	ear drops	55	36.7
	not taking any treatment	22	14.7

n – number of respondents, % – percentage of all respondents, CI – confidence interval

Statistical methods

The analysis was performed in PQ Stat version 1.6.6 with calculations performed using Microsoft Excel 2010. The significance level was set at $p = 0.05$. Respondents' level of knowledge was determined based on evaluation of their responses. For indicating the correct answer, the subjects obtained 1 point and 0 points were awarded for indicating the incorrect answer or a non-response. The results were summarized and recalculated on a percent scale (0 to 100 percent). Based on this, three groups were identified: people with low knowledge (having no more than 75% correct responses), people with an average level of knowledge (above 75% but not more than 85% correct responses) and people with a high level of knowledge (above 85% correct responses). Knowledge was the main dependent variable. Variables at nominal and ordinal levels were analyzed using tests based on the chi-squared distribution with a correction for continuity for 2x2 tables.

Results

Descriptive data

The definition of allergy was known by 72.7% (109) of the respondents. Most who knew the definition were in the age groups of 18–29 (82.8%; 29) and 30–41 (74.3%; 52). However, according to 23.3% (35) of participants, allergy was a respiratory disease. 4% (6) did not know the definition and they thought that allergy was either a gastrointestinal disease, rash or vomiting.

Causes of inhalation allergy were correctly identified by 80.7% (121) of participants, mostly in the age group of 18–29 (91.4%; 32); food allergy by 95.4% (143) with 100% (20) in the age group of 42–53; contact allergies by 66.7% (100) of which 22% (33) did not know the causes while 11.3% (17) indicated the wrong answer (Tab. 2). The most common allergic symptom in the multiple-choice question was correctly identified to be 'stuffy nose/runny nose' by 95.3% (143) of the respondents. The second and correct most common choice was 'conjunctivitis/tearing of the eyes' (80%; 120). Satisfactory knowledge of the most life-threatening allergy exacerbations was achieved by 79.3% (119) of the respondents who chose answers such as breathing disorders/shortness of breath/wheezing in the chest. Only 0.7% (1) thought that hives/itching could be a life-threatening symptom (Fig 1).

More than half of the respondents (53.3%; 80) had correct knowledge of how to act in the case of a severe allergic shortness of breath and symptoms that do not subside despite administration of medications. In the age group of 30–41, the management of very severe allergic dyspnea was known by 60% (42) of individuals. In the youngest age group, 42.8% (15) of respondents chose the correct answer, while 46.7% (78) did not know what to do in such a case, with most in the oldest age group 55% (11) (Tab. 3). Only 84.7% (127) of the examinees knew the definition of anaphylac-

Table 2. Knowledge about the causes and definition of allergies.

Definition and causes of allergies	Age (years)								n	%	p	95% CI	
	18–29		30–41		42–53		54–65					Low	Top
	n	%	n	%	n	%	n	%					
What is an allergy?													
Respiratory disease	5	14.3	17	24.3	8	32	5	25	35	23.3	< 0.001	0.168	0.309
Hypersensitivity of the immune system	29	82.8	52	74.3	16	64	12	60	109	72.7	< 0.001	0.648	0.796
Others	1	2.8	1	1.4	1	4	3	15	6	4	< 0.001	0.015	0.085
Total	35	100	70	100	25	100	20	100	150	100			
What is an inhalation allergy?													
It is a reaction to allergens found in food	0	0.0	6	8.6	1	4	1	5	8	5.3	< 0.001	0.023	0.102
It is a reaction to allergens in chemical substances	1	2.9	1	1.4	2	8	3	15	8	5.3	< 0.001	0.023	0.102
It is a reaction to airborne allergens	32	91.4	58	82.9	18	72	14	70	121	80.7	< 0.001	0.734	0.867
I don't know what inhalation allergy is	2	5.7	5	7.1	4	16	2	10	13	8.7	< 0.001	0.047	0.144
Total	35	100	70	100	25	100	20	100	150	100			
What is a food allergy?													
It is a reaction to allergens in foods	34	97.1	68	97.2	25	100	16	80	143	95.4	< 0.001	0.906	0.981
It is a reaction to allergens in chemical substances	0	0	1	1.4	0	0.0	1	5	2	1.3	< 0.001	0.002	0.047
It is a reaction to airborne allergens	1	2.9	0	0	0	0.0	1	5	2	1.3	< 0.001	0.002	0.047
I don't know what a food allergy is	0	0.0	1	1.4	0	0.0	2	10	3	2	< 0.001	0.004	0.057
Total	35	100	70	100	25	100	20	100	150	100			
What do you think can be a contact allergy?													
It is a reaction caused by house dust mites	2	5.7	7	10	2	8	1	5	12	8	< 0.001	0.042	0.136
It is a reaction to the food eaten	1	2.9	2	2.9	0	0.0	1	5	5	3.3	< 0.001	0.011	0.076
It is a reaction caused by chemical substances, e.g. hair dye, perfumes, creams	26	74.3	50	71.4	18	72	7	35	100	66.7	< 0.001	0.585	0.741
I don't know what contact allergy is	6	17.1	11	15.7	5	20	11	55	33	22	< 0.001	0.157	0.295
Total	35	100	70	100	25	100	20	100	150	100			

n – number of respondents, % – percentage of all respondents, CI – confidence interval.

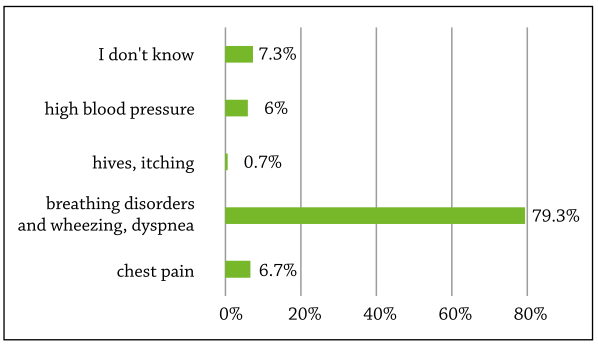

Fig. 1. Life-threatening complications of allergies

tic shock. All age groups showed a sufficient or high level of knowledge in this subject. The concept was more commonly known to women 90% (83) than to men 74.1% (43). 10% (15) did not know the definition (women 7.6%, 7; men 13.8%, 8) while 5.3% (8) chose the incorrect answer.

In the multiple-choice questions, participants were asked to demonstrate their knowledge about actions to take in the case of anaphylactic shock by choosing the answers: 'administering the EpiPen' 41.3% (62), with females having a higher knowledge level (30%; 45) than men (11.3%; 17) but not sufficient; and 'calling an ambulance' answered by 63.2% (95). In this group of respondents, only 40.7% (61) female and 26.7% (34) men chose the correct answer. Presented with such a situation, 16% (24) of the subjects did not know what to do (women 10%, 6.7; men 9.3%, 14), while 12.4% (15%) had incorrect knowledge of how to act in this case (Tab. 4). Information about allergies and their causes and prevention was sufficiently known by most respondents (average: 37.3%, 56; high: 18.7%, 28), as well as the diagnosis of allergy complications (Tab. 5).

A statistically significant correlation between level of knowledge about allergies and knowledge sources was found for books as well as the internet and doctor's consultations ($p<0.05$). To obtain this information, 68.7% (103) spoke to their doctor but only 18% (27) spoke to a nurse (Tab. 6). In the self-assessment, 87.3% (131) of respondents believed that allergology education is use-

Table 3. Management of very severe allergic dyspnea.

Treatment in case of very severe shortness of breath related to allergies; constant symptoms despite the administration of drugs	Age (years)								n	%	p	95% CI	
	18–29		30–41		42–53		54–65					Low	Top
	n	%	n	%	n	%	n	%					
Going to bed and putting cold compress on the chest	1	2.9	3	4.3	0	0.0	0	0.0	4	2.7	< 0.001	0.007	0.067
Opening the window	1	2.9	3	4.3	0	0.0	0	0.0	4	2.7	< 0.001	0.007	0.067
Taking calcium	3	8.6	6	8.6	4	16	7	35	20	13.3	< 0.001	0.083	0.198
Going to a family doctor's clinic	10	28.5	16	22.8	5	20	3	15	34	22.7	< 0.001	0.162	0.302
Calling an ambulance	15	42.8	42	60	14	56	9	45	80	53.3	0.463	0.450	0.615
I don't know	5	14.3	0	0.0	2	8	1	5	8	5.3	< 0.001	0.023	0.102
Total	35	100	70	100	25	100	20	100	150	100			

n – number of respondents, % – percentage of all respondents, CI – confidence interval.

Table 4. Knowledge about anaphylactic shock.

Definition of anaphylactic shock and management of its occurrence	Age (years)								Gender				n	%	p	95% CI	
	18–29		30–41		42–53		54–65		women		men					Low	Top
	n	%	n	%	n	%	n	%	n	%	n	%					
What is an anaphylactic shock?																	
The body's reaction manifested by high pressure	0	0.0	2	2.9	1	4	0	0	0	0	3	5.2	3	2	< 0.001	0.004	0.057
The body's reaction to an allergen that can lead to death	32	91.4	61	87.1	20	80	14	70	83	90.2	44	75.8	127	84.7	< 0.001	0.779	0.900
The body's reaction manifested as a decrease in blood glucose levels	1	2.8	1	1.4	2	8	1	5	2	2.2	3	5.2	5	3.3	< 0.001	0.007	0.067
I don't know what anaphylactic shock is	2	5.7	6	8.6	2	8	5	25	7	7.6	8	13.8	15	10	< 0.001	0.057	0.160
Total	35	100	70	100	25	100	20	100	92	100	58	100	150	100			
What should you do in case of shock?*																	
Administer antihypertensive drugs	0	0.0	2	2.1	0	0.0	1	3.7	2	1.3	1	0.7	3	2	0.25	0.292	1.000
Administer the EpiPen	18	38.3	22	23.6	13	40.6	9	33.3	45	30	17	11.3	62	41.3	< 0.001	0.942	1.000
Give something sweet to eat	1	2.1	3	3.2	1	3.1	1	3.7	3	2	3	2	6	4	0.031	0.541	1.000
Give plenty of water to drink	1	2.1	5	5.4	0	0	1	3.7	4	2.7	3	2	7	4.7	0.016	0.590	1.000
I don't know what to do in this case	6	13.7	9	9.7	5	15.6	4	14.8	10	6.7	14	9.3	24	16	< 0.001	0.858	1.000
Call an ambulance	21	44.7	51	54.8	12	37.5	11	40.7	61	40.7	34	26.7	95	63.3	< 0.001	0.962	1.000
Other	0	0.0	0	0.0	1	3.1	0	0.0	1	0.7	0	0.0	1	0.7	1	0.025	1.000

n – number of respondents, % – percentage of all respondents, CI – confidence interval, * – percentages do not sum up to 100% as it was a multiple-choice question.

Table 5. Level of knowledge about allergies, causes, prevention and complications

Level of knowledge about:	n	%	p	95% CI	
				Low	Top
Allergies, causes and prevention					
Low level	66	44	0.165	0.359	0.523
Average level	56	37.3	0.002	0.296	0.456
High level	28	18.7	< 0.001	0.128	0.258
Allergy complications					
Low level	65	43.3	0.121	0.353	0.517
Average level	36	24	< 0.001	0.174	0.316
High level	49	32.7	< 0.001	0.252	0.408

n – number of respondents, % – percentage of all respondents

ful to minimize the occurrence of allergies and complications. Only 4.7% (7) declared that such education has no influence on the occurrence of allergies.

The study found a correlation between respondents' self-assessment of knowledge about allergies and their actual knowledge of anaphylactic shock $p<0.05$ (Tab. 7). Of participants who responded that they had a high level of knowledge, 94.3% (50) answered the question about anaphylactic shock correctly.

Discussion

There is limited research in the literature related to patient knowledge about allergies and associated preventative measures and complications. Only a few authors have attempted to conduct some research in this area. Therefore, the literature for this discussion was determined by the convergence of the scope of the study (knowledge level) and not the respondent group. The results of the study were compared with the work of researchers dealing with other diseases such as diabetes and hypertension.

Key results

In this self-reported questionnaire study, participants exhibited a higher level of knowledge about allergic complications compared with causes of allergies and their prevention. Awareness about recognizing complications of allergies and the definition of anaphylactic shock was satisfactory, but not sufficient. What is more, respondents knew little about the steps to take in the case of anaphylactic shock in a home situation. Physician engagement in patient education was at a good level while engagement from nursing staff appeared to be abnormally low. In most cases, patients used the internet for information on allergies as they experienced difficulties associated with accessibility to the Allergy Department at the hospital.

Interpretation

Knowing the basic definitions of a disease is a prerequisite for further health education. In the question about the definition of allergy, 72.7% (109) of the respondents confirmed their knowledge of it. The

Table 6. Sources of allergy knowledge and level of knowledge.

How do you learn about allergies?		Allergy Knowledge			Test result
		Lowest level	Medium level	High level	
I read books	n	2	11	8	$\chi^2 = 9.819$ df = 2 p = 0.007
	%	9.5	52.4	38.1	
I do not use this source	n	59	41	29	
	%	45.7	31.8	22.5	
I talk to a doctor	n	36	35	32	$\chi^2 = 8.146$ df = 2 p = 0.017
	%	35.0	34.0	31.1	
I do not use this source	n	25	17	5	
	%	53.2	36.2	10.6	
I talk to a nurse	n	7	13	7	$\chi^2 = 3.507$ df = 2 p = 0.173
	%	25.9	48.1	25.9	
I do not use this source	n	54	39	30	
	%	43.9	31.7	24.4	
I use the Internet	n	30	39	29	$\chi^2 = 11.953$ df = 2 p = 0.003
	%	30.6	39.8	29.6	
I do not use this source	n	31	13	8	
	%	59.6	25.0	15.4	

n – number of respondents, % – percentage of all respondents p – materiality; χ^2 – test statistics; df – degrees of freedom.

Table 7. Self-assessment of knowledge about allergies and anaphylactic shock.

What do you think an anaphylactic shock is?		How do you assess your knowledge of allergies?		Chi-square test result
		I know more than a little or a lot	I know little or do not know anything	
correct answer	n	50	77	$\chi^2 = 4.811$ df = 1 p = 0.028
	%	94.3	79.4	
invalid response	n	3	20	
	%	5.7	20.6	

n – number of respondents, % – percentage of all respondents, p – materiality; χ^2 – test statistics; df – degrees of freedom.

findings are consistent with a study that involved 100 patients hospitalized in the Gastroenterology and Hepatology Departments at the University of Warmia-Mazury hospital in Olsztyn in which 76% of respondents correctly defined an allergy to be 'an organism's response to an allergen – a sensitizer' [30].

The level of knowledge of patients' about the diagnosis of allergic complications was satisfactory but not sufficient. The question that assessed this revealed that only 32.7% (49) of respondents had a high level of awareness, 24.0% (36) average, while 43.3% (65) had a low level of knowledge. Given that 73% (109) of the study group was treated for allergies for more than a year and 86% (129) had some treatment, greater awareness and knowledge of allergic complications was expected. The author, in asking this question in the survey, assumed that subjects who were being treated and those under specialized treatment would have a good understanding of complications. In subsequent studies, it may be considered whether a low level of patient knowledge on the subject may have a negative impact on the development of allergic diseases, irrespective of treatment.

The study also found that respondents showed a higher level of awareness of allergic complications than about their causes and prevention. In the group, 79.3% (190) reported the complications to be acute and life-threatening, which was correct, and 81.3% (120) identified them as late complications. In comparison, in a 2017 study that looked at type II diabetes complications, 97.1% of diabetics in the study demonstrated knowledge of early complications of the disorder and 98.6% about late complications [31]. Knowledge among diabetics about complications of their disease was thus much higher than that of allergies. Allergy is a more common disease than diabetes and both early and late complications can pose a risk to life, hence, it is necessary to more closely investigate causes of knowledge deficits in this disease area.

This study showed that level of knowledge pertaining to the definition of anaphylactic shock was insufficient as 14.5% (33) of the respondents did not know the concept. In a study by Jędrusek-Golińska et al. conducted among 222 non-allergenic patients, 68% of them knew the concept of anaphylactic shock. A lower knowledge level of its definition in this study seems to support the assumption that people with the hypersensitivity have greater knowledge of the concept than those that are healthy [32].

In the same study, a question about management of anaphylactic shock before the arrival of an ambulance revealed that 12% of respondents would give adrenaline, 36% anti-allergic medicines, 51% would sustain vital functions and 18% did not know what to do in such a case [32]. Comparably, in this research study, in the case of a shock, respondents reported little knowledge of how to deal with the situation while at home. Only 63.3% (95) of subjects would call an emergency team, while 41.3% (62) would give an EpiPen. Of those surveyed, 16% (24) would not know how to respond in such a situation. The results obtained in both studies show that the level of knowledge about shock and rescue is abnormally low. It is worrying that so few people would give adrenaline, which is now considered to be the standard of care in treating people undergoing anaphylactic shock [33].

The respondents indicated that conversation with a doctor 68.7% (103), followed by the internet 65.3% (98), were their main sources of medical knowledge. Nursing interviews were only a source of knowledge for 18% (27) of all subjects. The results were compared with a 2015 study titled 'Knowledge on Gluten and Gluten-Dependent Diseases' where nursing staff provided information to 2% of patients while 88% of participants received knowledge from the internet [34]. In studies from 2012 by Cichońska et al. in which nursing staff provided support to women with breast cancer, it was shown that for 86% of women, nurses were a source of knowledge on prophylaxis and prevention of chemotherapy complications. Nurses' knowledge of treatment was at a level of 78% [35]. Based on these studies, it may be speculated that whether nursing staff serve as a source of information about a disease largely depends on the disease itself.

According to self-reported studies, there is a clear deficit of nurses' participation in educating patients about allergies. It can be assumed that low accessibility to health care services might result in educational deficits among patients, leading them to obtain knowledge from the most available sources (i.e. the internet). After filling in the questionnaire, respondents explained the phenomenon of searching for information on the internet. As the main reason for turning to the internet, they pointed to doubts and questions they had about symptoms and exacerbation of the disease, which required immediate specialist consultation but was impossible because of accessibility issues. Research published by Hesse in the US revealed that 'Dr. Google' "treats more American patients than real doctors do," and that this internet phenomenon is perceived positively [36]. Similarly, Morrison et al. found that asthma patients, more often than others, looked for online information. Knowledge obtained this way significantly improved the quality of their lives, increased the feeling of safety and was complementary to information found on medications [37]. In their studies, Kłak et al. found that 97% of asthma and allergy patients obtain knowledge from the internet [38].

The phenomenon of the universality of internet knowledge, apart from its widespread benefits, carries a number of serious threats such as information overload, unreliability of the information, overuse of over-the-counter drugs, looking for alternative treatments, as well as decreased authority of contemporary health care institutions. A detailed analysis revealed the 'highest' and 'high' levels of knowledge about allergies came from consulting a doctor for 67% of respondents, and from using the internet for 68%. Such negligible dif-

ferences may suggest that patients in the study value both doctors and the internet as reliable sources of information.

The risk of allergic reactions and allergy exacerbations depends on public awareness on the subject of allergies, including causes of gastrointestinal, inhaled and contact hypersensitivity. In the study, patients were asked to self-assess their knowledge of allergies. Results showed that 32% (48) answered that 'they know a lot, but must complete the knowledge', while 56.7% (85) decided they have the knowledge but at an insufficient level. Only 2.7% (4) of respondents chose the option that they know nothing about it. In comparable studies in 2016 conducted among a group of 110 hypertensive patients, it was found that 55.4% answered that they know a lot about hypertension but need to complete their knowledge and 30% claimed to know nothing about the disease [39,40]. Therefore, it might be assumed that people suffering from allergic diseases reflect a higher level of self-assessed knowledge about their disorders compared with those with hypertension.

The studies showed that high self-assessment of allergy knowledge was confirmed by knowledge of life-threatening allergic symptoms. Patients who assessed their knowledge as 'high' or 'very high' also demonstrated a high level of knowledge of life-threatening symptoms 92% (138). However, a correlation between self-assessment levels and general symptoms was not found. The second confirmation of respondents' high knowledge levels was provided by the fact that they knew the definition of anaphylactic shock, with 94.3% (141) knowing what the shock is. However, among the group of patients whose self-assessed knowledge was low, 79.3% (118) knew its definition. These results give rise to the assumption that patients are fully aware of their knowledge deficits. Lack of knowledge about anaphylactic shock in the study group was alarming. Additionally, while examining the correlation between self-assessed knowledge about allergies and knowledge of how to proceed in the case of anaphylactic shock, it turned out that those who assess their knowledge as high did not always know how to act properly in the event of shock in home conditions (24.5%; 36).

Limitations of the study

Limitations of the study included rigid patient admittance hours and the time devoted to allergic procedures. The findings in this study pertaining to knowledge about anaphylactic shock and allergic complications in people suffering from high-risk allergies, warrant further research on the subject.

Recommendations

The study was intended to show whether patients of the allergy clinic have knowledge of allergies and related conditions.

1. Causes of knowledge deficits in the diagnosis of conditions associated with exacerbations of allergies, including the handling of life-threatening situations, should be further investigated.
2. The risk of anaphylactic shock in allergic diseases is much higher than in healthy people. It is advisable to increase nursing educational activities in this area and to carry out a social educational campaign, particularly with respect to rescue procedures in the event of anaphylactic shock.
3. In subsequent studies, it should be evaluated whether low patient knowledge levels of allergy complications can have a negative impact on the development of allergic diseases, despite the treatment used.

Conclusions

1. The overall level of patient knowledge of allergies, including their causes and prevention, is sufficient and allows for the identification of associated complications. On the other hand, knowledge about the diagnosis of complications of allergies is at a satisfactory but insufficient level.
2. Respondents showed a significantly higher level of knowledge about allergy complications than their causes and prevention. Level of knowledge about causes and how to prevent allergies is not reflected in the knowledge about the complication and how to act in cases of their occurrence.
3. High self-assessed knowledge levels did not predict subjects' identification of the most common symptoms of allergies and the management of their exacerbations, but was positively correlated with knowing the definition of anaphylactic shock.
4. Knowledge of the diagnosis of allergic exacerbations in allergy sufferers was insufficient. An understanding of the proper proceedings in life-threatening situations associated with an acute allergic disease and anaphylactic shock in home conditions was also poor.
5. Source of information is a significant factor that influences knowledge levels about allergies. Nurses were found to have an abnormally insufficient impact on patient knowledge of allergies and their complications.

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KNOWLEDGE AND OPINIONS OF PATIENTS ATTENDING A HOSPITAL EMERGENCY DEPARTMENT ON THE PURPOSE AND OPERATION OF TRIAGE SYSTEMS

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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 high occupancy rate of hospital emergency departments (ED) necessitates the selection of patients whom an excessively long waiting time for medical assistance may result in deterioration of their health condition or pose a threat to life. Medical categorization plays an important role in the identification of such patients.

Aim of the study: The aim of this study was to determine the level of knowledge, and opinions, of patients attending the ED regarding the purpose and processes surrounding the use of triage.

Material and methods: This study included 123 patients attending the ED of the University Clinical Hospital (UCH) in Opole in the period from January to March 2019. Study participants carried out a questionnaire after leaving the triage room.

Results: Most participants (93.50%, n = 115) gave a correct answer to the question of what triage is, and 90.20% (n = 111) gave a correct answer to the question of its purpose. Most patients felt that triage was needed (73.20%, n = 90), and 54.50% (n = 67) felt that ED staff should refer patients without life-threatening conditions to the PHCF (Primary Health Care Facility) or OOHC (Out of Hours Care) unit. Most participants (59.30%, n = 73) were aware of which color to which they had been assigned following medical categorization.

Conclusions: The level of knowledge of patients attending the ED regarding the triage process was generally good, but nevertheless ED staff should ensure attendees are provided with information on the urgency category assigned to them and estimated waiting time, as well as information regarding possible delays. Information leaflets or short videos on ED operation and admission procedures may play an important role in the education of patients in waiting rooms.

KEYWORDS: emergency department, triage, knowledge

Background

Triage – the essence and models of categorization

In order to prioritize the provision of medical assistance in mass-casualty situations, patients are usually subject to medical categorization (triage). According to the legal definition, triage is "the process of determining the order of providing healthcare services in hospital emergency departments and by medical rescue teams, carried out on persons in a state of emergency, taking into account their health" [1]. With regard to hospital emergency departments (ED), "mass" refers to a large number of patients reporting, disproportionate to the personnel and resources available to the department at a given time [2]. This phenomenon is called "overcrowding" and is commonly observed in emergency departments around the world [3,4]. In these conditions, medical categorization of patients is of particular importance as a tool to manage patient flow and facilitate immediate assistance to those most in need, while considering the significant diversity of clinical presentations [5–7]. These emergency situations

require action aimed at efficient selection of patients in whom an excessively long wait for medical assistance may result in deterioration of their condition or pose a threat to their life. Triage allows the categorization of patients in the shortest possible time: those at risk of deterioration, those suffering from severe pain and those requiring quick and accurate clinical decisions [8,9], and also affects decisions concerning further management of patients [10,11]. ED personnel believe that triage is necessary and constitutes the beginning of the relationship between the healthcare staff and patients attending ED [2].

Medical categorization in ED differs between countries, and there are different triage models in use due to the differences in the organization of emergency systems around the world. Triage systems are often characterized by a set of priority colors. In Poland, urgency categories according to the current regulations [3] are as follows: red = immediate contact with a doctor; orange = waiting time for the first contact with a doctor of up to 10 minutes; yellow = waiting time for the first contact with a doctor of up to 60 minutes; green = waiting time for the first contact with a doctor of up to 120 minutes; blue = waiting time for the first contact with a doctor of up to 240 minutes.

Triage can be divided into pre-hospital and hospital. The START (simple triage and rapid treatment) model is the most widely used in EMS (Emergency Medical Services) in Poland, similar to the USA, and is especially useful when providing assistance in cases of mass-casualty incidents [12–14]. An initial evaluation is carried out on each patient within a maximum of 1 minute, and after the evaluation of all casualties, triage starts again and is repeated until all casualties have been evacuated from the incident scene (the so-called re-triage). Colors green, yellow and red are used in this system. A modified version of this model, JUMP START is used in children under the age of 8 [13]. There are several modifications of this system in the world, e.g. Careflight Triage and Homebush Triage in Australia; Triage Sieve in Australia and parts of Europe, including the United Kingdom; MASS Triage in the USA and Mass Gathering Triage in Australia [12,15].

A unified SALT system (sort, assess, lifesaving interventions, treatment and/or transport) has been created in the United States for pre-categorization. It consists of an overall individual assessment to divide patients into those walking, waving, and still, thus allowing unconscious patients to be identified earlier. The priority of assistance according to this system assumes that patients with minor injuries receive deferred assistance, severely injured but with good survival prognosis receive immediate assistance, while those severely injured but with a poor prognosis receive assistance next [12,14]. There are many less common systems around the world, such as: STM (Saco Triage Method), Burn Triage, SWiFT Triage (Senior, Without, Families, Team), TEWS triage (Triage Early Warning Score), and PTT triage system (Pediatric Triage Tape) [12,15].

Triage in the ED setting is aimed at enabling hospital personnel to segregate patients depending on the type and severity of symptoms, injury grade and probable prognosis. The most common models used in hospital ED in different countries include the Manchester Triage System (MTS), Emergency Severity Index (ESI), Australian Triage Scale, and Canadian Emergency Department Triage and Acuity Scale (CTAS) [6,15–18]. The Manchester Triage System is widely used for medical categorization in Europe, Australia and Brazil [19]. The essence is that patients are seen in order of clinical priority and not in order of attendance. It is a reductive system, starting from the premise that the patient is presenting with a life-threatening condition and all high priority discriminators must be ruled out prior to reducing the patient priority. This ensures safety of the system and that no serious conditions are missed. The patient is assigned one of the five categories of urgency marked with the appropriate color, which indicates the maximum time the patient should wait for examination by a doctor [20]. The ESI model is similarly based on qualifying the patient into one of five categories, and is used primarily in the USA, but also in other countries [21,22].

Level of patients' knowledge on medical categorization

Regardless of the differences between the various models of medical categorization, all of them have been developed to identify patients in a life-threatening condition, as soon as possible. This process can be even more difficult in the hospital ED setting, as the previously mentioned phenomenon of overcrowding is often present [3,4,23,24], and often the patients attending are not in an emergency situation and may benefit from seeking help in PHCF, OOHC or outpatient healthcare facilities rather than the ED. Findings by Schwappach et al. indicate that the ED is a substitute for primary healthcare [25], while Sulej et al. indicate that there is a lack of education regarding the operation of emergency medical systems among patients [2]. Adeniji and Mash found that most patients have no knowledge of triage and Alhabdan et al. report that only 11% of people undergoing examination knew the definition of medical categorization [26,27]. Meek and Phiri found that 50.8% of patients associated medical categorization with the division of patients into "more and less urgent", yet respondents in this study did not know how medical categorization works [28]. A Polish study reported that 83% of respondents have never heard of triage before and that hospital personnel do not provide sufficient information on medical categorization during registration [29]. To date, there have been no studies to determine which factors may determine patients' knowledge regarding triage. These factors may be similar to those which determine reporting to ED with non-urgent issues, as these attendances often result from a complete lack of knowledge of where

to look for medical assistance when their usual facility such as a PHCF is closed. These patients do not know about night and holiday healthcare facilities, and even if they do, they do not know how to access healthcare services in these settings [30,31].

Having considered the aforementioned research, this study was designed to determine the knowledge level of patients attending ED on medical categorization, and what factors may determine the level of knowledge. Results of this study may help develop educational programs to raise patients' awareness of medical categorization, and may assist in optimizing the methods by which education regarding ED operating can be delivered to patients.

Aim of the study

The aim of this study was to determine the level of knowledge, and opinions of ED patients regarding the purpose and processes surrounding the use of triage.

Material and methods

Study design

The study was conducted during the period January to March 2019. The study was commenced after obtaining consent from the Institutional Review Board of the State Medical Vocational School in Opole (permission number 160/PI/2018) and the permission of management at the University Clinical Hospital in Opole. The study was conducted in accordance with the principles of the Declaration of Helsinki. The authors' own questionnaire was implemented, using a diagnostic survey method. Patients received the questionnaires after leaving the medical categorization room. The act of filling in the questionnaire by the patient was tantamount to their consent to participate in the survey. Of 150 questionnaires distributed, 123 (82%) were completed and returned.

Settings

Participants of the study were enrolled from patients attending the ED of the University Clinical Hospital in Opole. During the study, a three-color categorization model was used in the ED, with colors green, yellow and red, representing waiting time for the first contact with a doctor: up to 240 minutes, up to 60 minutes, and immediate contact, respectively.

Participants

The study included adults who consented to participate in the study, who were fluent in Polish, who were able to express consent, and were not in a life-threatening condition. The majority of participants were women (54.50%, n = 67); typically 41–60 years of age (42.30%, n = 52); and most were in a relationship (68.30%, n = 84). Participants were most often living in a city with 100,000–500,000 inhabitants (43.90%, n = 54); higher education was declared by 34.10% (42) and 67.50% (83) were employed. Participants assessed their material status as "rather good" (44.70%, n = 55) (Tab. 1).

Table 1. Sociodemographic data of study participants

Variable		n (%)
Sex	Women	67 (54.50)
	Men	56 (45.50)
Age	18–40	42 (34.10)
	41–60	52 (42.30)
	> 61	29 (23.60)
Marital status	Single	15 (12.20)
	In a relationship	84 (68.30)
	Divorcee	13 (10.60)
	Widow/widower	11 (8.90)
Place of residence	Countryside	36 (29.30)
	A city of up to 20,000 inhabitants	14 (11.40)
	City of 20,000–100,000 inhabitants	17 (13.80)
	City of 100,000–500,000 inhabitants	54 (43.90)
	City > 500,000 inhabitants	2 (1.60)
Education	Primary	3 (2.40)
	Junior High School	4 (3.30)
	Vocational	24 (19.50)
	Secondary	34 (27.60)
	Post-Secondary	16 (13.00)
	Higher	42 (34.10)
Employment status	Employed	83 (67.50)
	Pensioner	3 (2.40)
	Retiree	28 (22.80)
	Student	4 (3.30)
	Unemployed	5 (4.0)
Material status	Very good	16 (13.00)
	Rather good	55 (44.70)
	Average	48 (39.00)
	Rather bad	3 (2.40)
	Very bad	1 (0.80)

Legend: n – number, % – percentage

Data sources/measurement

We used a proprietary questionnaire consisting of questions concerning sociodemographic variables (questions 1–7); reasons for reporting to ED and factors influencing the decision to report to ED (questions 8–10); presence of chronic disease (questions 11–13); opinion on which symptoms require reporting to ED and which should be reported to the PHCF (questions 14–15); knowledge of the definition of medical categorization and knowledge of the meaning of the colors assigned to patients (questions 16–20); patients' feelings about the information given to them by hospital staff and about the triage process itself (questions 21–23); the presence of information in PHCF facilities

regarding where health services are provided outside of working hours, and information about the symptoms which require reporting to ED (questions 24–25); and suggested changes in the operation of the medical triage room in the aforementioned facility (question 26). When assessing the level of patients' knowledge regarding triage, questions 16–25 were scored using a three-stage scale, with level of knowledge interpreted as high, average or low.

Variables

The following groups of variables have been identified:

- Variables concerning the knowledge and opinions of ED patients on triage (knowledge of the definition of triage, knowledge of the meaning of particular colors for urgency categories, opinion on referral of non-urgent patients from ED),
- Sociodemographic variables (sex, age, marital status, place of residence, education, employment status, material situation)
- Other variables that may determine the level of knowledge and opinions on triage (presence of multiple diseases, if the PHCF facility offered information on where to access OOHC services and information when you should seek help in ED, reason for reporting, symptom duration, trust in PHCF doctor).

Statistical analyses

Statistical analyses were performed assuming a significance level of 0.05. The Shapiro-Wilk test was used to examine if variables were normally distributed in the study population. Comparison of quantitative variables in two groups was performed using Student's t-test (when the variable was normally distributed) or the Mann-Whitney test (otherwise).

Results

Knowledge and opinions of ED patients on triage and ED functioning

Most participants, (93.50%, n = 115) gave a correct answer to the question of what triage is about ("medical categorization (triage) consists of the initial examination of a patient to determine his/her symptoms and condition and to assign him/her a color, which will determine the expected time of admission"). Most participants (90.20%, n = 111) also correctly answered the question of the purpose of medical categorization ("medical categorization (triage) aims to identify patients in need of urgent medical intervention and those who can wait for help"). The same number of participants (92.68%, n = 114) selected the correct definition of the meaning of red and yellow, while the correct meaning of green was indicated by 91.85% (n = 113) of participants.

Participants generally believed that medical categorization was necessary (73.20%, n = 90) and ED personnel should refer patients in non-life-threatening conditions to PHCF/OOHC (54.50%, 67). Most participants (59.30%, n = 73) knew which color they had been assigned to following medical categorization. Increasing the number of personnel in ED (43.80%, n = 14) and reducing the waiting time to be seen in the triage room (28.10%, n = 9) were the most frequently suggested elements that could be improved in the operation of medical categorization.

Twenty four participants (19.50%) indicated that their usual PHCF facility offered information on medical conditions which require attendance at the ED, while 66 participants (53.70%) did not know about this due to the absence of such information in their PHCF. Most of the respondents (61.78%, n = 76) were not informed of the estimated waiting time associated with their assigned color following medical categorization.

ED patients' knowledge of triage and sociodemographic variables

Participants who correctly answered the question of what triage consisted of were typically aged 41–60 (n = 51, 41.46%), with a higher education (n = 50, 40.65%), and living in a city (n = 78, 63.41%). Women more often than men (47.15%; n = 58 vs. 43.89%, n = 53) gave the correct answer to the question regarding the purpose of triage i.e. selecting patients requiring urgent medical intervention. In the question regarding whether triage consists of the initial examination of the patient to determine his/her ailments and symptoms and to provide him/her with the color of the group, the most correct answers were recorded in the age group 41–60 (98.1%, n = 51) and the fewest in the age group > 61 (82.8%, n = 24). There was no correlation between the level of knowledge about medical categorization and education (P = 0.947) or place of residence (P = 0.994). In terms of relationship status, 91.7% (n = 77) of those living in a relationship and 97.4% (n = 38) of those declaring their marital status as single had knowledge of what triage was about.

ED patients' knowledge of triage and other factors

More than half of participants (54.50%, n = 67 declared that they had chronic diseases, of which 39% (n = 48) considered medical categorization to be necessary, while among those with no chronic disease, 34% (n = 42) considered medical categorization necessary. There was no statistical significance when comparing those with and without chronic disease and response to whether medical categorization was considered necessary (χ^2 = 0.023, df = 2, P = 0.088). There was also no significant relationship demonstrated between the number of attendances and participants opinion on if ED personnel should refer patients without a threat to

health or life (χ^2 = 4.318, df = 4, P = 0.365). In terms of availability of information regarding OOHC at the PHCF, 48.80% (n = 60) respondents answered "yes" to the question of whether there is information in their PHCF facility indicating where to seek medical attention at night and on holidays. The answer "I do not know" was chosen by 53 respondents (43.10%). There was no statistically significant correlation between the number of attendances during the 12 months preceding the study and the knowledge of patients reporting to ED about the information offered in PHCF on what symptoms require attendance at ED and where to seek medical attention at night and on holidays (P > 0.05) (Tab. 2).

The most common cause of respondents reporting to ED were high blood pressure (13%, n = 16), thoracic pain or burning sensation (13%, n = 16), heart palpitations (12.20%, n = 15), and abdominal pain (11.40%, n = 14). The duration of symptoms in subjects who reported to ED was categorized as 0–6 hours (33.30%, n = 41), 6–12 hours (23.60%, n = 29), 13–24 hours (14.60%, n = 18), several days (22%, n = 27), several weeks (3.30%, n = 4), or several months (3.30%, n = 4),. No correlation was found between these factors and the level of knowledge about medical categorization.

Discussion

Knowledge and opinions of ED patients on triage

Patients' knowledge on medical categorization plays an important role in the efficient operation of emergency departments and in patient satisfaction with healthcare [32–34], however, according to various researchers, the level of both knowledge and satisfaction are low [26,35]. In the study by Seibert et al. 51.9% of patients defined triage as an assessment of the patient's condition, while 17.5% defined triage as a check of vital signs. Many of this study's participants (68.8%) did not know why some patients arriving to ED later were admitted first, most respondents (72.2%) would like to be informed about possible delays in the provision of treatment and 41% of respondents would like to learn more about ED operation [35]. A similar analysis was made by Alhabdan et al. in which 61% of respondents replied that they would like to obtain more information on the ED operation, with 50% preferring educational films playing in the waiting room as the source of information. In this study, 40% of patients surveyed did not know why other patients, despite shorter waiting times, were asked to the admission room earlier. Most respondents (75%) wished be informed about delays, and 73% wanted to know their causes. The respondents also pointed out the need to be informed about the color of urgency assigned to them [27]. Adeniji and Mash highlighted that there was scarce information provided by ED personnel as to the color assigned during categorization, information on their health condition and the waiting time for the medical examination, and diagnostic test results and the reasons why these tests are to be performed. These authors also drew attention to the complaints of patients regarding exposure to stressors, such as seeing blood or other patients in life-threatening conditions while waiting for medical services or test results [26]. A Polish study reported that as many as 83% of patients have not previously heard of triage [29], which does not correlate with the results of our own study, in which 93.50% of patients selected the correct definition of medical categorization. This may mean that the participants in our study have encountered medical categorization before. The level of knowledge among our studied population seems to be high, however, due to significant discrepancies in the results reported by other authors concerning, e.g. the frequency of correct answer to the question about the definition of triage (11% of correct answers in Saudi Arabia, 33% in the USA, 50% in Australia) [26–28], a study on a more representative group may be necessary.

Knowledge and opinions of ED patients about triage and sociodemographic variables

Our study group mostly consisted of women (54.50%, n = 67). Similar results were also obtained

Table 2. Relationship between number of attendances and the knowledge of patients reporting to ED about the information offered in PHCF on what symptoms require attendance at ED and where to seek medical attention at night and on holidays.

Question		Number of attendances during the last year [n (%)]			Test result
		≤ 3 times	4–8 times	>9 times	
Does your PHCF provide information on what symptoms require reporting to ED?	Yes	6 (26.11)	4 (14.3)	4 (30.8)	χ^2 = 2.074 df = 4 p = 0.722
	No	4 (17.4)	7 (25)	3 (23.1)	
	I do not know	13 (56.5)	17 (60.7)	6 (46.2)	
Does your PHCF facility provide information on where to seek medical attention at night and on holidays?	Yes	11 (47.8)	16 (57.1)	6 (46.2)	χ^2 = 4.318 df = 4 p = 0.365
	No	1 (4.3)	2 (7.1)	0 (0)	
	I do not know	11 (47.8)	10 (35.7)	7 (53.8)	

Legend: χ^2 – test statistics; df – degrees of freedom; p = p value

by other researchers which indicates that 54.5–57.2% of ED patients are female [25,29,36]. According to various researchers, the mean age of ED patients is between 43.7 [37] and 54.51 years [38], which our study also shows, with age group 41–60 forming the largest group in our study (42.30%, n = 52). In terms of relationship status, 84 of our participants (68.30%) reported being in a relationship, compared with 56% reported by Alhabdan et al. [27]. Higher education was declared by 42 of our respondents (34.10%), which correlates with the 38% reported by Alhabdan et al. [27], yet this does not correlated with the 11.4% reported by Sadillioglou et al. [37]. Employment was declared by 83 of our patients (67.50%), while other studies report employment levels of only 26% [27].

The study by Adeniji et al. did not investigate the relationship between sociodemographic factors and knowledge about triage [26]. In our study, more women than men selected the correct answer to the question whether triage is aimed at selecting patients in need of urgent medical intervention (47.15%, n = 58 vs. 43.89%, n = 53), but this was not a statistically significant difference. No correlation was found between the level of knowledge about medical categorization and education (P = 0.947) or place of residence (P = 0.994).

Knowledge and opinions of ED patients about triage and other factors

It can be assumed that regular contact with healthcare may increase the level of patients' knowledge about medical categorization systems, emergency department operation, conditions which should be reported to ED and where to seek medical attention at night and on holidays.

One of the reasons for increased contact may include presence of multiple diseases and accompanying polypharmacy. Markun et al. showed that 40% of patients attending an ED have 8 or more coexisting diseases [39], while Sadillioglou et al. showed presence of multiple diseases in 63% [37]. It has been shown that these patients are more likely to be hospitalized (5.5 times more for those with multiple diseases and 12 times more for those with polypharmacy) and therefore indirectly more likely to seek help in ED [40]. Nevertheless, the results of our own studies do not correlate with the thesis that regular contact affects the level of knowledge (P > 0.05).

According to the results of this study, 43.10% (n = 53) of the respondents did not know whether there was information available in their PHCF on places which provide medical assistance at night and on holidays. Lack of knowledge on whether information about symptoms which would necessitate attendance at ED was available in the PHCF facility was demonstrated in 53.70% (n = 66) of respondents. The Patients' Ombudsman published information online about when to attend the ED, what emergencies are a threat to health, and where to seek medical attention at night and on holidays [41], however, there have been no analyses in the literature about the availability of such information in PHCF and OOHC settings.

The level of knowledge about where to seek medical attention at night and on holidays in our study group was similar to an audit of PHCF units performed by the Polish Supreme Audit Office (NIK) which showed that only 68% of them placed the information on the subject correctly [42]. In view of the above, as well as the fact that as many as one third of visits to ED are not associated with a health emergency [43], it can be indirectly concluded that patients do not know enough about what situations require attendance at ED and about medical categorization.

More education regarding triage and ED attendance should be made available. Delivery of such information may utilize the Internet as a source of knowledge aimed at patients [44]. There are studies demonstrating the role of educating patients in waiting rooms and ED observation rooms by means of short videos on the operation of hospital emergency departments, as well as information regarding patient admission and categorization procedures via information leaflets and posters [45]. Few studies exist on the impact of health education during patients' ED visit, however studies show that as many as 41% of patients are interested in receiving such information [28,46]. Taking into account the increasing ED attendance rate, campaigns such as those using interactive information points ("booths"), available in PHCF, OOHC and ED facilities, demonstrate a great potential to provide patients with useful information, and may have a potential impact on increasing the level of knowledge about medical categorization in a large portion of the population [47].

Limitations of the test

The study was carried out in only one hospital emergency department and it would be beneficial to extend the study to cover the remaining EDs in the administrative division. In addition, the small size of the study group is a limitation.

Conclusions

1. The level of patients' knowledge of medical categorization is generally good. It is difficult to specify the characteristics of patients who report to ED depending on their level of knowledge and opinion on triage, as sociodemographic variables, patient beliefs and the presence of a chronic disease did not significantly correlate with their knowledge or opinion. Having considered that, ED personnel should provide each patient with all necessary information on the categorization process, the color assigned, and the waiting time involved. Information leaflets or short videos on hospital emergency department operation and admission procedures can play an important role in the education of patients in waiting rooms.

2. Indeed, people who have reported to ED often did not know if there is information available in PHCF facilities on where to seek medical attention at night and on holidays, or symptoms which are an indication to report to ED. Appropriate education in this area should be introduced. There may be a role for "booths", information leaflets and educational videos played in the waiting rooms of PHCF, OOHC and ED facilities.
3. Increasing the number of personnel in ED and reducing the waiting time to enter the triage room were elements identified by patients which may improve the medical categorization process.

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COLLEGE STUDENTS' ATTITUDES TOWARDS PROHEALTH BEHAVIOR AND ALCOHOL CONSUMPTION DURING PREGNANCY PLANNING AND PREGNANCY

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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: Alcohol is one of the most commonly used psychoactive substances among students.

Aim of the study: This study aimed to examine the level of pro-health behaviors among college students, and their opinions on alcohol consumption during pregnancy planning and pregnancy.

Material and methods: This study was conducted in 2018 among 228 adult students in Opole secondary schools. Diagnostic surveys were used, which included the Health Behavior Inventory (HBI) and a questionnaire developed by the authors.

Results: Forty-six percent (n = 105) of the 228 students presented with very low levels of pro-health behaviors and 57.46% (n = 131) of students endorsed alcohol intoxication or abuse in the past. Most of the students (n = 215; 94.3%) claimed that a baby's father should have an impact on pro-health behaviors of his pregnant female partner. There were, however, divergent opinions on the permissibility of alcohol consumption by a mother-to-be and a potential father while planning to become pregnant. The students were more likely to report that drinking is acceptable among potential fathers as compared to mothers (35.52% vs. 22.37%). Students also pointed out the need to spread knowledge about fetal alcohol Syndrome (FAS). Finally, students reported that their families and teachers were the best sources of knowledge on the potential harmful effects of alcohol, including FAS.

Conclusions: There is high accessibility and social acceptance of alcohol consumption, in conjunction with low and average levels of pro-health behaviors among most young adults. Further, most young adults have experienced alcohol intoxication or abuse in the past and the opinions on the acceptance of alcohol consumption by potential fathers and mothers while planning a baby. Together, these patterns may be associated with an increased risk of FAS. The students pointed to a strong need for more information about FAS, and indicated that their families and schools as the most desired sources of this information. These results may can be used to create an educational strategy for students aimed at FAS prophylaxis.

KEYWORDS: health behavior, fetal alcohol syndrome, alcohol drinking

Background

Over the last two decades, rates of alcohol misuse and alcohol use disorder have increased across the globe [1]. Alcohol is one of the most common psychoactive substances used by adolescents [2]. Indeed, the European School Survey Project on Alcohol and Other Drugs (ESPAD) conducted in 48 European countries founds that alcohol use among adolescents in Europe is high. In that study, on average, four out of every five students reported lifetime alcohol experience and about half of students reported alcohol use in the last 30 days. Within Europe, the highest rates of alcohol use among

adolescents were observed in Austria, Bulgaria, Croatia, Denmark, Hungary, Liechtenstein, and Monaco [3]. Another study conducted among 4085 secondary school students from 70 schools in Poland showed that half of students tried alcohol and one in five have drank five or more beverages in a row [4].

Scientists highlight a relatively early age of alcohol initiation. The Health Behavior in School-aged Children (HBSC) survey shows that young people typically begin using alcohol between the ages of 12 and 16, because during this age they gain increasing independence and spend more time outside the home unsupervised [2]. The following factors have been shown to affect the consumption of alcohol by young people: household and family alcohol use, traveled to study at an off-site residence, travelling abroad, social and enhancement motives (i.e., social drinking), drinking to cope with life issues, enhance contact with peers, and initiate new relationships [4–8].

Alcohol can negatively affect human health at the biological, medical and social levels. Alcohol consumption is considered to be an anti-health behaviors, damaging the body and contributing to psycho-physical health disturbances [2]. Alcohol exposure to is associated with neurodevelopmental and behavioral outcomes among adolescents, including substance use, mental illness, problem behaviors, and suicidality [9]. Early studies suggest that drinking alcohol is directly correlated with having unprotected sex with random partners, the occurrence of unplanned pregnancies, increased risk of sexually transmitted diseases, and greater likelihood of perpetrating sexual abuse [5,10–13]. For example, Francisco et al. found that alcohol consumption was present in 60.4% of planned pregnancies compared with 77.5% of unplanned pregnancies [11]. Further, Srahbzu and Tirfeneh [14] demonstrated that alcohol use is associated with participation in risky sexual activities among adolescents aged 15–19. In that study, adolescents who used alcohol within three months before the start of the study period were 2.55 times more likely to participate in risky sexual activities than those who did not use alcohol [14]. In a study by Marcantonio et al., students who met criteria for 'hazardous drinking' were more likely to engage in sexual activity as compared to students who did not meet criteria for 'hazardous drinking' [7]. Engaging in risky sexual behavior may be linked to alcohol-related reductions in mental functioning.

Binge drinking by women of childbearing age remains a problem globally and is increasing in some countries [15]. Prior studies conducted in the United States have reported that alcohol consumption and alcohol use disorder (AUD) are more common among men than women. However, statistics from the most recent decade indicate an increase in the prevalence of AUD among women as compared to men [16]. The issue of alcohol consumption among sexually mature young women is closely related with negative consequences for a fetus. Alcohol is a known teratogen, which might cause a wide range of morphological and neurodevelopmental abnormalities, most notably fetal alcohol syndrome (FAS) [17,18]. The term 'fetal alcohol spectrum disorders' covers a range of conditions related to gestational alcohol exposure, including growth retardation, neurological abnormalities, minor craniofacial anomalies, cognitive and behavioral impairment, and birth defects [19]. It is worth mentioning that approximately 45% of pregnancies are unplanned, and many pregnancies are not recognized during the first days after the first missed menstrual period. Meanwhile, the first trimester is a very important period of fetal developmental. Exposure to alcohol during the first trimester may disturb gastrulation and neurulation processes which may, in turn, lead to the aforementioned abnormalities [15].

Given these facts, the present study sought to examine health behaviors among college students and to examine their opinions on alcohol consumption during pregnancy planning and pregnancy. Results from this study could inform the development of prevention and/or intervention strategies for reducing anti-health behaviors related to alcohol in this age group.

Aim of the study

The present study aimed to (1) examine the level of pro-health behaviors among college students, (2) evaluate their opinions on alcohol consumption during pregnancy and pregnancy planning. We also (3) examined the correlation between the level of behaviors presented by students and their opinions on the subject.

Material and methods

Study design

This observational survey study was conducted among students from five secondary schools located in the city of Opole (Opolskie Voivodeship, Poland). We used a purposeful sampling strategy to select participants.

Setting

This study was conducted in 2018 after obtaining the permission of the Institutional Review Board at the Opole Medical School, No. KB -5/PI/2019. The students were assured of full anonymity and voluntary participation. The students were informed about its purpose and methodology, as well as the possibility of withdrawing from the study at any stage. Returning a completed questionnaire by a student was tantamount to agreeing to participate in the survey study.

Participants

A total of 228 students were included in the study. The inclusion criteria consisted of the following: consent to participate in the study, adult age (age ≥ 18 years), and college attendance. Minors (i.e., < 18 years of age),

non-college students, and those who did not agree to participate in the survey were excluded.

The students were predominantly 18 years of age (n = 128; 56.14%), followed by 19 (n = 81; 35.53%), 20 (n = 18; 7.8%), and 21 (n = 1; 0.44%) years old. Most respondents were male (n = 141; 61.84%) and resided in households with 3–4 (n = 148; 64.91%) or 5–6 family members (n = 59; 25.88%). A small portion of students lived in households with 2 (n = 14; 6.14%), 7–8 (n = 3; 1.32%), or 9–11 family members (n = 1; 1.44%). Three respondents did not answer this question. The majority of students rate their material status as good (n = 140; 61.40%) or very good (n = 50; 21.93%). Thirty students reported that their material status was average (n = 13; 16%) and four as bad (1.75%). Four respondents did not answer the question at all. As for the place of residence, most of the students reported living in a big city (n = 81; 35.53%) or village of a big city (n = 88; 38.60%), and others reported living in a small city (n = 43; 18.86%) or village of a small city (n = 15; 6.58%). One respondent did not respond to this question.

Variables

The following variables were collected that relate to pro-health behaviors: HB, general health behavior index; HEH, healthy eating habits index; PB, preventive behavior index; PMA, positive mental attitude index; and HP, health practices index. We also collected demographic data to characterize the study sample, including age, sex, place of residence, number of family members, material status, and the average grades.

Data sources/measurement

Diagnostic surveys were used, including the Health Behavior Inventory (HBI) and a questionnaire developed by the authors. The HBI is a tool developed by Z. Juczyński and consists of 24 statements that measure the following: preventive behavior, health practices, healthy eating habits, and positive mental attitudes. These questions primarily concern dietary habits, avoidance of stress and tension, smoking, physical exercise, sleep and rest, and observance of medical recommendations. The patient's task was to determine the frequency of health behaviors using a five-point Likert-style scale (1 = "almost never", 5 = "almost always"). The overall indicator of health behavioral intensity ranges from 24 to 120 points. The severity of the four categories of health behavior is calculated separately by means of an indicator, which is the average number of points in each category, i.e., the sum of points divided by 6. The overall result is converted into standard tens in conformity with the standards available in the key for the questionnaire. The standards differ for men vs. women. The results of 1–4 in tens indicate low, 5–6 average and 7–10 high intensity of pro-health behaviors [20].

The questionnaire developed by the authors consisted of 14 questions. Six questions were related to sociodemographic data. Eight questions assessed students' opinions about alcohol consumption during pregnancy and conception, and the need for education about FAS.

Statistical analysis

Qualitative variables were analyzed in groups using chi-square tests with Yates correction for 2 × 2 tables, or using Fisher's exact test in the case of low expected numbers in the tables. The normality of the distribution of variables was examined using the Shapiro-Wilk test. The analysis assumed a significance level of 0.05. Thus, all p-values below 0.05 were interpreted as statistically significant. The analysis was performed in R software, version 3.5.3 [21].

Results

Students' pro-health behaviors

Two hundred and five of the 228 college students reported drinking alcohol in the past. The age of alcohol initiation was 17–18 years for 42.33% (n = 91), 15–16 years for 34.42% (n = 74), 11–12 years for 3.26% (n = 7), 9–10 years for 1.4% (n = 3), and 6–8 years for 0.47% (n = 1). Eight respondents did not provide an answer to this question. One hundred thirty-one of the 228 respondents (57.46%) admitted being intoxicated by alcohol or in the state of heavy alcohol abuse. Sixty-seven of the 228 respondents (29.39%) reported never experiencing a state of intoxication, 28 students chose the answer 'it's difficult to say', and two did not provide an answer.

The HBI questionnaire revealed that 105 (46.05%) of the respondents reported low, 92 (40.35%) average, and 26 (11.4%) high intensity of pro-health behaviors (Tab. 1).

Table 1. The level of pro-health behaviors among students examined in the study, provided in standard ten units.

HBI – number of points		Interpretation	n	%
women	men			
24–77	24–71	low intensity of health behaviors	105	46.05%
78–91	72–86	average intensity of health behaviors	92	40.35%
92–120	87–120	high intensity of health behaviors	26	11.40%
---	---	questionnaire incomplete	5	2.19%

The highest intensity of pro-health behaviors was found among health practices (M ± SD = 3.19 ± 0.65), followed by mental attitude (M ± SD = 3.15 ± 0.76), proper eating habits (M ± SD = 3.01 ± 0.81), and prophylactic behaviors (M ± SD = 2.98 ± 0.72).

Male respondents showed much higher general level of pro-health behaviors than their female counterparts (general HBI result: M ± SD = 4.72 ± 1.64 vs. M ± SD = 4.23 ± 1.86, p = 0.028). Males (M ± SD = 3.25 ± 0.72) also achieved higher results in the category of Positive Mental Attitude) as compared to females

(M ± SD = 2.98 ± 0.81, p = 0.009). In contrast, females achieved significantly higher results than males in the intensity of pro-health behaviors related to Proper Eating Habits (M ± SD = 3.24 ± 0.87 vs. M ± SD = 2.87 ± 0.74, respectively, p = 0.001) and Prophylactic Practices (M ± SD= 3.1 ± 0.8 vs. M ± SD = 2.9 ± 0.65, respectively, p = 0.026).

The students who rated their material status as 'very good' displayed much higher results in the aspect of Positive Mental Attitude (M ± SD = 3.42 ± 0.74) when compared to those with good (M ± SD = 3.11 ± 0.79) and average or bad (M ± SD = 2.89 ± 0.65) material status (p < 0.01).

Level of pro-health behaviors was not significantly correlated with place of residence nor number of family members (p > 0.005).

Students' opinions on alcohol consumption around the period of conception and during pregnancy, and their educational needs about Fetal Alcohol Syndrome

Almost all the respondents (n = 212; 92.98%) agreed that a baby's father should have an impact on pro-health behaviors of his pregnant female partner. Fifty-one survey respondents (22.37%) reported that a woman may drink alcohol in the period of planning a baby if she does not use contraceptives, whereas 97 students completely disagreed with that statement. These data, along with other opinions on alcohol consumption by a potential father and the necessity of education about FAS, are shown in Tab. 2.

Eighteen-year-olds (n = 66; 80.47%) were significantly more often convinced of the need for education about FAS than both 19 (n = 58; 71.61%) and 20–21 (n = 15; 78.95%) year-olds (p = 0.002).

Female students were also more convinced about the need for education about FAS than their male counterparts, with 89.66% of females (n = 78) reporting that this is 'definitely necessary' or 'necessary' as compared to 69.51% of males (n = 98; p = 0.001). As compared to males (n = 63, 44.68%), females (n = 55; 63.22%) more frequently reported that teachers should educate teens about the harmful effects of alcohol consumption before and during pregnancy (p = 0.01).

Students with an average of grades of 4.0 or below (n = 72, 97.3%) were more often convinced that a baby's father should influence his female partner's pro-health behaviors than those achieving 4.1–5.0 (n = 116; 88.72%) and 5.1–6.0 (n = 24; 92.31%). The degree of certainty about that statement increased with an increase in the average grades, wherein 88.46% of 'definitely yes' answers was observed in students with an average of 5.1–6.0. Students with average marks of 5.1–6.0 also more frequently reported that the students should be responsible for educating themselves on the subject of FAS (n = 9; 34.62%) whereas this was less frequently reported among students with the average of 4.1–5.0 (n = 19; 14.84%) (p = 0.018) (Tab. 3).

Students living in small families (i.e. 4 or less than four members) more often disagreed with the statement that drinking alcohol by a potential mother is permissible than those living in bigger households (i.e., more than 4 members) (p = 0.016).

The students with good financial status (n = 113; 80.71%) more often reported that education about FAS is necessary than those with very good (n = 38; 76%) and average or bad material statuses (n = 22; 64.71%)

Table 2. The opinion of college students on alcohol consumption during pregnancy planning and pregnancy, and their educational needs about FAS

Kind of statement	n	%
A baby's father should have an influence on his pregnant partner's pro-health behaviors		
definitely yes	163	71.49%
yes	49	21.49%
difficult to say	9	3.95%
no	2	0.88%
definitely no	2	0.88%
no answer	3	1.32%
Drinking alcohol by a woman when contraceptives are not used is permissible		
definitely yes	8	3.51%
yes	43	18.86%
difficult to say	78	34.21%
no	58	25.44%
definitely no	39	17.11%
no answer	2	0.88%
Drinking alcohol by a man in the period of planning a pregnancy is permissible		
definitely yes	34	14.91%
yes	47	20.61%
difficult to say	85	37.28%
no	37	16.23%
definitely no	21	9.21%
no answer	4	1.75%
Educating students about FAS is necessary		
definitely yes	64	28.07%
yes	112	49.12%
difficult to say	38	16.67%
no	6	2.63%
definitely no	6	2.63%
no answer	2	0.88%
Education on the harmful effects of alcohol consumption before and during pregnancy should be performed by		
parents and family	116	50.88%
teachers	118	51.75%
health care staff	96	42.11%
adolescents	49	21.4%
other persons or institutions	9	3.95%

Legend: percentages do not sum up to 100% as multiple answer choices were allowed.

Table 3. Relationship between age, sex, and average grade of the students and opinions on alcohol consumption during pregnancy planning and pregnancy

Kind of opinion	category	age				sex			average grade			
		18 years	19 years	20–21 years	p *	Women	Men	p *	4.0 or less	4.1–5.0	5.1–6.0	p *
A baby's father should influence his pregnant partner's pro-health behaviors	definitely yes	90 (70.31%)	58 (71.60%)	15 (78.95%)	0.829 F	65 (74.71%)	98 (69.50%)	0.546 F	49 (66.22%)	91 (71.09%)	23 (88.46%)	0.005 F
	yes	28 (21.88%)	17 (20.99%)	4 (21.05%)		16 (18.39%)	33 (23.40%)		23 (31.08%)	25 (19.53%)	1 (3.85%)	
	difficult to say	6 (4.69%)	3 (3.70%)	0 (0.00%)		5 (5.75%)	4 (2.84%)		0 (0.00%)	8 (6.25%)	1 (3.85%)	
	no	1 (0.78%)	1 (1.23%)	0 (0.00%)		1 (1.15%)	1 (0.71%)		1 (1.35%)	0 (0.00%)	1 (3.85%)	
	definitely no	0 (0.00%)	2 (2.47%)	0 (0.00%)		0 (0.00%)	2 (1.42%)		1 (1.35%)	1 (0.78%)	0 (0.00%)	
	no answer	3 (2.34%)	0 (0.00%)	0 (0.00%)		0 (0.00%)	3 (2.13%)		0 (0.00%)	3 (2.34%)	0 (0.00%)	
Drinking alcohol by a woman while planning a pregnancy is permissible	definitely yes	3 (2.34%)	4 (4.94%)	1 (5.26%)	0.196 F	2 (2.30%)	6 (4.26%)	0.657 F	4 (5.41%)	3 (2.34%)	1 (3.85%)	0.898 F
	yes	31 (24.22%)	11 (13.58%)	1 (5.26%)		19 (21.84%)	24 (17.02%)		13 (17.57%)	24 (18.75%)	6 (23.08%)	
	difficult to say	36 (28.12%)	34 (41.98%)	8 (42.11%)		26 (29.89%)	52 (36.88%)		26 (35.14%)	46 (35.94%)	6 (23.08%)	
	no	32 (25.00%)	19 (23.46%)	7 (36.84%)		23 (26.44%)	35 (24.82%)		18 (24.32%)	32 (25.00%)	8 (30.77%)	
	definitely no	24 (18.75%)	13 (16.05%)	2 (10.53%)		17 (19.54%)	22 (15.60%)		13 (17.57%)	21 (16.41%)	5 (19.23%)	
	no answer	2 (1.56%)	0 (0.00%)	0 (0.00%)		0 (0.00%)	2 (1.42%)		0 (0.00%)	2 (1.56%)	0 (0.00%)	
Drinking alcohol by a man, when his female partner is trying to get pregnant, is permissible	definitely yes	16 (12.50%)	16 (19.75%)	2 (10.53%)	0.354 F	12 (13.79%)	22 (15.60%)	0.949 chi2	12 (16.22%)	20 (15.62%)	2 (7.69%)	0.545 F
	yes	31 (24.22%)	15 (18.52%)	1 (5.26%)		20 (22.99%)	27 (19.15%)		13 (17.57%)	26 (20.31%)	8 (30.77%)	
	difficult to say	44 (34.38%)	32 (39.51%)	9 (47.37%)		33 (37.93%)	52 (36.88%)		23 (31.08%)	52 (40.62%)	10 (38.46%)	
	no	23 (17.97%)	9 (11.11%)	5 (26.32%)		14 (16.09%)	23 (16.31%)		15 (20.27%)	17 (13.28%)	5 (19.23%)	
	definitely no	11 (8.59%)	8 (9.88%)	2 (10.53%)		7 (8.05%)	14 (9.93%)		9 (12.16%)	11 (8.59%)	1 (3.85%)	
	no answer	3 (2.34%)	1 (1.23%)	0 (0.00%)		1 (1.15%)	3 (2.13%)		2 (2.70%)	2 (1.56%)	0 (0.00%)	
Education about FAS among adolescents is necessary	definitely yes	41 (32.03%)	13 (16.05%)	10 (52.63%)	0.002 F	35 (40.23%)	29 (20.57%)	0.001 F	17 (22.97%)	36 (28.12%)	11 (42.31%)	0.554 F
	yes	62 (48.44%)	45 (55.56%)	5 (26.32%)		43 (49.43%)	69 (48.94%)		37 (50.00%)	63 (49.22%)	12 (46.15%)	
	difficult to say	21 (16.41%)	15 (18.52%)	2 (10.53%)		7 (8.05%)	31 (21.99%)		14 (18.92%)	22 (17.19%)	2 (7.69%)	
	no	2 (1.56%)	4 (4.94%)	0 (0.00%)		2 (2.30%)	4 (2.84%)		3 (4.05%)	2 (1.56%)	1 (3.85%)	
	definitely no	0 (0.00%)	4 (4.94%)	2 (10.53%)		0 (0.00%)	6 (4.26%)		3 (4.05%)	3 (2.34%)	0 (0.00%)	
	no answer	2 (1.56%)	0 (0,00%)	0 (0.00%)		0 (0.00%)	2 (1.42%)		0 (0.00%)	2 (1.56%)	0 (0.00%)	
Who should provide education on harmful effects of alcohol consumption among adolescents before and during pregnancy?**	parents and family	70 (54.69%)	39 (48.15%)	7 (36.84%)	0.289 chi2	47 (54.02%)	69 (48.94%)	0.542 chi2	32 (43.24%)	69 (53.91%)	15 (57.69%)	0.262 chi2
	teachers	73 (57.03%)	37 (45.68%)	8 (42.11%)	0.189 chi2	55 (63.22%)	63 (44.68%)	0.01 chi2	39 (52.70%)	66 (51.56%)	13 (50.00%)	0.97 chi2
	health care staff	57 (44.53%)	36 (44.44%)	3 (15.79%)	0.053 chi2	41 (47.13%)	55 (39.01%)	0.285 chi2	32 (43.24%)	52 (40.62%)	12 (46.15%)	0.848 chi2
	adolescents	31 (24.22%)	14 (17.28%)	4 (21.05%)	0.534 F	20 (22.99%)	29 (20.57%)	0.79 chi2	21 (28.38%)	19 (14.84%)	9 (34.62%)	0.018 chi2
	other persons or institutions	4 (3.12%)	3 (3.70%)	2 (10.53%)	0.297 F	3 (3.45%)	6 (4.26%)	1 F	4 (5.41%)	4 (3.12%)	1 (3.85%)	0.699 F

Legend: * chi2 – chi-square test, F – Fisher exact test (low expected values in the table), ** percentages do not sum up to 100% as multiple answer choices were allowed.

(p = 0.003). However, students who reported an average or bad material status (n = 5; 14.71%) were more often certain that knowledge about FAS should be spread by other persons and institutions as compared to students who reported a good (n = 3; 2.14%) or very good material status (n = 1; 2%) (p = 0.008) (Table 4).

Table 4. Correlation between selected variables and the opinion of students on alcohol consumption during pregnancy planning and pregnancy

Kind of opinion	category	Number of family members			Material status				Place of residence			
		≤ 4	>4	p *	Bad or average	Good	Very good	p *	Big city	Average or small city	Village	p *
A baby's father should influence his pregnant partner's pro-health behaviors	definitely yes	111 (68.52%)	49 (77.78%)	0.344 F	26 (76.47%)	100 (71.43%)	34 (68.00%)	0.396 F	55 (67.90%)	44 (75.86%)	64 (72.73%)	0.583 F
	yes	40 (24.69%)	9 (14.29%)		7 (20.59%)	32 (22.86%)	9 (18.00%)		20 (24.69%)	10 (17.24%)	18 (20.45%)	
	difficult to say	6 (3.70%)	3 (4.76%)		0 (0.00%)	6 (4.29%)	3 (6.00%)		2 (2.47%)	2 (3.45%)	5 (5.68%)	
	no	2 (1.23%)	0 (0.00%)		1 (2.94%)	0 (0.00%)	1 (2.00%)		1 (1.23%)	1 (1.72%)	0 (0.00%)	
	definitely no	1 (0.62%)	1 (1.59%)		0 (0.00%)	1 (0.71%)	1 (2.00%)		2 (2.47%)	0 (0.00%)	0 (0.00%)	
	no answer	2 (1.23%)	1 (1.59%)		0 (0.00%)	1 (0.71%)	2 (4.00%)		1 (1.23%)	1 (1.72%)	1 (1.14%)	
Drinking alcohol by a woman while planning to a pregnancy is permissible	definitely yes	5 (3.09%)	3 (4.76%)	0.016 F	3 (8.82%)	4 (2.86%)	1 (2.00%)	0.199 F	3 (3.70%)	2 (3.45%)	3 (3.41%)	0.243 F
	yes	38 (23.46%)	5 (7.94%)		3 (8.82%)	28 (20.00%)	12 (24.00%)		14 (17.28%)	17 (29.31%)	12 (13.64%)	
	difficult to say	54 (33.33%)	23 (36.51%)		14 (41.18%)	48 (34.29%)	13 (26.00%)		31 (38.27%)	13 (22.41%)	34 (38.64%)	
	no	34 (20.99%)	23 (36.51%)		5 (14.71%)	39 (27.86%)	13 (26.00%)		17 (20.99%)	14 (24.14%)	26 (29.55%)	
	definitely no	30 (18.52%)	8 (12.70%)		9 (26.47%)	21 (15.00%)	9 (18.00%)		15 (18.52%)	12 (20.69%)	12 (13.64%)	
	no answer	1 (0.62%)	1 (1.59%)		0 (0.00%)	0 (0.00%)	2 (4.00%)		1 (1.23%)	0 (0.00%)	1 (1.14%)	
Drinking alcohol by a man, when his female partner is trying to get pregnant, is permissible	definitely yes	27 (16.67%)	6 (9.52%)	0.323 chi2	4 (11.76%)	23 (16.43%)	7 (14.00%)	0.232 F	15 (18.52%)	8 (13.79%)	11 (12.50%)	0.791 chi2
	yes	37 (22.84%)	9 (14.29%)		5 (14.71%)	30 (21.43%)	11 (22.00%)		15 (18.52%)	13 (22.41%)	18 (20.45%)	
	difficult to say	57 (35.19%)	28 (44.44%)		13 (38.24%)	55 (39.29%)	15 (30.00%)		27 (33.33%)	20 (34.48%)	38 (43.18%)	
	no	25 (15.43%)	11 (17.46%)		5 (14.71%)	23 (16.43%)	8 (16.00%)		13 (16.05%)	9 (15.52%)	15 (17.05%)	
	definitely no	14 (8.64%)	7 (11.11%)		7 (20.59%)	7 (5.00%)	7 (14.00%)		9 (11.11%)	7 (12.07%)	5 (5.68%)	
	no answer	2 (1.23%)	2 (3.17%)		0 (0.00%)	2 (1.43%)	2 (4.00%)		2 (2.47%)	1 (1.72%)	1 (1.14%)	
Education about FAS among adolescents is necessary	definitely yes	48 (29.63%)	15 (23.81%)	0.214 F	6 (17.65%)	36 (25.71%)	22 (44.00%)	0.003 F	20 (24.69%)	18 (31.03%)	25 (28.41%)	0.833 F
	yes	77 (47.53%)	34 (53.97%)		16 (47.06%)	77 (55.00%)	16 (32.00%)		40 (49.38%)	26 (44.83%)	46 (52.27%)	
	difficult to say	30 (18.52%)	7 (11.11%)		7 (20.59%)	23 (16.43%)	7 (14.00%)		13 (16.05%)	12 (20.69%)	13 (14.77%)	
	no	3 (1.85%)	3 (4.76%)		4 (11.76%)	1 (0.71%)	1 (2.00%)		4 (4.94%)	1 (1.72%)	1 (1.14%)	
	definitely no	3 (1.85%)	3 (4.76%)		1 (2.94%)	3 (2.14%)	2 (4.00%)		3 (3.70%)	1 (1.72%)	2 (2.27%)	
	no answer	1 (0.62%)	1 (1.59%)		0 (0.00%)	0 (0.00%)	2 (4.00%)		1 (1.23%)	0 (0.00%)	1 (1.14%)	
Who should provide education on harmful effects of alcohol consumption among adolescents before and during pregnancy?**	parents and family	76 (46.91%)	39 (61.90%)	0.061 chi2	14 (41.18%)	73 (52.14%)	26 (52.00%)	0.502 chi2	47 (58.02%)	27 (46.55%)	42 (47.73%)	0.296 chi2
	teachers	86 (53.09%)	30 (47.62%)	0.556 chi2	15 (44.12%)	74 (52.86%)	26 (52.00%)	0.655 chi2	42 (51.85%)	25 (43.10%)	50 (56.82%)	0.267 chi2
	health care staff	66 (40.74%)	28 (44.44%)	0.722 chi2	13 (38.24%)	64 (45.71%)	17 (34.00%)	0.316 chi2	32 (39.51%)	20 (34.48%)	44 (50.00%)	0.146 chi2
	adolescents	31 (19.14%)	17 (26.98%)	0.267 chi2	12 (35.29%)	29 (20.71%)	8 (16.00%)	0.095 chi2	17 (20.99%)	15 (25.86%)	17 (19.32%)	0.634 chi2
	other persons or institutions	6 (3.70%)	2 (3.17%)	1 F	5 (14.71%)	3 (2.14%)	1 (2.00%)	0.008 F	3 (3.70%)	2 (3.45%)	4 (4.55%)	1 F

Legend: * chi2 – chi-square test, F – Fisher exact test (low expected values in the table), ** percentages do not sum up to 100% as multiple answer choices were allowed.

The level of pro-health behaviors vs. students' opinions on alcohol consumption during pregnancy planning and pregnancy

Intensity of pro-health behaviors was not significantly associated with opinions on alcohol consumption during pregnancy and pregnancy planning, nor with opinions regarding education about FAS ($p > 0.05$) (Tab. 5).

Discussion

Key results

Almost half of the students in the present study displayed low levels of pro-health behaviors, and 57.46% of students endorsed alcohol intoxication or abuse in the past. Almost all of the students agreed that a potential father should influence his pregnant female partner's pro-health behaviors. In contrast, students' opinions on the permissibility of alcohol consumption by a woman and man planning to have a baby were divergent. In particular, alcohol use was rated as slightly more acceptable among fathers than mothers-to-be; however, the difference was not so notable (i.e., 35.52% vs. 22.37%, respectively). Most students agreed they need more education regarding FAS and pointed to families and teachers as authorities about the harmful effects of alcohol consumption during pregnancy and its planning.

Interpretation

Pro-health behaviors among students

The main anti-alcohol policy in Europe and across the globe is to protect individuals from the harmful effects of alcohol on their lives, regardless of age. The main aim of this anti-alcohol policy is to delay the age of alcohol initiation [22] given that early alcohol use initiation is one of the strongest predictors of alcohol use disorders [23]. The HBSC report issued in 2018 concerning consumption of alcohol among teenag-

Table 5. The correlation between the intensity of pro-health behaviors and students' opinions on alcohol consumption during pregnancy planning and pregnancy

Type of opinion and response category		The intensity of pro-health behaviors			p *
		low	average	high	
A baby's father should influence his pregnant partner's pro-health behaviors	definitely yes	77 (73.33%)	61 (66.30%)	21 (80.77%)	0.406 F
	yes	22 (20.95%)	24 (26.09%)	3 (11.54%)	
	difficult to say	4 (3.81%)	5 (5.43%)	0 (0.00%)	
	no	2 (1.90%)	0 (0.00%)	0 (0.00%)	
	definitely no	0 (0.00%)	2 (2.17%)	0 (0.00%)	
	no answer	0 (0.00%)	0 (0.00%)	2 (7.69%)	
Drinking alcohol by a woman while planning a pregnancy is permissible	definitely yes	5 (4.76%)	2 (2.17%)	1 (3.85%)	0.766 F
	yes	19 (18.10%)	18 (19.57%)	6 (23.08%)	
	difficult to say	33 (31.43%)	35 (38.04%)	10 (38.46%)	
	no	29 (27.62%)	23 (25.00%)	3 (11.54%)	
	definitely no	19 (18.10%)	14 (15.22%)	5 (19.23%)	
	no answer	0 (0.00%)	0 (0.00%)	1 (3.85%)	
Drinking alcohol by a man, when his female partner is trying to get pregnant, is permissible	definitely yes	18 (17.14%)	13 (14.13%)	3 (11.54%)	0.824 F
	yes	22 (20.95%)	21 (22.83%)	4 (15.38%)	
	difficult to say	39 (37.14%)	30 (32.61%)	13 (50.00%)	
	no	18 (17.14%)	16 (17.39%)	3 (11.54%)	
	definitely no	7 (6.67%)	11 (11.96%)	2 (7.69%)	
	no answer	1 (0.95%)	1 (1.09%)	1 (3.85%)	
Education about FAS among adolescents is necessary	definitely yes	25 (23.81%)	28 (30.43%)	10 (38.46%)	0.779 F
	yes	53 (50.48%)	43 (46.74%)	13 (50.00%)	
	difficult to say	20 (19.05%)	16 (17.39%)	2 (7.69%)	
	no	4 (3.81%)	2 (2.17%)	0 (0.00%)	
	definitely no	3 (2.86%)	3 (3.26%)	0 (0.00%)	
	no answer	0 (0.00%)	0 (0.00%)	1 (3.85%)	
Who should provide education on harmful effects of alcohol consumption among adolescents before and during pregnancy?**	parents and family	49 (46.67%)	50 (54.35%)	16 (61.54%)	0.312 chi2
	teachers	57 (54.29%)	42 (45.65%)	16 (61.54%)	0.268 chi2
	health care staff	52 (49.52%)	33 (35.87%)	9 (34.62%)	0.109 chi2
	adolescents	26 (24.76%)	21 (22.83%)	1 (3.85%)	0.062 chi2
	other persons or institutions	5 (4.76%)	3 (3.26%)	1 (3.85%)	0.891 F

Legend: * chi2 – chi-square test, F – Fisher exact test (low expected values in the table), ** percentages do not sum up to 100% as multiple answer choices were allowed.

ers emphasized that the biggest group started drinking alcohol between 12–16 years of age [2]. Further, the self-report study summarized in the HBSC report found that 19.08% (n = 41) of the students reported an early age of alcohol initiation, between the ages of 8 and 14 years. Moreover, the study demonstrated that the frequency of alcohol consumption increased with increasing age. Alcohol consumption was most frequent among students between the ages of 17–18 years (42.33%, n = 91) and 15–16 years (34.42%, n = 74). Similar patterns have been reported in other studies. For example, one study found that 11.4% of 11-year-olds reported their first drink of alcohol, and 28% of 13-year-olds and 63.4% of 15-year-olds [24]. Together with these prior studies, the present study suggests that underage alcohol use is common despite the regulations limiting alcohol availability under the age of 18. Moreover, results of the present study show that more than a half of the students (57.46%) experienced heavy alcohol intoxication or abuse. This heavy use may result from lack of knowledge regarding the harmful effects of alcohol, and the ease of access to alcoholic beverages among young people. Further studies should examine the factors underlying the frequent alcohol consumption among children and teenagers.

In this self-reported study, only 11.40% (n = 26) of students presented a high intensity of prophylactic behaviors, and 46.06% (105) reported a low intensity of prophylactic behaviors. Low levels of prophylactic behaviors have also been reported in a study of college students by Michalski et al [25]. Our results also demonstrated that prophylactic behaviors differed by gender. In general, male students showed higher levels of pro-health behaviors, whereas females showed higher levels in particular domains, including Proper Eating Habits and Prophylactic Behaviors. Similar gender differences were noted in a study by Nowak and Barcicka [26]. However, a study by Mazur et al. reported a direct correlation between alcohol consumption and male teenagers [4]. According to the HBSC, weekly drinking was higher among boys than girls in most countries and regions across all survey years; however, gender differences have decreased over time [2]. Taken together, our results for Proper Eating Habits are consistent with prior studies after accounting for gender differences.

The level of pro-health behaviors vs. the opinion of students on alcohol consumption during pregnancy planning and pregnancy

In contrast to our hypotheses, we did not find an association between intensity of prophylactic behaviors and opinions on alcohol consumption during pregnancy planning, in either women or men. This null finding may be due to the fact that students of low, average, and high intensity of pro-health practices may have difficulty in formulating their opinions on the permissibility of alcohol consumption during pregnancy. A substantial subset of students in the low prophylactic behaviors group reported having no opinion on the topic (31.43%, n=33), 38.04% (n=35) in the average group, and 38.46% (n=10) in high group. Similar results were obtained regarding the permissibility of alcohol consumption by a man whose partner is planning a baby. Therefore, this lack of clear opinions may indicate a shortage of knowledge on these issues. At the same time, we acknowledge that prenatal alcohol use has well-established adverse impacts on child development, including increased risk for behavioral problems and deficits in academic performance, which can in significant functional impairment [15,17,18,27]. The estimated rate of Polish newborns affected by FAS is 9,000 annually, and 1 out of 100 children suffer from disorders associated with the teratogenic influence of alcohol on a fetus [28,29]. These data confirm that not all Polish women completely abstain from alcohol during pregnancy.

Students' opinions on drinking alcohol during pregnancy planning and pregnancy

The majority of survey students (n = 212; 92.98%) agreed that prophylactic behaviors of a pregnant female should be influenced by a baby's father. Interestingly, 92.9% of men in our sample also agreed with this statement. These results may indicate a high awareness of the male's participation and responsibility for a baby's life, even during the prenatal phase. However, our survey data also demonstrated that students found that consumption of alcohol was more acceptable among future fathers than mothers. Indeed, less than half (n = 97; 42.55%) of students reported that women should not consume alcohol during pregnancy and its planning. In contrast, only 25.44% (n = 58) of students disapproved of men drinking alcohol while planning a baby with their partners (Tab. 2). We also found that, relative to those with larger families, those living in households with up to four family members more often disagreed with the statement that drinking alcohol by a mother-to-be is permissible. This result may arise from the fact that parents in smaller families may have more time to discuss these topics with their children.

We examined students' opinions on the necessity for more education on FAS and found that 77.1% (n = 176) of students reported the need. Similar results were reported in a study by Żołnierczuk et al., wherein 51.8% of students in that study agreed to participate in classes about the harmful effects of alcohol on the human body [30]. Together, results of the present self-report study and prior research studies suggest that young people need and want to be educated on the harmful effects of alcohol consumption, including FAS. Significant determinants in spreading knowledge about FAS appeared to be age, sex, and material status. In particular, the students who reported 'good' material status most frequently reported the need for education on FAS. Similar statistics were found for 18-year-olds as compared to 19-, 20-, or 21-year-olds. Therefore, it might be concluded that younger ages require more education on

harmful effects of alcohol consumption. We also found that residents of small villages reported a higher need for education about the harmful effects of alcohol consumption (n = 71; 80.68%) as compared to city residents; however, differences between city and village residents was not statistically significant.

Our survey results suggest that knowledge about the harmful effects of alcohol consumption during pregnancy planning and pregnancy among college students should be delivered by parents and family members (n = 166; 50.88%) and teachers (n = 118; 51.75%). The expectations of the students directed at their families prove the potential important role of parents in education on alcohol effects. Prior studies by Gruber et al. and by Arcan et al. highlight the important role of family members in cultivating pro-health behaviors among children and adolescents [31,32]. In addition, research by Ecstein et al. reported a crucial role of the family in developing proper attitudes among youth [33]. Pro-health practices constitute a crucial element of cultural and social activity in every human, and, therefore, ought to be promoted in a family environment [34]. However, parents do not always have enough time to talk to their children and they often initiate a discussion only after their children has started drinking alcohol. In support of this notion, a study by Marleo et al [35] demonstrated that 79.9% of parents of 11–17-year-olds were aware of the fact that their children drink alcohol and 92.7% of parents reported talking to their children about alcohol use. In that study, the authors also found that children frequently gained access to alcohol in the home [35]. Therefore, lack of proper healthy lifestyle models, deficits in parents' education, and permissive attitudes towards children's' alcohol use constitute significant challenges for public health.

Deficits in the opinions of the students on FAS precluded us from formulating conclusions on this topic. Schools do not meet educational expectations of students regarding risks of FAS. This notion has been confirmed by research by Kajak and Król wherein only 34% of students in their study chose college as the place where they had learned about FAS [36]. Thus, schools should broaden their educational practices for students and take part in public campaigns aimed at promoting knowledge about alcohol and its negative effects on a fetus [37,38].

Limitations of the study

The present survey study was limited to a small sample size. Further, participants were limited to 18- and 19-year-olds from the Opolskie Voivodeship (Poland). Ultimately, it would be worthwhile to conduct a similar survey on a larger sample of young people living in different regions of the country.

Conclusions

The ease of accessibility to alcohol and its popularity, together with (1) the low and average intensity of prophylactic behaviors in most students, (2) the fact that most students have experienced alcohol intoxication in the past, and (3) the opinion of some students about the permissibility of alcohol consumption by a mother and father-to-be during the period of planning a baby, can increase the risk of FAS. Students in the present study reported a high demand for knowledge about FAS, and pointed to families and schools as the most desired sources of such information. These results may aid in the development of an educational strategy about FAS prophylaxis among young people.

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THE FREQUENCY OF SELECT ADAPTATION DISORDERS IN PRETERM NEWBORNS

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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: Preterm birth, defined as the birth of an infant before 37 complete weeks of gestation, is the single major cause of death and disability in children up to 5 years of age in the developed world.

Aim of the study: The study aimed at analyzing select adaptation disorders in newborns delivered between 34–37 weeks of gestation and in particular, (1) determining the frequency of breathing, thermoregulatory, hypoglycemic and pathological hepatic disorders, and (2) examining underlying factors that determine their incidence.

Material and methods: The study was carried out according to the documentoscopy on the basis of medical files collected between 2019–2020 at the Neonatal and Preterm Baby Unit in WS SPZOZ (the regional hospital) in Nowa Sól. The records of 102 preterm newborn patients were examined, which included the birth book, detailed newborn observation charts, fever charts and individual patient observation charts.

Results: The most commonly diagnosed disorders included hepatitis (21.6%; 50) and thermoregulation disorders (20.3%; 47). Additionally, hypoglycemia and tachypnea were observed in every third child (31.4% and 29.4%, respectively) and almost every fourth newborn experienced some respiratory disorders (23.5%). Among the findings, maternal and gestational age were not found to be statistically significant with respect to an association with the incidence of the disorders examined in the study. However, hepatitis was more frequently diagnosed among naturally born children (64.5%) compared with those delivered by Cesarean (C) section (42.3%, p=0.039). Respiratory disorders were more often found in children delivered by C-section (21.1%) than in those born naturally (3.2%, p=0.022).

Conclusions: Hepatitis and thermoregulatory disorders occurred most frequently in preterm infants of all the adaptation disorders examined. The type of delivery was quite determinant for some of the disorders. Hepatitis was found more often in naturally born babies than in those delivered by C-section, whereas respiratory problems occurred more frequently in children delivered by C-section compared with those delivered naturally. Mothers who wish to deliver their babies by C-section should be informed about potential complications associated with the occurrence of respiratory disorders. They can stem from the absorption of pulmonary liquid and inappropriate surfactant activity, which can lead to some serious abnormalities related to the improper exchange of respiratory gases.

KEYWORDS: premature infant, newborn respiratory distress syndrome, neonatal jaundice, low birth weight

Background

Preterm birth, defined as the birth of an infant before 37 completed weeks of gestation, is the single major cause of death and disability in children up to 5 years of age in the developed world [1,2]. It is estimated that globally, 13 million to 15 million preterm infants are born annually [3,4]. Data from 184 countries shows that the rate of preterm birth ranges from 5% to 18% of all babies born [5].

The proportion of preterm births in different countries varies with socioeconomic conditions, ethnicity, level of women's education and age [6]. Preterm births ranged from 13.4% in North Africa to 8.7% in Europe [7]. According to data from the Central Statistical Office

(GUS), 388,178 infants were born in Poland in 2018 and 24,078 of them were born between 32–36 weeks, 2,751 between 28–31 weeks and 1,586 below 28 weeks of gestation. Children born with a birth weight below 2,500g constituted 5.5% of all the newborns. The number of preterm babies with birth weight below 2,500g, born between 32–36 weeks of gestation, was 11,418 [8].

The adaptation of preterm newborns to life outside the uterus is hindered by bodily systems that are not fully developed or mature [9], with the degree of maturation and depending on the duration of gestation. The most commonly diagnosed clinical disorders found in preterm infants include respiratory disorders, apnea, thermoregulatory disorders, nutrition difficulties, hypoglycemia, hyperbilirubinemia and perinatal infections [10].

Depending on fetal age, some preterm infants' organs are not adjusted and formed well enough to live outside the uterus. Immature lungs seem to be the most critical as they are unable to produce surfactant [10]. The clinical condition most frequently diagnosed in preterm babies born with shortages of surfactant is known as infantile respiratory distress syndrome (IRDS) [11]. Symptoms may arise right after birth or develop gradually in the early hours of an infant's life. The most frequently observed are complications in taking the first breath and continuing to breathe independently, acceleration of breathing frequency above 60/min (tachypnea), inhalation effort, symptoms of dyspnea such as exhalation groaning, supraclavicular, diaphragm or intercostal muscle retractions, moving nostrils while breathing, apnea, peripheral cyanosis and tachycardia [12].

What is more, preterm infants experience problems with sustaining normal body temperature. The reasons for this adaptation disorder include increasing loss of body heat, high body surface to body weight ratio, insufficient amount of fatty tissue, impaired thermogenesis and thin skin [13]. Thus, cooling of the body in preterm infants has a negative impact and leads to vessel shrinkage and reduces tissue blood perfusion. These complications may cause metabolic acidosis, hypoglycemia and even hypoxia which, in consequence, independently hinders surfactant production in the lungs and also negatively influences the activity of other bodily organs [14].

Hypoglycemia is a metabolic disorder often diagnosed in the initial hours of a preterm infant's life. The maximum decrease in glucose levels occurs between the second and the third hour of life [15]. On the other hand, hepatitis typically appears on the second day of life in 60 – 80% of infants. The level of bilirubin in a preterm newborn should not exceed 15 mg/dL [16]. Neonatal period is a difficult time for an infant as the immune system is not well developed yet; it is a particular concern as preterm newborns are at a higher risk of various bacterial, viral and fungi infections. Bacterial infections are found in 1 – 5 per every 1,000 infants, but the frequency increases in preterm ones [17,18].

Previous studies have shown that many factors have been associated with an increased risk of spontaneous preterm birth, including previous preterm birth, multiple gestation, pregnancy induced hypertension, antepartum hemorrhage, prolonged pre-labor rupture of membranes, young or advanced maternal age, short inter-pregnancy intervals, low maternal body mass index and urinary tract infections [3,19].

In this self-reported study, it was assumed that adaptation disorders such as respiratory and thermoregulatory conditions, hypoglycemia and hepatitis occur more frequently in preterm newborns. Identifying the factors that determine the frequency of their occurrence may contribute to a better understanding of the phenomena.

Aim of the study

The study aimed at analyzing select adaptation disorders in newborns delivered between 34–37 weeks of gestation at the Multispecialist Hospital of SPZOZ in Nowa Sól in 2019–2020 to (1) determine the frequency of breathing, thermoregulatory, hypoglycemic and pathological hepatic disorders as well as (2) indicating the factors which directly determine their incidence.

Material and methods

Study design and setting

The research was carried out using documentoscopy based on medical files collected between January 2019 and January 2020 at the Neonatal and Preterm Baby Unit at WS SPZOZ in Nowa Sól with agreement from the Hospital Management and the Head of the Unit.

Data sources

The analysis of 102 newborns' medical records was carried out including the birth book, detailed newborn observation charts, fever charts and individual patient observation charts.

The condition of the patients was assessed according to the Apgar Scale which is applied right after birth. The aspects evaluated included the functioning of the heart, respiratory activity, skin color, muscle tension and reaction to reflexes. The scale ranges from 0 to 10, and the higher the value, the better the condition of an infant.

Variables

Variables taken into consideration in the study included gestational age, the gender, birth weight and length of the infant, length of pregnancy, manner of pregnancy termination, mother's age, the number of labors, number of points on the Apgar Scale, length of stay at the hospital unit and diagnosis of adaptation disorders examined in the study such as respiratory and thermoregulatory disorders, hypoglycemia, hepatitis, tachypnea, respiratory failure, neonatal infections and perinatal asphyxia.

Participants

The analysis was based on the medical records of 102 preterm newborns (n=102, 100%) among which 69.6% (n=71) were delivered by C-section and 30.4% (n=31) were born naturally. Over half of the infants examined were male (58.8%, n=60). The largest group was formed by babies born between 36–37 weeks of gestation (36.3%; 37). Birth weight and length constitute, among others, relevant criteria to assess an infant's maturation. The smallest infant weighed 1,820 g and the heaviest 4,460 g. The average birth weight was 2,618.43 g (SD=478.57). Every fourth newborn weighed less than 2,280 g. The average body length of the infants was 50.93% (SD=2.67).

Patients that achieved 10 points at the Apgar Scale represented 37.25% (n=38) of all patients, while 27.45% (n=28) were given 9 points and 16.67% (n=17) had 8 points. Newborns who achieved 4 – 7 points on the Apgar Scale constituted 14.78% (n=16) of all those examined (Tab. 1).

Clinical conditions among preterm newborns results from long-term hospitalization. The longest stay in the study group was 24 days and the shortest 3 days. The average hospital stay time was 7 days. Every fourth newborn stayed at the hospital unit for more than 9 days.

Average maternal age was M=30.81. The youngest mother was 16 and the oldest 42 years old. Mothers that were 29 years of age constituted the largest group age-wise. The biggest group included primigravidas – women who gave birth to their first child – (28.4%; n=29) and those with 2 children (22.5%; n=23). Every fourth newborn was the third baby of its mother (25.5%; n=26). Sixteen infants were the fourth child (15.7%), 4 infants were born of the fifth pregnancy (3.9%), 3 newborns were delivered by mothers in their sixth pregnancy (2.9%) and 1 newborn was the outcome of the ninth pregnancy.

Table 1. Characteristics of the study group.

Distribution of newborn age		
Gestational newborn age	n	%
week 35	16	15.69
week 34/35	12	11.76
week 35	8	7.84
week 35/36	13	12.75
week 36	13	12.75
week 36/37	37	36.27
week 37	3	2.94
Total	102	100.00
Score on the Apgar Scale		
Score on the Apgar Scale	n	%
1	0	0.00
2	2	1.96
3	1	0.98
4	0	0.00
5	1	0.98
6	5	4.90
7	10	9.80
8	17	16.67
9	28	27.45
10	38	37.25
Total	102	100.00
Birth weight and length of newborns		
Average distribution measurements	Weight (g)	Length (cm)
Min	1820.00	46.00
Max	4460.00	57.00
M	2618.43	50.93
SD	478.57	2.67
Q.25%	2280.00	49.00
Q.50%	2525.00	51.00
Q.75%	2852.50	53.00

Legend: min – minimum, max – maximum, M – median, SD – standard deviation, Q.25% – 1st quartile, Q.50% – median, Q.75% – 3rd quartile.

Statistical methods

Analysis of the results was performed with the program Statistica, using contingency tables, the Chi-squared test and the V Cramer's correlation coefficient. The chi-squared Pearson's test was performed to confirm statistical significance between nominal variables or nominal and ordinal ones. The level of statistical significance was established at $p<0.05$.

Results

Analysis of the incidence of select adaptation disorders among preterm newborns

Each newborn examined in the study suffered from at least one of the adaptation disorders mentioned above. The most common included hepatitis (21.6% of all cases) and thermoregulatory disorders (20.3%), which were found in almost half of the patients. Every third infant suffered from hypoglycemia (31.4%) or tachypnea (29.4%). Almost every fourth newborn experienced some respiratory failure (23.5%) and every fifth some perinatal infections (18.6%) (Tab. 2).

Factors affecting the incidence of the adaptation disorders in newborns

The age of a mother was not found to be statistically significant with reference to the incidence of any of the adaptation disorders examined ($p>0.05$). However, babies born to mothers under the age of 30 most

Table 2. Analysis of the incidence of select adaptation disorders in preterm newborns.

Type of disorder	Responses		Percentage of observations
	Number of infants	Percentage of all analyses	
hepatitis	50	21.6%	49.0%
thermoregulatory disorders	47	20.3%	46.1%
temporary hypoglycemia	32	13.8%	31.4%
temporary tachypnea	30	12.9%	29.4%
respiratory failure	24	10.3%	23.5%
perinatal infection	19	8.2%	18.6%
respiratory distress syndrome	16	6.9%	15.7%
birth asphyxia	10	4.3%	9.8%
other disorders	4	1.7%	3.9%
Total	232	100.0%	--

Legend: The percentages do not sum to 100 as the newborns could be diagnosed with more than one disorder.

frequently suffered from hepatitis (61.9%; 26), whereas those born to mothers aged 30 – 35 and over 35 experienced thermoregulatory disorders more often. The percentages were 46.5% (20) and 52.9% (9), respectively (Tab. 3).

No significant correlation was confirmed between gestational age and the incidence of the adaptation disorders examined ($p>0.05$). However, it is worth mentioning that hepatitis was more frequently diagnosed in newborns delivered before 35, and after 36 weeks of gestation (64.3% and 47.5%, respectively). Thermoregulatory disorders occurred more often in those born between 35–36 weeks of gestation (55.9%). Respiratory failure was confirmed in 39.3% of infants born before week 35, in 20.6% of those born between weeks 35–36 and in 15% of those delivered after week 36. Infantile respiratory distress syndrome (IRDS) was found in 28.6% of infants born before week 35, in 11.8% of those delivered between weeks 35–36 and in 10% of those born after week 36 (Tab. 4).

Table 3. Mother's age vs. the incidence of adaptation disorders in the newborns.

Type of disorder	Mother's age						Test Chi2	
	<30 years		30–35 years		>35 years			
	n	%	n	%	n	%	Chi2	p
hepatitis	26	61.90%	16	37.20%	8	47.10%	5.217	0.074
thermoregulatory disorders	18	42.90%	20	46.50%	9	52.90%	0.501	0.778
temporary hypoglycemia	13	31.00%	13	30.20%	6	35.30%	0.151	0.927
temporary tachypnea	12	28.60%	16	37.20%	2	11.80%	3.824	0.148
respiratory failure	11	26.20%	9	20.90%	4	23.50%	0.327	0.849
perinatal infection	8	19.00%	5	11.60%	6	35.30%	4.510	0.105
respiratory distress syndrome	8	19.00%	5	11.60%	3	17.60%	0.944	0.624
birth asphyxia	6	14.30%	2	4.70%	2	11.80%	2.319	0.314
other disorders	2	4.80%	1	2.30%	1	5.90%	0.543	0.762

Legend: The percentages do not sum to 100 as the newborns could be diagnosed with more than one disorder.

Table 4. Gestational age vs. the incidence of the selected adaptation disorders in the newborns.

Type of disorder	Gestational age						Test Chi2	
	< 35 weeks		35–36 weeks		> 36 weeks			
	n	%	n	%	n	%	Chi2	p
hepatitis	18	64.3%	13	38.2%	19	47.5%	4.230	0.121
thermoregulatory disorders	14	50.0%	19	55.9%	14	35.0%	3.464	0.177
temporary hypoglycemia	7	25.0%	13	38.2%	12	30.0%	1.307	0.520
temporary tachypnea	11	39.3%	9	26.5%	10	25.0%	1.832	0.400
respiratory failure	11	39.3%	7	20.6%	6	15.0%	5.644	0.059
perinatal infection	7	25.0%	5	14.7%	7	17.5%	1.129	0.569
respiratory distress syndrome	8	28.6%	4	11.8%	4	10.0%	4.888	0.087
birth asphyxia	3	10.7%	5	14.7%	2	5.0%	1.994	0.369
other disorders	3	10.7%	1	2.9%	0	0.0%	5.148	0.076

Legend: The percentages do not sum to 100 as the newborns could be diagnosed with more than one disorder.

The correlation between the manner of pregnancy termination and the incidence of hepatitis and respiratory disorders was found to be statistically significant (p=0.039 and p=0.022, respectively); however, parturition did not determine the incidence of the adaptation disorders in any relevant way (p>0.05).

Hepatitis was more frequently detected in newborns delivered naturally (64.5%) than in those delivered by C-section (42.3%). However, IRDS occurred more often in infants delivered by C-section (21.1%) compared with those born naturally (3.2%) (Tab. 5).

Discussion

Key results

The study confirmed hepatitis (21.6%; 50) and thermoregulatory disorders (20.3%; 47) as the most frequent diseases diagnosed among preterm newborns. Maternal age and gestational age did not significantly determine the incidence of the select adaptation disorders examined. However, hepatitis was more often found in infants delivered naturally than in those delivered by C-section, while IRDS showed the opposite distribution.

Interpretation

The analysis shows that a preterm labor is associated with an increased incidence of diseases and deaths among newborns. The most common adaptation disorders include respiratory and thermoregulatory ones, hypoglycemia, hyperbilirubinemia and perinatal infections [20].

Analyses of the results in this self-reported study showed that hyperbilirubinemia was the most frequently reported of all the adaptation disorders evaluated, being found in 49% of all newborns. Similar outcomes were confirmed by Ćwik and Siedlarz [21] who reported that hepatitis was found three times more often in late preterm newborns than in full term babies. Additionally, hepatitis was found to occur in 71.7% of infants in a study by Kornacka and Tołłoczko [10].

The second most frequently diagnosed condition was thermoregulatory disorders which were found in 46.1% of the newborns. Similar conclusions were drawn by Baumert et al [22] who reported 33% newborns with such problems. However, Ćwik and Siedlarz [21] found completely opposite results. In their study cohort, only 9.9% of the infants had thermoregulatory issues. According to their conclusions, the disorders stem from an immature skin barrier, a high ratio of body surface to body weight, as well as an underdeveloped thermoregulatory center [22].

The most serious disorders examined in the study were respiratory conditions. According to the results collected in the study, infantile respiratory distress syndrome (IRDS) occurs more frequently in children delivered by C-section (21.1%) compared with those born naturally (3.2%). The findings are in line with those of Ćwik [21] and Baumert [22] in their studies. Analysis of results in this self-reported study showed that IRDS was diagnosed in 28.6% of newborns delivered before week 35, in 11.8% of those born between weeks 35–36 and in 10% of those born after week 36. It may therefore be concluded that there is a correlation between the incidence of IRDS and gestational age. Kornacka et al [10] also reported IRDS in 24.5% of late preterm newborns and Ćwik [21] in 16.5%. The incidence of IRDS found in our study is thus similar to the findings of Ćwik [21], Baumert [22] and Kornacka [10]. In light of this, mothers who wish to have C-sections should be informed of the higher incidence of IRDS, which stems from the absorption of pulmonary liquid and defects in surfactant activity that can lead to serious issues related to the improper exchange of respiratory gases.

Table 5. Manner of pregnancy termination vs. incidence of adaptation disorders in newborns.

Type of disorder	Parturition				Test Chi2	
	C-section		Natural labor			
	n	%	n	%	Chi2	p
hepatitis	30	42.3%	20	64.5%	4.280	0.039*
thermoregulatory disorders	36	50.7%	11	35.5%	2.012	0.156
temporary hypoglycemia	22	31.0%	10	32.3%	0.016	0.899
temporary tachypnea	21	29.6%	9	29.0%	0.003	0.956
respiratory failure	19	26.8%	5	16.1%	1.356	0.244
perinatal infection	10	14.1%	9	29.0%	3.181	0.075
IRDS	15	21.1%	1	3.2%	5.228	0.022*
birth asphyxia	7	9.9%	3	9.7%	0.001	0.977
other disorders	4	5.6%	0	0.0%	1.818	0.178

Legend: The percentages do not sum to 100 as the newborns could be diagnosed with more than one disorder.

Another disorder examined in the study was temporary hypoglycemia, which was found in 31.4% of examined preterm newborn. The observed decreased glycemia in the first days of an infant's life is temporary and subsides spontaneously. This is also confirmed in research by Świetliński [12].

Finally, the study examined the incidence of perinatal infections, which were found in almost 19% of all newborns. Czublińska-Łada et al reported infections in 71.6% of the newborns examined in their study. They claim that congenital infections occur more often in children born between weeks 34–37 of gestation, with 53.3% of infants in this group that suffered from them [23].

Limitations of the study

The study was limited by the number of cases examined and the fact that it was conducted at only one hospital. However, the research is a pilot program.

Conclusions

Hepatitis and thermoregulatory disorders were frequently found in preterm newborns. Method of delivery determined the incidence of some of the adaptation disorders examined. Hepatitis occurred more often in infants born naturally compared with those delivered by C-section. On the other hand, IRDS was more commonly diagnosed in newborns delivered by C-section than in those born naturally.

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BODY STRUCTURE AND PHYSICAL FITNESS ASSESSED BY THE SENIOR FITNESS TEST: A CROSS-SECTIONAL STUDY IN A SAMPLE OF POLISH SENIORS

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ABSTRACT

Background: The Senior Fitness Test (SFT) measures the underlying physical parameters associated with functional ability, and identifies whether an older adult may be at risk of loss of functional fitness. Assessing the functional fitness performance of older adults is an essential element in the design of effective exercise programs.

Aim of the study: The present study aimed to assess selected parameters of the body structure and functional fitness of the elderly using the SFT.

Material and methods: 60 people (30 women and 30 men) were examined. The participants were divided into two age groups: the younger group (people up to 74 years old) and the older group (people over 75 years old). Height, weight, waist circumference, and hip circumference were measured. Body mass index (BMI) and waist to hip ratio (WHR) were calculated. The prevalence of overweight and obesity was estimated. The SFT was used to assess physical fitness.

Results: The younger men were taller, heavier, and had greater hip circumference than older men (respectively $p=0.03$, $p=0.02$, $p=0.03$). Younger men also showed statistically significant better results in the arm curl and 2 min step tests ($p<0.05$). Younger women were taller ($p<0.05$) and obtained better results in almost all fitness trials than older women. Between younger vs. older women statistically significant results were found in the following tests: arm curl, 30 s chair stand, chair sit and reach, 8 ft up-and-go, and 2 min step ($p<0.05$). Overweight and obesity were more common among younger groups of both sexes.

Conclusions: Age influences mobility and physical fitness, especially among women. Younger people are characterized by higher body structure parameters and achieve better results in the physical fitness test.

KEYWORDS: aging, body structure, physical fitness, seniors, Senior Fitness Test

Background

Age-associated evolutionary changes can deteriorate the functioning of individual systems in the body as well as physical performance. An increased attention is paid to physical fitness in the elderly because research has shown that in people over 50 years of age there is a decrease in: muscle strength, endurance, agility, range of motion, coordination, and balance [1–3]. As a consequence of reduced muscle strength and poor balance, the number of falls among older adults is increasing [4].

Many research projects emphasize the importance of physical activity in preventing diseases, lowering the parameters of physiological aging, and increasing the level of functional fitness of the elderly [5–9]. The level of physical activity determines the independence and self-sufficiency of a senior while enabling functioning without the help of other people, such as caregivers or family. Maintaining or improving muscle strength, flexibility, balance, and mobility prevents falls [10].

Increasingly, seniors use various forms of institutionalized support. Single people with chronic illness

become residents of nursing homes [11]. Nursing homes should ensure optimal quality of life for residents and provide them with active aging [12]. Seniors can also find support in the Daily residence, which started to exist in Poland in the 1960s. The Daily residence provides partial home and institutional help. It is a place where older people have the opportunity to meet new peers, take part in various trips and events, participate in physical activities, and enjoy cultural and educational activities organized for seniors [13].

One of the ways to monitor the body functions of the elderly is the Senior Fitness Test (SFT), developed in the United States. In a safe manner, without specialized equipment, it allows the assessment of cardiovascular endurance and efficiency in terms of coordination, endurance, strength and flexibility. This test consists of six tasks designed to assess the strength and flexibility of the upper and lower body, dynamic balance, and aerobic endurance [14].

The aim of the study was to assess selected parameters of the body structure and functional physical fitness of the elderly using the SFT.

Research questions:

1. Which age group (74 yrs. and younger or over 75 yrs.) has more overweight and obese participants?
2. Which age group of participants has the best functional fitness?
3. Do the test participants meet the age-appropriate norms of the SFT?

Material and methods

Study design and settings

The study was conducted in two Daily residences in Opole Voivodeship, Poland from March to April 2016. The study was carried out in accordance with the guidelines of the Declaration of Helsinki and Good Clinical Practice. Prior to the study, all subjects were informed of the principles and purpose and expressed written consent to participate. The Bioethical Commission at the Opole Medical School in Opole approved of the study (No. 33/2015).

Participants

Sixty participants, including 30 men and 30 women aged 65 to 80 yrs. (mean 74.0 ± 5.19 yrs.; median 75 yrs.) from the "Złota Jesień" Daily Care Service (Dom Dziennego Pobytu "Złota Jesień") in the Opole Voivodeship were examined.

The "Złota Jesień" Daily Care Service is a support center (community-based services) operating within the structure of the Municipal Family Support Center in Opole. The main goal of the home is to keep seniors physically fit enough for independent functioning in the surrounding environment, satisfying the basic needs of everyday life, and integrating with the local environment.

The mean age was 73.9 ± 5.19 yrs. (median 74 yrs.) for men, and 74.1 ± 5.18 yrs. (median 76 yrs.) for women. The criterion for inclusion in the study group were people aged 65 years and older with whom contact was maintained. Younger people, people with whom verbal contact was difficult, and those who felt unwell on the day of the test were excluded. Moreover, participants were excluded if they had: inability to move independently, cancer or a recent myocardial infarction.

Data sources/measurement

Height (cm), body mass (kg), waist circumference (cm), and hips circumference (cm) were measured using standard anthropometric techniques. Based on the measurements, Body Mass Index (BMI) (kg/m^2) and waist to hip ratio (WHR) were calculated. The following weight categories were adopted according to the criteria provided by the World Health Organization (WHO): underweight <18.5 kg/m^2; standard 18.5–24.9 kg/m^2; overweight 25.0–29.9 kg/m^2; obesity> 30.0 kg/m^2 [15].

The SFT was used to assess physical fitness. It is a test designed to assess the functional fitness of the elderly. The test consists of six tasks designed to assess the strength and flexibility of the upper and lower body, dynamic balance, and aerobic endurance. Each test component of the SFT has been selected for its high content validity, criterion validity, construct validity, and reliability [14,16].

The SFT assess the six underlying functional fitness parameters:

1. Upper body strength – arm curl. Number of bicep curls that can be completed in 30 seconds.
2. Upper body flexibility – back scratch. Standing position with one hand reaching over the shoulder and one up the middle of the back, the number of inches (cm) between extended middle fingers (+ or -).
3. Lower body strength – 30 s chair stand. Number of full stands from a chair that can be completed in 30 seconds with arms folded across chest.
4. Lower body flexibility – chair sit and reach. From a sitting position at front of chair, with legs extended and hands reaching toward toes, the number of inches (cm) between extended fingers and tip of toe (+ or -).
5. Agility/dynamic balance – 8 ft up and go. Number of seconds required to get up from a seated position, walk 8 feet (2.44 m), turn, and return to seated position.
6. Aerobic endurance – 2 min step test. Number of full steps completed in 2 minutes, defined as raising each knee to a point midway between the patella (kneecap) and iliac crest (top hip bone). Score is recorded as the number of times the right knee reaches the required height.

During the examination, the rooms were sufficiently lit and oxygenated to perform the tasks comfortably and properly. Enough space was provided to perform individual tests. The tests were carried out in

the morning. The respondents had appropriate clothes and sports shoes to perform the tasks. The tasks were preceded by a demonstration and warm-up. Conducting the study did not require the use of specialized equipment. When applying the test in Polish conditions, an adaptation (units of measures and weights) was used, which made it possible to perform it with the use of commonly available instruments [17]. Instead of the original dumbbell weights of 5 pounds (2.27 kg) for women and 8 pounds (3.63 kg) for men, dumbbells weighing 2 kg for women and 3.5 kg for men were used. In addition, the following were used to perform the test: a stopwatch, a measuring tape, a chair and a table.

Statistical methods

The results were subjected to statistical analyses. Descriptive statistics: mean (M), median (Me), standard deviation (SD), minimum (Min) and maximum (Max) were calculated. The Mann-Whitney U test was used to assess the differentiation of means anthropometric parameters and the results of the SFT in individual age groups (younger/older) in both sexes. The frequencies of overweight and obesity were calculated with chi^2 test. P-value at 0.05 or less was regarded as significant. Statistica, version 13.1. StatSoft, Tulsa, USA was used for calculations.

Results

Descriptive data

Participants (men and women) were divided into two subgroups, younger (up to 74 years old) and older (over 75 years old). The quantitative division of the study group is presented in Tab. 1. The statistical characteristics of age were presented in Tab. 2.

Main results

The men from the younger group were characterized by higher parameters of body structure (Tab. 3). There were statistically significant differences in height (p = 0.025), body mass (p = 0.020) and hip circumference (p = 0.031). Obesity was more common in the

Table 1. The size of the study group.

Gender	Group 1 – younger		Group 2 – older		Total	
	n	%	n	%	n	%
men	17	56.67	13	43.33	30	50.00
women	12	40.00	18	60.00	30	50.00
total	30	48.33	31	51.67	60	100.00

Table 2. Descriptive statistics of age in younger and older group.

Gender	Group	M	SD	Me	Min	Max	U	p-value*
men	younger	69.88	3.02	70.00	65.00	74.00	0.00001	<0.001
	older	79.15	1.52	80.00	76.00	80.00		
women	younger	68.58	3.26	67.50	65.00	74.00	0.00001	<0.001
	older	77.89	1.96	77.50	75.00	80.00		

M – mean, SD – standard deviation, Me – median, Min – minimum, Max – maximum, * Mann-Whitney U test.

Table 3. Characteristics of body structure and the results of the Senior Fitness Test among men.

Values	Group	M	SD	Me	Min	Max	U	p-value*
height (cm)	younger	175.95	8.81	176.10	162.30	196.60	56.50	0.025
	older	167.18	5.65	170.30	153.30	172.20		
body mass (kg)	younger	83.80	13.18	86.30	55.20	106.60	54.50	0.020
	older	71.15	11.80	76.30	52.10	85.10		
BMI (kg/m^2)	younger	27.13	4.32	26.67	19.67	33.47	83.00	0.258
	older	25.36	3.36	26.51	19.18	29.34		
waist circumference (cm)	younger	106.94	10.55	108.10	83.80	121.30	68.00	0.079
	older	99.03	13.01	104.50	75.30	115.70		
hip circumference (cm)	younger	108.75	7.68	107.70	95.30	119.80	58.50	0.031
	older	101.62	6.82	103.60	90.30	109.60		
WHR	younger	0.98	0.06	0.99	0.84	1.07	96.00	0.560
	older	0.97	0.08	0.97	0.81	1.10		
arm curl (no. of reps)	younger	20.29	4.90	20.00	13.00	32.00	50.00	0.012
	older	16.08	2.96	17.00	11.00	21.00		
back scratch (cm)	younger	-20.14	17.99	-16.10	-65.50	1.60	91.50	0.439
	older	-24.87	17.51	-20.60	-61.20	-7.05		
30 s chair stand (no. stands)	younger	14.71	4.82	14.00	6.00	23.00	84.50	0.283
	older	12.92	3.66	12.00	8.00	20.00		
chair sit and reach (cm)	younger	-5.51	10.42	0.00	-27.70	7.60	95.00	0.513
	older	-2.19	5.92	0.00	-18.50	5.30		
8 ft up and go (s)	younger	7.21	1.68	6.90	4.81	10.23	71.00	0.103
	older	9.79	4.10	8.76	4.70	18.76		
2 min step test (no. of steps)	younger	85.71	15.71	86.00	52.00	111.00	57.50	0.028
	older	68.38	22.93	72.00	36.00	106.00		

M – mean, SD – standard deviation, Me – median, Min – minimum, Max – maximum, * Mann-Whitney U test.

younger group (35%), while in the older group, the normal body weight (38%) and overweight (46%) was more frequent. Both groups were not underweight. There were no statistically significant differences in the age groups (younger/older) (Fig. 1).

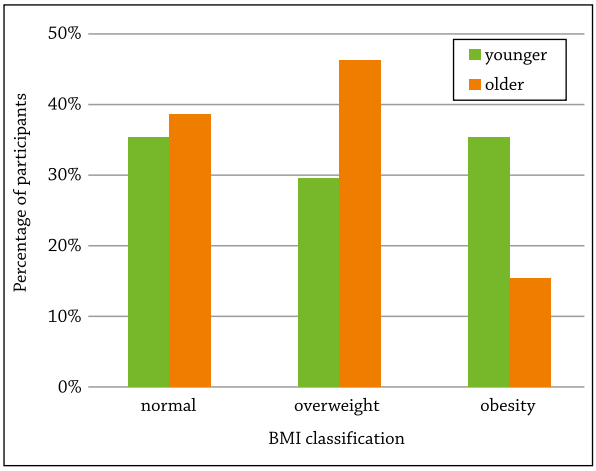

Figure 1. The frequency of normal weight, overweight and obesity among men.

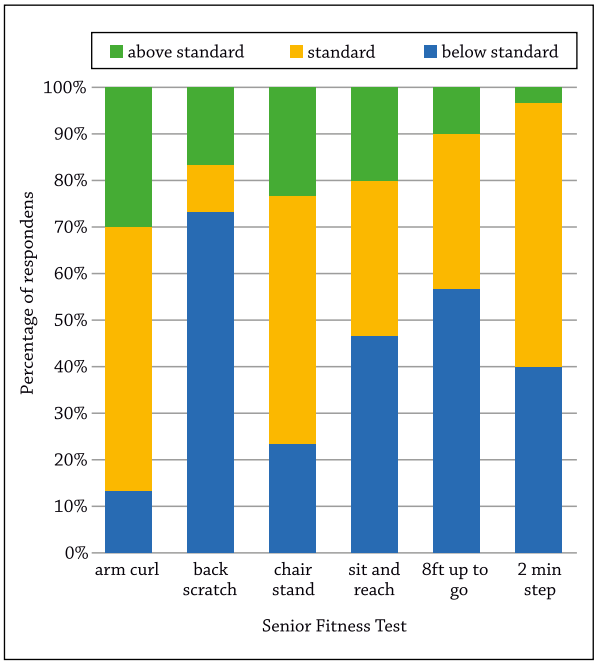

Figure 2. Percentage of men representing particular categories of assessing the performance of the SFT.

In all of the functional tests, younger men performed better. Statistically significant differences were observed in the tests of arm curl ($p = 0.012$) and 2 min step test ($p = 0.028$) (Tab. 3). The results of the surveyed men were compared to the ranges and standards developed by the SFT authors [16]. Most study participants met the predetermined standards in the arm curl and 30 s chair stand tests. The worst results were obtained in the back scratch and 8 ft up and go tests (Fig. 2).

The women from the younger group were characterized by higher parameters of body structure (Tab. 4), but statistically significant differences occurred only in height ($p = 0.025$). More than half of younger women (58%) were overweight. In the older group, 50% of the women had a normal weight and 28% were obese. None of the women were underweight. There were no statistically significant difference between age groups (younger/older) (Fig. 3).

Table 4. Characteristics of body structure and the results of the Senior Fitness Test among women.

Values	Group	M	SD	Me	Min	Max	U	P-value*
height (cm)	younger	160.48	6.44	161.20	145.20	169.10	55.00	0.024
	older	155.24	6.26	155.40	147.30	169.90		
body mass (kg)	younger	69.08	12.59	64.60	55.70	98.20	81.00	0.262
	older	61.76	12.72	61.60	45.50	84.40		
BMI (kg/m^2)	younger	26.79	4.39	26.68	21.28	38.31	88.00	0.409
	older	25.66	5.37	24.93	19.27	36.58		
waist circumference (cm)	younger	93.47	14.53	95.40	76.40	127.20	73.50	0.641
	older	89.60	14.06	84.60	67.20	114.90		
hip circumference (cm)	younger	109.48	9.38	108.55	96.60	128.30	96.50	0.150
	older	103.91	11.30	100.30	89.60	123.80		
WHR	younger	0.85	0.08	0.85	0.73	0.99	92.00	0.512
	older	0.86	0.09	0.86	0.62	1.04		
arm curl (no. of reps)	younger	18.42	5.45	18.5	8.00	27.00	49.50	0.014
	older	14.17	3.00	14.00	8.00	19.00		
back scratch (cm)	younger	-11.60	17.49	-3.75	-43.30	7.10	62.50	0.057
	older	-25.06	15.40	-23.85	-59.30	1.50		
30 s chair stand (no. stands)	younger	14.08	3.45	14.00	9.00	21.00	38.00	0.003
	older	9.28	3.69	11.00	2.00	15.00		
chair sit and reach (cm)	younger	4.68	8.64	1.65	-13.20	16.50	48.00	0.007
	older	-4.33	7.34	0.00	-17.70	3.20		
8 ft up and go (s)	younger	6.45	1.30	5.99	5.19	9.23	13.00	0.001
	older	13.97	9.71	10.15	6.62	44.75		
2 min step test (no. of steps)	younger	93.58	15.20	95.00	66.00	110.00	34.00	0.001
	older	68.94	20.70	72.00	19.00	98.00		

M – mean, SD – standard deviation, Me – median, Min – minimum, Max – maximum, * Mann-Whitney U test.

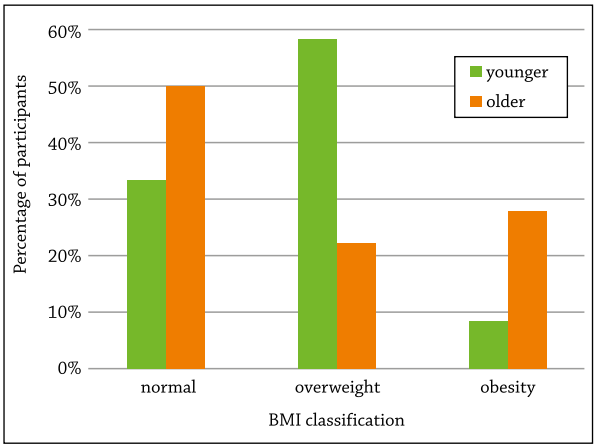

Figure 3. The frequency of normal weight, overweight and obesity among women.

Younger women obtained better results in physical fitness than older women. Statistically significant differences were noted in the arm curl ($p = 0.014$), 30 s chair stand ($p = 0.003$), chair sit and reach ($p = 0.007$), 8 ft up and go ($p = 0.001$) and the 2 min step test ($p = 0.001$). Only in the test of back scratch were not statistically significantly different.

The results of the women were also compared to the ranges of norms developed by the Senior Fitness Test authors [16]. As in the group of men, women also fared best in the arm curl, 2 min step test, 30 s chair stand and chair sit and reach attempts. The women performed worse than men in the back scratch and 8 ft up and go tests (Fig. 4).

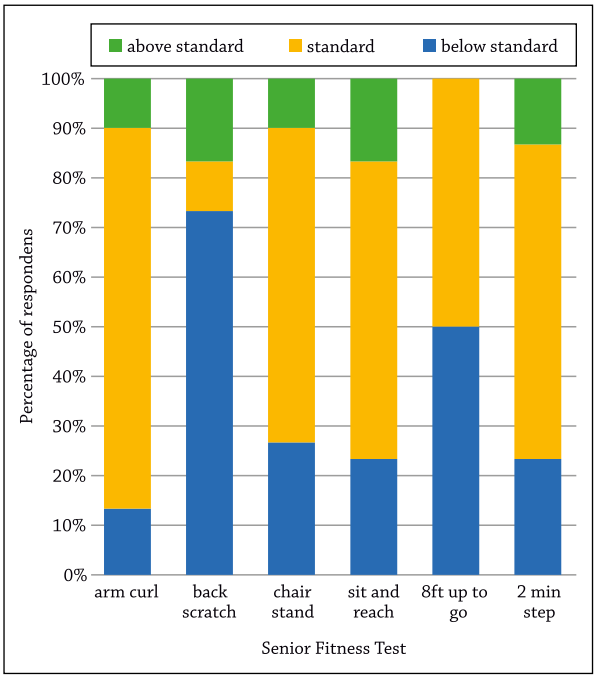

Figure 4. Percentage of women representing particular categories of assessing the performance of the SFT.

Discussion

The functional fitness of seniors is extremely important for maintaining independence in everyday life. Our research confirms that age affects an individual's performance, especially among women. Younger women obtained significantly more favorable results than older women in five trials of the SFT. The back scratch test was the only test in which the difference in results was not statistically significant, although the younger group did achieve better results. Among men, the younger group achieved significantly more favorable results than the older group in two tests (arm curl and 2 min step). Upper body strength and aerobic endurance in men deteriorate with age. The cause of this deterioration may be the phenomenon of sarcopenia, a decrease in muscle mass with age and the associated decrease in strength of skeletal muscles. Body composition proportions also change with age; muscle circumference decreases while fat content increases. Sarcopenia leads to a gradual loss of the ability to perform intense efforts and limits functional independence [18, 19]. The level of physical activity, which decreases with age, also reduces muscle strength and aerobic capacity [2, 18].

Other researchers obtained similar results. A study by Milanowic et al. [2] showed that reduced functional fitness in older seniors, as opposed to younger seniors, is caused by a decrease in muscle strength, flexibility, agility and endurance. In the study by Ignasiak et al. [20] investigating elderly men in nursing homes, the younger group achieved more favorable results than the older group, but only in the arm curl sample was the difference was statistically significant.

In the study by Ignasiak et al. [20], men in both age groups obtained lower mean results in the SFT than male participants in our study. Similar results to the Ignasiak et al. study [20] were obtained by Furtado et al., who examined women living independently and in nursing homes using the SFT. Women living independently [21] achieved better results, than in nursing homes. More favorable results obtained by people living independently may be due to their greater activity related to running a household independently. This is confirmed by the research of Fisher et al. [22], which shows that older age and living in nursing homes negatively affect the level of physical activity of older people.

The results of our participants were compared to the American standards developed by the authors of the SFT [16]. In the male participants, strength tests (arm curl and 30 s chair stand) produced the most favorable results, with only a small percentage of people not meeting the standards. The test assessing upper body flexibility (back scratch) produced the least favorable results. Over 70% of men did not reach the predetermined standards. In women, the percentage of participants who did not meet the standards was lower than men. The best tests were the arm curl, 2 min step, 30 s chair stand, and sit and reach. The worst test was the back scratch, in which over 70% of women did not meet American standards.

Muscle strength seems to be the best preserved motor ability of the studied seniors. The tests assessing flexibility, especially of the upper body, showed

the greatest age-related deterioration. The flexibility depends on the mobility of the joints. This mobility and range of motion is limited by degenerative changes in the joints, which becomes more severe in the case of low activity in older people. Regular exercise is required to maintain muscle flexibility and full range of motion. Perhaps, in the daily residence attended by the surveyed seniors, more attention is paid to strength and endurance exercises during physical activities, rather than exercises that enhance flexibility.

Other authors also compared the results of the surveyed seniors to American standards. Studies by Ignasiak et al. [23] showed that women living in nursing homes did not meet American standards. Women living independently, as opposed to patients of a sanatorium, demonstrated superior results in strength tests (arm curl and 30 s chair stand). In a study by Kaczorowska et al. [24], residents of nursing homes met the American standards in the arm curl, chair stand and 2 min step tests. The remaining tests fared weaker compared to the developed standards. Grześkowiak and Wieliński [25] tested women from daily residence using five tests of the SFT. The majority of test results were significantly lower than those of American women. The lower body flexibility test was the only test in which the examined women achieved results similar to the American population. Other results were obtained by Umiastowska and Kupczyk [26], who tested seniors from north-western Poland using the SFT and compared their results in individual age groups to the ranges of American norms. The only tests in which men did not achieve the developed standards was the back scratch and 8 ft up and go tests for age groups 60–64, 65–69 and 70–74 years. Women performed even more favorably, with substandard performances in the back scratch and 8 ft up and go tests from the 60–64 and 60–69 age groups residing in a rehabilitation center. In the remaining samples, the participants obtained performed in the ranges of American standards, and some results exceeded these ranges.

The biological condition of a population can be determined by anthropometric characteristics, including height and weight. Both younger men and younger women were significantly taller than those in the older groups. Body weight is a more labile trait, largely dependent upon eating habits. Our results revealed statistically significant differences in body weight in men. The average BMI of all groups indicated predominantly overweight participants. None of the men or women were underweight. Studies by Ignasiak et al. [20]. Carried out in a group of men confirm these tendencies. Similar results were obtained by Svozilova et al. [27]. The examined women had an average age of 66.6 years had a BMI of 27.1 kg/m^2, which indicates overweight.

Younger participants of the current study, despite a greater percentage of overweight and obese people, achieved better results in the SFT. Age is a factor influencing the decrease in the level of functional fitness of seniors. In addition, there are perceptions among scientists that calculating the BMI for the elderly using body height may not be the most accurate body composition measurement method. In the elderly, enlarged thoracic kyphosis and flattening of the intervertebral discs are common. This significantly reduces the height of an elderly person. Calculating the BMI with the use of body height may overestimate an elderly individual's BMI [28]. In this way, underweight people can be considered as having a normal body mass index and people with a normal body structure can be considered overweight. Yilmaz et al. propose the use of arm length instead of body height to calculate the BMI in the elderly [26]. Therefore, more research is needed on the topic of overweight and obesity in older people.

Physical fitness affects not only the musculoskeletal system, but is also related to the condition of the whole body. On the other hand, the body structure is associated with the occurrence of diseases. Thus, both body structure and physical fitness affect the quality of life [29]. Previous research has shown that physical fitness deteriorates with increasing age, especially upper body flexibility, as opposed to lower body flexibility and balance. Thus, the poorer results of the older participants in many of the tests may be a consequence of deteriorating physiological processes. It is worth introducing exercises to improve flexibility as well as balance and coordination exercises to the daily activity of seniors. A large percentage of participants in previously published studies did not meet the standards proposed by the authors of the SFT. The standards were developed for the American population. Due to the social, economic, and cultural differences between the American and Polish population, it seems reasonable to develop Polish standards for the SFT.

Limitations of study

The SFT is designed so that everybody who is able to "independently" move can perform it. However, there are certain limitations of its use. The test might not be used in its complete form in patients with severe damage to the locomotor system and severe balance disturbances, in whom safety reasons prevent the performance of trials requiring locomotion. Limitations in this cross-sectional study include the use of a sample of healthy elderly people. Thus, the findings may not be generalized to older adults with compromised physical abilities. Long term data collections utilizing individuals with a variety of physical and mental status are warranted to better prepare older adults to take full advantage of functional independence as they age. In addition, this study was conducted at two sites by different evaluators.

Practical Implications

The Senior Fitness Test (SFT) is a reliable and valid test of functional fitness. Application of the test allows the assessment of physical fitness level. Evaluation of simple motor tasks used in the test is fast

and easy to interpret, which allows easy presentation of the tasks and results to the patient. This expediency is a very important part of rehabilitation. The use of simple, uncomplicated motor patterns derived from everyday activity enables an indirect determination of parameters of physical fitness, such as: upper body strength and flexibility, lower body strength and flexibility, endurance, motor coordination, and reaction speed. The test is safe for the elderly and easy to perform, not requiring sophisticated devices or a separate room.

Generalizability

The study shows that age is an important factor in reducing the level of functional fitness of older adults. The level of physical fitness of seniors decreases with age. The SFT is a good tool to assess the functional fitness of seniors in Poland.

Conclusions

1. The younger group in both sexes is characterized by higher parameters of body structure.
2. Age is an important factor that reduces physical fitness in seniors.
3. The vast majority of the examined women and men did not meet American standards. Due to the social, economic and cultural differences between American and Polish society, it seems reasonable to develop Polish standards for the SFT.

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MEDICATION AND DIET ADHERENCE IN PATIENTS WITH TYPE 2 DIABETES AND DEPRESSIVE DISORDER: A SCOPING REVIEW

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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

Diet adherence (DA) is one of the most critical factors that determine the effectiveness of therapy among patients with type 2 diabetes mellitus (T2DM). Concomitant depressive disorder (DD) may affect treatment adherence.

This review aimed to synthesize the results of research published between 2010–2020 on medication adherence and DA among patients with co-occurring T2DM and DD. Potential factors related to DA are also discussed.

This scoping review was conducted on studies published between January 2010 to November 2020. The literature review was carried out using the PubMed (MEDLINE®) medical database. The following inclusion criteria were applied: (1) written in English, (2) published in the last ten years (between 2010 and 2020), (3) applied to patients with diagnosed T2DM and DD, (4) analyzed DA, and (5) original or review studies.

Twenty-six studies were included in the final review. Three main areas were analyzed in the context of DD and effectiveness of T2DM therapy: (1) general medication adherence, (2) glycemic control, and (3) DA. Only 16 of the 26 included studies examined the effects of DD on DA, and 14 of those 16 studies reported a negative impact of DD symptoms on DA.

A higher intensity of DD symptoms was associated with poorer medication adherence and DA. These data suggest that it is critical to develop proper therapeutic interventions that can strengthen personality dispositions (e.g., self-efficacy) and/or improve social support.

KEYWORDS: depression, diabetes mellitus type 2, medication adherence, diet

Background

Depressive disorder (DD) is among the most common mental disorders in patients with type 2 diabetes mellitus (T2DM). Co-occurring DD and T2DM may negatively affect treatment effectiveness, which is directly related to lifestyle changes [1]. These negative impacts may arise from mental stress and the experience of negative emotions, which may become a real barrier during treatment. Furthermore, common symptoms of depression, including decreased energy, changes in thinking, appetite changes, disrupted sleep, or suicidality [2], can negatively impact the patient's mental condition, and consequently their adherence [1].

Adherence to treatment and lifestyle changes is especially important in the context of medical recommendations for T2DM patients. Medical recommendations for T2DM often include a good-quality diet, an appropriate level of physical activity, medication self-administration (e.g., glucose-lowering medication), blood glucose monitoring, foot care, and glycemic control [3]. Pharmacotherapy should also be considered as a medical recommendation. One study suggests that the type of pharmacotherapy prescribed plays a role in medication adherence. In particular, patients prescribed insulin as initial pharmacotherapy were less likely to continue on medication than those who were initially prescribed oral agents [4].

Co-occurring DD and T2DM is prevalent. According to epidemiological studies, approximately 18–25% of patients with T2DM also suffer from DD [1]. The rela-

tive risk of DD occurrence among patients with T2DM is estimated to be 1.49 (95% CI = 1.29–1.72, p < .001), which is much higher than rates estimated in the general population [5]. Similar data were obtained among Polish patients with T2DM. Indeed, the relative risk of DD occurrence among Polish patients is an estimated 1.35 [95% CI = 1.34–1.35] [6].

The direction of the relationship between T2DM and DD is difficult to determine. At present, research suggests that there is a bidirectional causal relationship between T2DM and DD. Indeed, DD may promote the occurrence of T2DM and conversely, the mental burden and stress related to diabetes may contribute to the development of DD [7]. It has been suggested that DD may be a risk factor for the development of diabetes. This risk may be due, in part, to biochemical changes associated with depression and because of a reduction of health care behaviors among individuals with depression (e.g.,. poor sleep, lack of physical exercise, poor diet) [1]. Moreover, long-term antidepressant treatment among nondiabetic depressed patients has been shown to have a negative effect on insulin sensitivity. Chronic antidepressant use is significantly associated with diabetes risk, which may be related to the higher incidence of T2DM among those with DD. It is important to examine the potential negative effects of antidepressant drugs on glycemic control, and develop approaches to minimize these negative effects [1,7,8]. Despite a lack of unambiguous determination of the cause-and-effect relationship, a long duration of diabetes is thought to be a risk factor for DD. That is, the longer that a patient suffers from T2DM, the more likely he/she is to develop depression [1].

The problem of co-occurring T2DM and DD poses a significant challenge for effective treatment, because the therapy must include the close cooperation of a diabetologist with a psychiatrist, and dietician, as well as, a psychologist and psychotherapist, if necessary [8]. Therefore, it is vital to develop effective strategies of therapeutic work for patients with TD2M and DD. The summary of the current scientific findings on the effects of DD on medication adherence, including but not limited to diet adherence (DA), may be helpful for developing effective therapeutic approaches. A prior systematic review by Sumlin et al. [3] included a summary of results on the effects of DD on medication adherence. Twenty out of the 27 studies included in the review by Sumlin et al. covered research published prior to 2010. Given the recent research and new approaches to behavioral therapy in diabetes (e.g., based on recommendations of scientific associations [9]), it seems justified to review studies published in the last decade. Examining the impact of DD symptoms on medication adherence, including DA, may unveil factors that can potentially mitigate the association between DD and T2DM. Identifying factors that can potentially protect against the development of DD and/or T2DM is particularly important. These topics were not included by the review by Sumlin et al. [3].

Aim of the study

This review aimed to synthesize the results of research published between 2010–2020 on medication adherence and DA among patients with co-occurring T2DM and DD. Potential factors related to DA are also discussed. The following research questions were formulated:

Research Question 1: What is the impact of concomitant DD on medication adherence – particularly adherence to dietary recommendations – among patients with T2DM?

Research Question 2: What are the potential factors that can positively affect DA among patients with co-occurring T2DM and DD?

Material and methods

This study used a scoping review method to evaluate existing data. In other words, this review aimed to characterize a specific phenomenon, identify the definition, and determine the limits. A scoping review is used in situations when a research area has not been comprehensively analyzed or when it cannot be subjected to a systematic review because of its nature [10].

Studies qualified for the review if they met the following inclusion criteria: (1) written in English, (2) published within the last ten years (i.e., between 2010 and 2020, inclusive), (3) applied to patients diagnosed with both T2DM and DD, (4) analyzed DA, and (5) were original or systematic studies. Studies that did not fulfil the aforementioned inclusion criteria were excluded. Studies were also excluded if the study did not specify the type of diabetes examined in the study. Patients with other types of diabetes (e.g., MODA, LADA, type 1 diabetes, gestational diabetes) were excluded from the present review.

We performed a search of the PubMed/MEDLINE® database to identify articles. Tab. 1 shows the keywords

Table 1. Keywords used in the literature search.

#1	(adherence[MeSH Terms]) OR (diet[MeSH Terms]) OR (adherence, medication[MeSH Terms]) OR (adherence[Text Word]) OR (diet adherence[Text Word]) OR (medication adherence[Text Word]) OR (diet adherence[Title]) OR (medication adherence[Title])
#2	(type 2 diabetes mellitus[MeSH Terms]) OR (type 2 diabetes[Text Word])
#3	(major depressive disorder[MeSH Terms] OR (major depressive disorder[Text Word])
#4	(adherence[MeSH Terms]) OR (diet[MeSH Terms]) OR (adherence, medication[MeSH Terms]) OR (adherence[Text Word]) OR (diet adherence[Text Word]) OR (medication adherence[Text Word]) OR (diet adherence[Title]) OR (medication adherence[Title]) AND (type 2 diabetes mellitus[MeSH Terms]) OR (type 2 diabetes[Text Word]) AND ((major depressive disorder[MeSH Terms] OR (major depressive disorder[Text Word]) Filters: in the last 10 year

that were used in this search. The initial search yielded 58 records, which were subsequently submitted to title and abstract screening. Thirty of the 58 initial studies met initial inclusion criteria and were submitted to full text review. Following full text review, four studies were excluded from the review because they were out of scope (i.e., not about depression among patients with diabetes, n = 3) or were a protocol of an ongoing study (n = 1). Twenty-six studies were included in the final review, and heterogeneity of the final 26 studies was evaluated based on study outcomes. An aggregative narrative synthesis of the included studies was performed (Fig. 1).

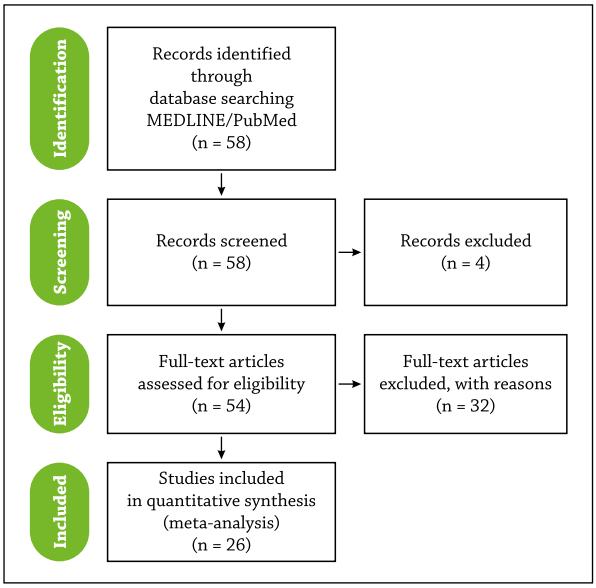

Figure 1. Flow Diagram.

Results

Twenty-six studies were included in the final review, including 20 cross-sectional studies, two mixed methods studies, one longitudinal study, one clinical trial, one review, and one randomized controlled trial. We analyzed the content of the included 26 studies, and identified three main thematic areas in reference to DD and T2DM treatment effectiveness: (1) general medication adherence (results shown in Tab. 2), (2) diet adherence (Tab. 3), and (3) potential factors related to diet adherence (Tab. 4).

Medication adherence among patients with T2DM and DD

The topic of medication adherence was covered by 14 of the 26 included studies (Tab. 1). One study was longitudinal in design and the remaining 13 were cross-sectional. Twelve studies reported a negative impact of DD on medication adherence, and three studies reported a negative role of diabetes distress on medication adherence. Four studies reported a negative relationship between DD and glycemic control. However, one study emphasized that there was no evidence that depression reciprocally influenced glycemic control.

Diet adherence among patients with T2DM and DD

Only 16 out of the included 26 studies examined the impact of emotional state (e.g., depression and/or disease-related stress) on DA (Table 2). Notably, 14 studies showed a negative impact of DD symptoms on DA, and one study showed no significant association between DD and DA. However, the authors of that study emphasized that they did not use an effective measure of the diet quality, which may have contributed to the null findings. One study reported on the effectiveness of the implemented intervention, which resulted in an improvement in DA and a reduction in DD symptoms.

Several studies examined factors that may improve DA among patients with diabetes, including self-efficacy (3 studies), social support (6 studies), and stress management (1 study). One study emphasized the effectiveness of implementing individual interventions based on motivational interviewing, and two studies emphasized the importance positive psychology. One study examined the role of affective temperaments in the context of DA, which remains unclear. One study reported a negative impact of diabetes fatalism on medication adherence among patients with T2DM.

Discussion

The present review found that DD can negatively impact medication adherence among T2DM patients. For example, the included studies report that DD is associated with diabetes-specific distress, which can subsequently impact medication adherence and glycemic control [11–16]. A higher intensity of negative emotions and/or stress has implications for self-management behaviors among patients with T2DM [11, 12, 17–19]. Indeed, several studies report that stress and negative emotions are associated with poorer adherence to dietary recommendations [19–22], poorer self-monitoring of blood glucose [20–23], and lower ability to meet an adequate level of physical activity [21]. These results indicate that comorbid DD and T2DM can negatively impact the effectiveness of therapy. In addition, studies show that comorbid DD and T2DM has a negative impact on the psychological functioning of patients, and can also impact side effect of some drugs used in the treatment of mood disorders [1,3,7,8]. Although it is not easy to determine the cause-effect relationship between DD and T2DM, future interventions should aim to increase the effectiveness of therapy. It should be noted that the therapy of patients with T2DM is complex and applies not only to medication adherence, but also to lifestyle modification. In the context of lifestyle modifications, DA is important to assess.

Our literature review revealed a negative impact of DD on DA among patients with T2DM. The majority of the included studies confirmed this relationship [13, 15–19,23,25–30]. However, null findings have also been reported [24]. However, the authors of

Table 2. Studies examining the impact of DD on medication adherence among patients with T2DM.

Author	Study design	Aim	Subjects	Results
Aikens [12]	Cross-sectional and longitudinal analyses	To link depressive symptoms and diabetes-related distress to diabetes self-management.	253 patients with T2DM	Depressive symptoms predicted lifestyle-oriented self-management behaviors. Diabetes-specific distress may impact subsequent medication adherence and glycemic control.
Al-Amer et al. [19]	Cross-sectional study	To examine the relationship between depression and blood sugar control.	649 patients with diabetes (581 with T2DM)	Following eating plans as recommended by dietitians and blood sugar testing were the main barriers for adherence and were associated with developing depression.
Belvederi Murri et al. [24]	Cross-sectional study	To examine the link between depressive symptoms and glycemic control.	279 patients (197 with T2DM)	Glycemic control affects the severity of depression by increasing diabetes-related distress, but there was no evidence that depression reciprocally influenced glycemic control.
Ellouze et al. [23]	Cross-sectional study	To evaluate the impact of depression on glycemic control and treatment adherence.	100 patients with T2DM	There was an association between depression and poor glycemic control. People with both depression and T2DM had poor treatment adherence more often than T2DM patients without depression.
Franks et al. [20]	Longitudinal study	To investigate patients' difficulties in managing their diet.	115 couples (a patient with T2DM and his/her partner (i.e., spouse) without diabetes	Patients' diet setbacks were associated with a short-term increase in their diabetes distress (over six months). Patients' diet setbacks were not related to long-term change in diabetes distress. Moreover, diet setbacks were not associated with a change in the patients' depressive symptoms at either time point.
Hernandez et al. [21]	Cross-sectional study	To examine the relationship between depressive symptoms and diabetes self-care.	250 patients with T2DM	Depressive symptoms were significantly associated with the general self-care, as well as specific self-care domains including diet, physical activity, and glucose monitoring.
Hoogendoorn et al. [14]	Cross-sectional study	To examine whether depression symptoms, diabetes distress, and well-being predict a diabetes self-care.	627 patients with T2DM	Psychological distress predicted insufficient diabetes self-care and fully accounted for the effects of depression and diabetes distress.
Johnson et al. [13]	Cross-sectional study	To examine the association of depressive symptoms and diabetes-related distress with diet adherence.	2,040 patients with T2DM	Distress and depressive symptoms were associated with poorer self-management behaviors among adults with T2DM.
Kim et al. [15]	Cross-sectional study	To examine the mediating role of social support on the relationship between depressive symptoms and medication adherence and self-care activities.	311 patients with T2DM	Patients with depressive symptoms had lower scores in medication adherence and self-care activities as compared to patients without depressive symptoms.
Osborn et al. [16]	Cross-sectional study	To examine the impact of stressors on diabetes self-care.	314 patients with T2DM	Depressive symptoms significantly predicted lower medication adherence.
Rahman et al. [22]	Cross-sectional study	To examine the potential modifiable factors involved in the association between low socioeconomic status and poor glycemic control.	500 patients with T2DM	Non-adherence to medication and diet; existing comorbidities, such as depressive symptoms mediated the relationship between social adversity and poor glycemic control.
Smith et al. [18]	Cross-sectional study	To characterize the relationship between elevated depression and anxiety symptoms with indicators of self-care and health.	1,990 patients with T2DM	Patients with elevated anxiety and/or depression symptoms were less likely to report adhering to self-care recommendations as compared to patients with lower symptoms.
Walker et al. [11]	Cross-sectional study	To investigate the determinants of health and diabetes outcomes.	615 patients with T2DM	Significant associations for self-care were observed between (1) medication adherence and diabetes distress, (2) medication adherence and perceived stress, (3) exercise and depression, and (4) exercise and self-efficacy.
Zhang et al. [17]	Cross-sectional study	To examine the association between depression and glycemic control, and the potential mediating factors among patients with T2DM.	2,538 patients with T2DM	Patients with depression reported lower medication adherence score than patients without depression.

Table 3. Studies examining the impact of DD on DA among patients with T2DM.

Author/Date	Study design	Aim	Subjects	Results
Aikens [12]	Cross-sectional and longitudinal analyses	To link depressive symptoms and diabetes-related distress to diabetes self-management and/or glycemic control.	253 patients with T2DM	Depressive symptoms predicted lifestyle-oriented self-management behaviors, such as diet, six months later. Diabetes-specific distress may impact subsequent medication adherence and glycemic control.
Al-Amer et al. [19]	Cross-sectional study	To examine the relationship between depression and blood sugar control.	649 patients with diabetes (581 with T2DM)	Among patients with diabetes, depression was associated with poorer adherence to dietary plans recommended by dietitians and lower ability to self-monitor blood glucose.
Anderson et al. [25]	Cross-sectional study	To determine whether specific stressors were associated with DA among patients with T2DM.	117 married couples in which one partner was diagnosed with T2DM	The patients' DA was negatively correlated with the patients' and spouses' diabetes-specific stress and depression symptoms. DA was also negatively correlated with the patient's chronic stress and comorbidities.
Bell et al. [26]	Cross-sectional study	To assess the association between depressive symptoms and diabetes self-management regimens.	696 patients with T2DM	Poor health outcomes associated with depression among persons with diabetes may be related to difficulties in DA.
Belvederi Murri et al. [24]	Cross-sectional study	To examine the link between depressive symptoms and glycemic control in the context of selected mediators.	279 patients (197 with T2DM)	There was no definite evidence of depression influencing HBA1C through the changes in adherence, appetite, and alcohol intake. However, this study lacked objective measures of diet.
Castillo et al. [27]	Mixed methods	To evaluate the effectiveness of a diabetes education program in improving glycemic control and self-management skills among patients with T2DM.	70 patients with T2DM	The program was associated with significant improvements in carbohydrates spacing, following a healthy eating plan, and eating fruits and vegetables. Depressive symptoms showed a positive trend in the intent-to-treat analysis.
Ellouze et al. [23]	Cross-sectional study	To evaluate the impact of depression on glycemic control and treatment adherence.	100 patients with T2DM	Patients with depression and T2DM had less balanced diets than T2DM patients without depression. There were no differences in alcohol consumption between groups (i.e., T2DM patients with vs. without depression).
Fisher et al. [28]	Cross-sectional study	To replicate prior findings showing that diabetes distress is related to glycemic control and self-management.	463 patients with T2DM	Poor diet and poor medication adherence were each associated with high diabetes distress and high clinical depression.
Hernandez et al. [21]	Cross-sectional study	To examine the relationship between depressive symptoms and diabetes self-care.	250 patients with T2DM	Depressive symptoms were significantly associated with poor DA.
Johnson et al. [13]	Cross-sectional study	To examine the impact of depressive symptoms and diabetes-related distress on DA.	2,040 patients with T2DM	Patients with depressive symptoms alone, diabetes-related distress alone or both depressive symptoms and diabetes-related distress were characterized by lower adherence to the recommended dietary behaviors as compared to the control group.
Kim et al. [15]	Cross-sectional study	To examine the mediating role of social support on the relationship between depressive symptoms and medication adherence and self-care activities.	311 patients with T2DM	Patients with depressive symptoms had higher scores in self-care activities related to diet than patients without depressive symptoms.
Naicker et al. [29]	Cross-sectional study	To determine whether symptoms of depression and anxiety are associated with self-management behaviors among patients with T2DM.	2,035 patients with T2DM	Comorbid anxious-depressive symptoms were associated with a three-fold increase in the odds of feeling that DA is problematic. Depression was associated with a lower likelihood of avoiding saturated fats. Anxiety was associated with increased odds of eating vegetables in women, and an over two-fold increase in feeling that suffering from diabetes is a challenging experience across both men and women .
Osborn et al. [16]	Cross-sectional study	To examine the impact of stressors on diabetes self-care.	314 patients with T2DM	Depressive symptoms were significantly associated with lower adherence to the general diet. The experience of a higher number of stressors was associated with lower diet adherence.
Smith et al. [18]	Cross-sectional study	To characterize the impact of elevated depression and anxiety symptoms on indicators of self-care and health.	1,990 patients with T2DM	Patients with elevated anxiety and/or depressive symptoms more frequently reported poorer adherence to dietary recommendations as compared to patients without symptoms of anxiety or depression. These associations remained significant after controlling for potential confounders.
Zhang et al. [17]	Cross-sectional study	To examine the associations between depression and glycemic control, and the impact of potential mediating factors.	2,538 patients with T2DM	Patients with depression reported lower adherence to the recommended diet than patients without depression.
Zuberi et al. [30]	Cross-sectional study	To assess associations between depression and self-care activities.	286 patients with T2DM	Depression was associated with low dietary restrictions.

Table 4. Study examining potential factors that relate to DA.

Author	Study design	Aim	Subjects	Intervention	Results
Anderson et al. [25]	Cross-sectional study	To determine whether specific stressors are associated with DA among patients with T2DM.	117 married couples in which one partner was diagnosed with T2DM	No	DA was positively correlated with patients' and spouses' diabetes self-efficacy. Patients' and spouses' diabetes self-efficacy was, in turn, negatively correlated with their depressive symptoms, chronic stress, and diabetes-specific stress.
Belvederi Murri et al. [24]	Cross-sectional study	To examine the link between depressive symptoms and glycemic control.	279 patients (197 with T2DM)	No	Affective temperaments influenced stress sensitivity and medication adherence. Patients with an affective temperament demonstrated a stronger impact of physical comorbidity and diabetes-related distress on depression. Patients with an affective temperament were also characterized by a weaker influence of depression on medication non-adherence.
Döbler et al. [31]	Randomized controlled trial	To evaluate the effectiveness of a telephone-delivered intervention to address behavior changes, emotional status, and glycemic control among patients with T2DM.	249 patients with T2DM	Yes, 12-month telephone follow-up support group	Motivational interviewing techniques and focusing on personalized action planning demonstrated improvements in the patients' activity level and health status.
DuBois et al. [32]	Clinical trial	To assess the feasibility of a positive psychological intervention and evaluate the short-term impact among adults with T2DM.	15 patients with T2DM	Yes, telephone-based, 12-week positive psychology intervention	Post-intervention scores on psychological measures (i.e., optimism, gratitude, depression, anxiety, and distress) were all improved as compared to preintervention, with a small-moderate effect.
Franks et al. [20]	Longitudinal study	To investigate patients' difficulties in managing their diet.	115 couples, including a patient with T2DM and his/her partner (i.e., spouse) without diabetes living in the same household	No	The emotional sequelae of challenges in sustaining a healthy diet can reach beyond the ill partner and affect the spouse. Spouses' perceptions of the patients' diet setbacks were associated with an increase in diabetes distress at both time points (i.e., over six months and one year), and also with a longer-term increase in their depressive symptoms (i.e., over one year).
Gupta et al. [33]	Review	To evaluate the role of the partner and family support in diabetes management.	66 articles, which included 33 original works, 21 review articles and 12 systematic reviews and meta-analysis	No	The support of family and spouse/partner is beneficial to improve the adherence to lifestyle interventions and pharmacotherapy.
Ji et al. [34]	Cross-sectional study	To examine the effects of selected factors on self-management behavior, glycemic control, and metabolic syndrome among patients with T2DM.	207 patients with T2DM	No	Self-efficacy and support were significantly associated with all examined self-management behaviors.
Kim et al. [15]	Cross-sectional study	To examine the potential mediating role of social support in the associations among depressive symptoms, medication adherence, and self-care activities.	311 patients with T2DM	No	Patients without depressive symptoms showed higher scores in social support and also managed stress better than patients with depressive symptoms. Moreover, social support mediated the relationship between depressive symptoms and medication adherence, and between depressive symptoms and self-care activities.
Pereira et al. [35]	Cross-sectional study	To examine potential variables associated with self-care among patients and their partners.	104 patients with T2DM	No	Patients with more positive support and patients and partners with less psychological morbidity presented with higher DA. Adherence to glucose monitoring was associated with positive support reported by patients, and with positive and negative social support reported by partners.
Schneider et al. [36]	Randomized controlled trial	To test the feasibility of a group exercise program enhanced with behavioral activation strategies among women with comorbid T2DM and depression.	60 patients with T2DM and depression	38 behavioral activation-enhanced group exercise classes over 24 weeks	A novel intervention that combines exercise with behavioral activation strategies may improve glycemic control and mood among women with comorbid type 2 diabetes and depression.
Walker et al. [37]	Cross-sectional study	To examine the link between diabetes fatalism and medication adherence among patients with T2DM.	378 patients with T2DM	No	Diabetes fatalism is associated with poor medication adherence and poor self-care.
Walker et al. [10]	Cross-sectional study	To investigate the impact of health determinants on diabetes outcomes.	615 patients with T2DM	No	Psychological factors, specifically self-efficacy and perceived stress, were most often associated with self-care and quality of life among patients with T2DM. Social support is also essential.

the Belvederi Murri et al. [24] study emphasized that they did not use objective measures of diet. The Belvederi Murri et al. study also analyzed changes in appetite and alcohol intake.

With respect to the relationship between DD and adherence of T2DM patients, it is difficult to assess which came first (i.e., DD or T2DM). That is, it is difficult to differentiate between the cause and the effect. On the one hand, failure to adhere to dietary recommendations by patients with T2DM may contribute to the development of DD [7]. On the other hand, symptoms of depressed mood may affect adherence to dietary recommendations, and psychiatric drugs may impair carbohydrate metabolism [8]. The available literature does not allow for a conclusive opinion on this topic.

Our literature revealed that the available data are based almost entirely upon cross-sectional studies. Only one study used a longitudinal design to examine the relationship between DD and DA among patients with T2DM over a longer period of time [12]. In that study, the impact of DD symptoms on DA was only evident after a longer period of time (i.e., after six months), and rather than in the short-term [12]. However, it should be noted that 49% of the T2DM patients in that study reported no DD symptoms, and only 6% of the patients reported a severe intensity of DD symptoms [12].

Studies that evaluate DA used a variety of measurement tools. Some researchers use standardized questionnaires, for e.g., the Summary of Diabetes Self-Care Activities (SDSCA) scale [11], which is a brief self-report questionnaire of diabetes self-management. The SDSCA includes items that assess the following aspects of the diabetes regimen: general diet, specific diet, exercise, blood-glucose testing, foot care, and smoking. Some studies directly asked patients to subjectively assess their eating behaviors over the last month (excellent/very good/good/fair/poor) [18]. Other studies included an analysis of the frequency of consumption of vegetables and saturated fats [29]. Such a diversified approach to examining adherence to dietary recommendations entails a significant risk of error, which needs to be interpreted carefully. Moreover, with the available data, it is not currently possible to conduct a thorough assessment of the diet recommendations that pose the most significant difficulty for the patients.

This review examined potential factors that can improve the effectiveness of medication adherence, including DA, among patients with T2DM. It should be noted that not all of the studies examined T2DM patients with co-occurring depressed mood symptoms. One of the factors discussed in this area is self-efficacy (SE). Researchers discovered that SE may a substantial impact on self-care in T2DM, whereas social support can affect patients' quality of life [11]. The literature emphasizes the critical role of self-efficacy in medication adherence and implementation of positive lifestyle changes [38]. Therefore, interventions that aim to improve DA among patients with co-occurring T2DM and DD should also aim to strength self-efficacy given that higher self-efficacy has been associated with better self-care among patients with T2DM [39].

Interventions that aim to improve DA among patients with co-occurring T2DM and DD may be most effective when social support is also high. Indeed, studies by Walker et al. [11], Franks et al. [20], Gupta et al. [33], Kim et al. [15], and Pereira et al. [35] highlighted the key role of social support in strengthening medication adherence. These researchers emphasized the critical impact of social support (e.g., provided by the partners of persons suffering from T2DM) on the effectiveness of therapy. It should be noted that social support has a particular meaning in the context of patients with T2DM and DD, because it is important in helping with cope with the disease and to improve adherence to treatment.

Our literature review identified several publications that examined the impact of motivational interviewing [31] and positive psychology [32] on medication adherence. These studies highlight the possibility of using psychotherapeutic approaches among patients with co-occurring T2DM and DD in particular, given that prior studies suggest that motivational interviewing may be helpful for patients suffering from depression [40], and for identifying poor eating behaviors [41].

Although one study examined the role of affective temperaments in DA [24], the role of this personality trait in DA among T2DM patients remains unclear and requires a more thorough analysis. As noted by the study authors, objective measures of diet were not included in the study and the study sample included patients with T2DM and type I diabetes [24]. Affective temperament is interesting among patients with co-occurring because affective temperaments can lead to mental adaptations to the disease, as well as strategies of coping with stress. Mental adaptations and coping strategies are crucial factors that may increase risk of DD symptoms.

We identified one study [37] that examined the impact of diabetes fatalism on the effectiveness of T2DM therapy. This study reported that diabetes fatalism can have a negative impact on medication adherence among patients with diabetes. Diabetes fatalism is therefore a mental trait that can affect adherence to medication, for e.g., taking drugs and engaging in health-promoting behaviors. Moreover, diabetes fatalism is thought to be a construct that is independent of DD and is associated with a fatalistic approach to one's disease and treatment process. The researchers of the study [37] reported lower glycemic control among T2DM patients with a higher intensity of diabetes fatalism as compared to patients with lower diabetes fatalism. Communicating the adequate and customized information on T2DM and treatment strategies may be helpful for reducing the negative approach to one's disease, thereby reducing diabetes fatalism.

Limitations of the study

The limitations of the studies included in this review should be noted. In particular, there were a limited num-

ber of longitudinal studies. The majority of reviewed studies were cross-sectional in design, which allows for the evaluation of the relationship between depression and DA among patients with T2DM at a specific time point. This cross-sectional design precludes an assessment of cause and effect. Another major limitation is the diverse methodology used to assess DA. Indeed, some researchers used a more or less comprehensive objective measurement tool while others relied upon the patients' subjective assessments of their own eating behaviors, or selected dietary aspects (e.g., appetite changes, alcohol consumption). Another important limitation is the diversity in DD measurement tools and variability in intensity of DD symptoms across patient groups. Indeed, in some study groups, half of the participants did not report DD symptoms. Of note, some of the included studies focused only on patients with T2DM, while other studies also included perspectives of the patients' partners and/or spouses. Another important limitation of this review relates to the selection of studies. The study inclusion criteria did not account for whether the DD or the T2DM came first, which may impact the results. Therefore, future reviews should examine this factor.

It should be noted that a relatively limited number of studies examined DA among patients with co-occurring T2DM and depression. This topic, therefore, requires a more detailed analysis, including longitudinal studies, and an analysis of potential positive mediating factors. Such research may help to inform the development of more therapeutic interventions and support for patients, including their family, friends and close relationships.

Conclusions

Co-occurring DD and T2DM can have a negative impact on medication adherence and DA, with a higher intensity of DD associated with poorer adherence to medications and dietary recommendations. Therefore, T2DM with high DD symptoms should be identified in clinical practice, as these patients are at increased risk of poor medication adherence and DA. Moreover, effective therapeutic interventions are needed to improve adherence to medications and dietary recommendations among patients with co-occurring DD and T2DM. Results of the present review suggest that certain factors, including personality dispositions and adequate social support, can have a positive impact on medication adherence and DA. Therefore, these factors may be significant for developing effective interventions.

Future studies that examine DA among patients with co-occurring T2DM and DD should utilize a longitudinal design, given that the majority of available studies are cross-sectional in nature. In future studies, it will also be critical to develop standardized approaches to identifying groups for the co-occurrence and aggravation of DD symptoms. Estimating the frequency of concomitant DD with highly intensified symptoms in patients with T2DM will be important.

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PREGNANT WOMAN WITH CIRCUMVALLATE PLACENTA AND SUSPECTED FETAL HYPOTROPHY CAUSED BY PLACENTAL INSUFFICIENCY: A CASE REPORT

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ABSTRACT

Background: The circumvallate placenta is a rare pathology of the human placenta that occurs in 1–2% of pregnancies. It is characterized by extrachorial placental development, resulting in a ring formation along the edges of the placenta, which leads to efficiency impairment. As a consequence, it causes an intrauterine fetal hypotrophy. The fetal hypotrophic pregnancies are classified as high-risk pregnancies, requiring not only intensive monitoring of fetal development but also maternal and fetal care by the highest reference clinical center.

Aim of the study: The aim of this study was to analyze the case of a patient with circumvallate placenta and fetal hypotrophy suspicion.

Material and methods: The study was based on the case study method. The data was obtained by analyzing medical documentation collected during hospitalization. The patient was interviewed and observed. All of the selected parameters were measured and scaled.

Case report: A 30-year-old primiparous woman at 38+1 weeks gestation, with diagnosed circumvallate placenta and suspected fetal hypotrophy. The pregnancy had several complications, including gestational hypothyroidism. There was spotting and imminent abortion in the first trimester and in the second and third trimester, the patient was treated for vaginal mycosis. There was a risk of preterm labor in the third trimester. The patient was admitted to the delivery room in the first stage of labor. The course of first stage of labor was normal however the second stage of labor was complicated. Obstructed labor with ace presentation, mentoposterior position. A lower uterine segment cesarean section (LUSCS) was performed and a live full-term female infant was delivered, which was found to be small for gestational age (SGA). The course of the early puerperium was uncomplicated with an expected duration of stay in the neonatology department. Both mother and baby were discharged from hospital on postpartum day 3.

Conclusions: Circumvallate placenta is not a contraindication to natural delivery however is associated with an increased risk of many perinatal complications. Holistic care during delivery and the early puerperium requires specialized knowledge and skills of medical staff in taking care of both of the mother and the child.

KEYWORDS: circumvallate placenta, fetal hypotrophy, small for gestational age, case study

Background

The human placenta is a highly specialized maternal and fetal organ that is formed during pregnancy allowing the growth and development of the fetus. It performs many important functions and without it, the development of the fetus in the uterus would be impossible [1].

Circumvallate placenta is a rare pathology of the human placenta that occurs in 1–2 % of pregnancies [2]. Circumvallate placenta is a type of extrachorial placenta, where the membranes of the chorion located at a distance from the edge of the placenta. Changes related to the deviation from the norms in the shape of the placenta leads to placental insufficiency and

adversely affects the development of the fetus. The ring forming the rounded placental margin significantly reduces the total surface of the chorion [3]. Circumvallate placenta is clinically important, which is a challenge for staff, who care for a pregnant women as it is often associated with a high frequency of serious perinatal complications. Only a few cases of this type of extrachorial placenta in the history of perinatal medicine have been described so far. Establishing the correct and unequivocal diagnosis of circumvallate placenta during pregnancy is difficult even for specialists, and the detection of placental pathology usually occurs only when the placenta is examined after delivery [3]. The etiology of the development of circumvallate placenta is not fully understood. There are two main theories for the development of this pathology. The first theory concerns the fusion of the amniotic sac with the decidua at an early stage of pregnancy, which leads to the formation of adhesions. The second theory seems to be particularly important and is reflected in the background of the research carried out so far. It suggests an excessive, too deep implantation of a fertilized egg in endometrium [2].

Circumvallate placenta is more common in primigravida women, those over the age of 35 years of age, and women who have received treatment for infertility such as in vitro procedure [4]. A typical circumvallate placenta contains a small area of extant chorion frondosum and a visible, wide white fibrin ring located at the periphery of the placenta [3]. Placental pathology can be diagnosed using 2D, 3D or HDLive ultrasound techniques [5]. Ultrasound scan shows the uplifted placental edge with an irregular structure, additionally there is a surrounding ring. Subchorionic hematomas and numerous vacuoles may also be visible [6]. Clinical signs during pregnancy that may suggest the presence of a circumvallate placenta include recurrent vaginal bleeding in the first and second trimester, the presence of subchorionic hematomas on placental imaging, oligohydramnios, premature rupture of membranes (PROM), placental abruption, placental insufficiency, fetal hypotrophy, IUGR, and an SGA fetus. Diagnosis of circumvallate placenta classifies is associated with the classification of pregnancy as high risk, with a high risk of preterm labor and complications in the infant due to prematurity [7].

IUGR is defined by the World Health Organization (WHO) as a fetus with an estimated birth weight of less than the 10th percentile for its gestational age [8]. Hypotrophic newborns also include small but healthy infants whose body weight and length are genetically determined; termed SGA. IUGR causing fetal hypotrophy may be a result of a combination of maternal factors including inadequate nutritional intake, pregorexia, poor weight gain in pregnancy, prenatal body mass index (BMI) below 20 and prenatal body weight below 45kg or greater than 75kg. Placental factors contributing to IUGR include subchorionic hematoma and placental abruption. Fetal factors include genetically determined small fetal weight, and genetic defects [9]. We pick two forms of hypotrophy out. Early IUGR occurs before 32–34 weeks of pregnancy, including in the second trimester. Late IUGR occurs after 32–34 weeks of pregnancy [10]. Ultrasound examination is considered to be the primary diagnostic method for detecting fetal hypotrophy where there is abnormal fetal growth i.e. fetal weight below the 10th centile for gestation, or in extreme cases, below the 3rd centile [11]. Care of pregnant women with IUGR should be provided by a clinic with the highest reference level.

Aim of the study

The aim of this study was to present a clinical case of a pregnant patient diagnosed with a circumvallate placenta and suspected fetal hypotrophy. This study aimed to analyze how to proceed with circumvallate placenta during pregnancy, labor and the early postpartum period and expand knowledge about the current guidelines regarding optimal care for women with suspected fetal hypotrophy.

Material and methods

This research paper was based on the case study method. The techniques that were used to describe the individual case study were: analysis of medical documentation, interview, and observation of the patient, including recording of vital signs. The patient was admitted to a delivery room in the Obstetrics and Gynecological Department, Subdivision of Perinatology and Delivery, a hospital with 3rd degree of reference. The case analysis was carried out with the patient's consent and with the provision of medical documentation in accordance with the current rules. The patient was assured of the anonymity of the study and the collected information was kept as a confidential data.

Case report

Patient characteristics

The patient was a 30 year old primipara at 38+1 weeks gestation with a singleton pregnancy. On initial presentation the fetus was found to be in a cephalic presentation with a fetal heart rate of 130 beats per minute (BPM). The patient was diagnosed with circumvallate placenta and the fetus was SGA with suspected fetal hypotrophy. The patient, having been diagnosed with gestational hypothyroidism, was euthyroid at presentation. The patient tested positive for group B streptococcus (GBS) and negative for syphilis (via Venereal Diseases Research Laboratory (VDRL) testing), hepatitis B antigen, anti-hepatitis C antibody and HIV. The patient was admitted as an emergency in the first stage labor to the Obstetrics and Gynecological Department, Subdivision of Perinatology.

Past medical history

The patient had been hospitalized seven years prior due to severe mononucleosis and cytomegalovirus infection. Medical history was otherwise unremarkable, with no previous surgical procedures. The patient's height was 172cm, and prenatal body weight was 50kg. Prenatal BMI was calculated at 16.9kg/m^2. The patient was noted to be underweight, and appeared skinny.

Obstetric interview

The patient was 13 years of age at menarche, and had a regular 28-day menstrual cycle, with five days of painful bleeding. There was no prior history of pregnancy, childbirth, or miscarriage. The patient had not undergone any fertility treatments or used assisted reproductive technology.

Socioeconomic interview

The patient was married and living in good housing conditions. Appropriate economic status and material conditions. She obtained a college education and was employed as a teacher in a public kindergarten, carrying out both physical and mental work. There was no use of addictive substances reported (coffee, isotonic drinks, alcohol, nicotine, passive smoker, drugs, or painkillers). The patient was on medical leave from work from the 8th week of pregnancy.

The course of the current pregnancy

The patient engaged with antenatal care from the 5th week of pregnancy, attending antenatal visits as per usual recommendations. At the time of the birth, the patient's body weight was 62.5kg, having gained 12.5kg during the pregnancy. Menstrual bleeding prior to the pregnancy was described as typical. The patient first felt fetal movements at approximately 16 weeks gestation, and continued to observe fetal movements throughout the pregnancy. Fetal descent occurred at the 37th week of pregnancy, manifesting as a reduction in fundal height.

The patient experienced nausea and vomiting between 8 and 10 weeks of pregnancy, which resolved spontaneously. There was no edema noted during the pregnancy or at the time of admission to the delivery room. There were no urinary symptoms described, however the patient complained of constipation, likely due to reduced physical activity, which did not require any invasive diagnostic or therapeutic procedures.

The course of pregnancy was complicated by gestational hypothyroidism which was diagnosed in the 6th week of pregnancy. At this time, thyroid function tests were as follows: thyroid stimulating hormone (TSH) = 3.5mIU/L, free T4 (fT4) = 1.3pmol/L, antithyroid peroxidase antibodies (anti-TPO) = 36.30IU/mL. The patient was treated with Euthyrox at increasing doses: 37.5mg, 50mg, 75mg. At 19+5 weeks, thyroid test results were as follows: TSH = 2.4mIU/L, fT4 = 4.13pmol/L, anti-TPO = 37.00IU/mL and at 27+4 weeks: TSH = 3.38mIU/L, fT4 = 1,=.22pmol/L, fT3 = 2.46pmol/L. Other blood counts were normal throughout pregnancy.

During early pregnancy, between 7 and 11 weeks, there was spotting and imminent miscarriage caused by the presence of subchorionic hematomas. The hematomas were absorbed following treatment with Lutein 100mg 3×2 tablets and Duphaston 10mg 2×2 tablets. This treatment continued until the 15th week of pregnancy.

During the pregnancy, the patient treated for vaginal candida albicans infection using Pimafucin 100mg 1×1 intravaginally, Macmiror Complex 500 (Nifuratel 500mg + Nystatin 200,000IU) 1×1 intravaginally, Pimafucort (Hydrocortisone 30mg + 30mg Natamycin + Neomycin 3,500IU) ointment 15g 2×1 Nystatin VP 100,000IU 1×1 vaginally. Treatment was complete by the 32nd week of pregnancy.

Ultrasound scans with measurements were performed as follows: At 10+5 weeks, crown rump length (CRL) = 3.31cm. At 13+4 weeks, CRL = 6.75cm, biparietal diameter (BPD) = 2.11cm, femur length (FL) = 1.27cm, nuchal translucency (NT) = 1.43mm. At 21+5 weeks, estimated fetal weight (EFW) = 389g, BPD = 4.75, occipitofrontal diameter (OFD) = 6.22cm, abdominal circumference (AC) = 15.77cm, head circumference (HC) = 17.43cm, FL = 3.67cm, amniotic volume index (AVI) = 17.56cm. At 24+6 weeks EFW = 748g, BPD = 6.13cm, OFD = 8.03cm, AC = 20.83cm, HC = 22.33cm, FL = 4.38cm, AVI = 18.52cm. At 28+5 weeks, EFW = 1,066g, BPD = 8.15cm, OFD = 8.69, HC = 24.95cm, AC = 22.78cm, FL = 5.15cm, AVI = 13.47cm. A pathological circumvallate placenta with numerous vacuoles was noted on ultrasound scan at 28+5 weeks. At 33+1 weeks, EFW = 1,760g, BPD = 8.50cm AC = 28.19cm, HC = 30.70cm, FL = 5.79cm AVI = 12.77cm. On the ultrasound performed at 33+1 weeks, fetal hypotrophy and SGA was suspected, with an estimated fetal weight which hovered around the 10th percentile. At the end of pregnancy, fetal weight was around the 10th percentile, with fetal growth potential preserved.

The patient was hospitalized in the department of Pathology of Pregnancy at 35+5 weeks gestation for observation for premature birth. Ultrasound scan on admission showed EFW = 2,010g, BPD = 8.66cm, AC = 33.87cm, FL = 6.98cm, AFI = 10.18cm. Throughout the course of pregnancy, placental blood flow measurements of the uterine artery (UtA), umbilical artery (UA), middle cerebral artery (MCA), and ductus venosus (DV) were normal.

Antenatal care and education were performed by the midwife and an independent obstetrician. Antenatal education was performed online after 25 weeks of pregnancy by the primary care midwife. The patient participated in online antenatal classes with her husband. The patient was well prepared for childbirth and the role of a mother.

Stages of labor

Labor began spontaneously at 38 weeks gestation. The first stage of labor progressed normally and lasted 11 hours. The fetal membranes ruptured at a cervical dilatation of 7 cm. Clean amniotic fluid was noted to drain from the 9th hour of the first stage of labor, 3 hours prior to delivery. Cervical dilatation progressed normally. Cardiotocography (CTG) showed a regular FHR of approximately 145 BPM with normal variability and numerous accelerations. During delivery, continuous cardiotocography with wireless detectors was used. In general, the patient was in good medical and obstetric condition and was motivated to give birth by natural forces. The patient's husband was present during the labor and she tolerated the stay in the delivery room well. The midwife discussed the birth plan with the patient and as per the delivery plan, the patient decided not to use epidural analgesia. The patient was informed of potential symptoms of worsening hypothyroidism and instructed to report these to medical staff. The midwife's care during labor involved frequent assessment of the patients general condition and measuring vital signs. The midwife also frequently checked for the possibility of vaginal bleeding and other symptoms of placental abruption. The midwife assessed the wellbeing of the fetus via CTG recording. The midwife maintained conversation with the patient and her husband to ensure good care during labor, and to enable detection of poor mental state. The midwife promoted privacy and encouraged the patient to use the shower for both hygiene and to take advantage of the relaxing properties of warm water. The patient was encouraged to stay hydrated and regularly empty the bladder. The midwife suggested an upright position that would be appropriate and comfortable for the patient, taking into account her obstetric condition. Entonox (50% N_2O + 50% O_2) was utilized as a form of analgesia.

Pharmacotherapy: Ampicillin 2g in 100mL 0.9% NaCl was administered intravenously according to local protocol due to GBS infection. An initial dose of 2g was followed by 1g every 4 hours until delivery. Oxytocin-Richter 5IU in 50mL 0.9% NaCl was administered intravenously via an infusion pump when contractions were deemed not to be of adequate strength. According to the general and obstetric condition of the patient, the flow of Oxytocin was increased by 1mU/h, to achieve effective contractions. The maximum flow used was 8mU/h. The patient was reassessed every 15–30 minutes. Paracetamol Kabi 10mg/mL, 100mL was administered intravenously for pain relief.

The second stage of labor lasted for one hour and was complicated. The second stage of labor lasted 1 hour. Labor was obstructed. After about 40 minutes of pushing, incorrect position of the fetus was detected. Vaginal examination revealed face presentation, with a mentoposterior position. Due to the malposition, vaginal birth was impossible and the decision was made to deliver the fetus by caesarean section. The midwife prepared for caesarean section by preparing a disposable protective suit for the patient and removing hair from the skin of the perineum and abdomen. The midwife also made sure that the venous cannula was patent, and catheterized the patient's bladder using a Foley catheter (CH16 with the balloon inflated with 5–10mL). The midwife prepared the necessary documentation required for transfer to the operating room. The patient was reassured that caesarean section was the right decision. FHR ranged from 120–130BPM prior to transfer to the operating room. Patient was in good general and obstetric condition on transfer to the operating room. Pharmacotherapy was administered in accordance with routine recommendations for preparation for caesarean section: Intravenous Cefazolinum 1g in 100ml 0.9% NaCl and multielectrolyte fluid 500ml.

A LUSCS was performed and a full-term female newborn was delivered. Apgar scores were 9, 10 and 10 at 1, 5 and 10 minutes, losing 1 point for skin color. Examination of the newborn was performed under a heater. There were no breathing difficulties. Body weight was 2,330g, body length was 49cm, head circumference was 32cm and chest circumference was 30cm. The newborn was dried and the umbilical cord stump was dressed. A pulse oximeter was placed on the right lower limb which gave oxygen saturations of about 98% in the first two hours of life. An umbilical cord blood sample was collected for blood gas analysis in accordance with the hospital's policy on caesarean sections. The newborn was handed to the father under the supervision of a midwife in order to initiate kangaroo care, and then the child was transferred to the neonatal unit. The baby latched on for the first time in the maternity ward, after the mother left the intensive care room following caesarean section, approximately 4 hours after birth.

Midwives regularly assessed the patient's obstetric status, including the amount, character and color of the lochia, as well as the height, location and contraction of the uterine fundus. Due to the presence of the pathological placenta, there was an increased risk of postpartum hemorrhage. The patient's vital signs were regularly measured with all parameters being normal. To minimize the risk of venous thromboembolism, the patient was encouraged to mobilize early and thromboprophylaxis was introduced. The patient was prepared for self-care and childcare.

The midwives in the maternity ward aided the patient with basic hygiene of the baby and alleviated the patient's fears about the small size of the baby. The mother was motivated to exclusively breastfeed and was referred to a lactation care midwife who provided education specific to breastfeeding a newborn with low birth weight and provided guidance on breastfeeding technique. The lactation care midwife worked with the patient and her baby until discharge. The infant remained in the rooming-in maternity unit with the mother. The newborn showed no difficulties in latching onto the breast and was fed regularly on demand. There were no signs of fatigue or low feeding efficiency

observed. The child was calm, and initial weight loss was proportionate to birth weight and maintained physiological norms.

The course of early postpartum proceeded without complications and both the mother and the newborn were discharged from the hospital three days following delivery. On discharge, the newborn weighed 2,275g and was in good general condition. The course of newborn's stay in the Neonatology Department was without complications. Screening tests and Vaccination with hepatitis B were performed. The child received vitamin K 1mg intramuscularly and vitamin D3 400 IU. Care was handed over to the community midwife.

Discussion

The course and therapeutic processes involved in a patient's journey through pregnancy, labor and the puerperium is individually tailored according to the clinical situation, the patient's requirements and the environment. Particular attention is paid to facilitating vaginal delivery and providing the mother with adequate physical and emotional support through specialist medical care. Proceedings during the delivery should be according to the delivery plan prepared by the woman prior to labor where possible. Caring for a woman in the immediate postpartum period is aimed at preserving an uncomplicated puerperal course, ensuring effective lactation, and preparing the mother for child care and self-care after hospitalization. The midwife provides holistic perinatal care and as the person closest to the woman and her baby, is able to quickly recognize and act on any disturbing symptoms.

Circumvallate placenta is a rare placental pathology [4]. There are few qualitative research papers in the literature about such cases, so it is important to detail the clinical aspects of circumvallate placenta during pregnancy, labor and early postpartum to highlight this rare condition to relevant healthcare professionals. So far only a few cases of repetitive circumvallate placenta have been described by perinatal medicine centers worldwide [14].

Current research suggests that a circumvallate placenta may be a risk factor for severe adverse obstetric and neonatal outcomes [15]. Therefore pregnant woman require interdisciplinary care during a pregnancy complicated by a circumvallate placenta, and special attention should be given to the assessment of obstetric condition, particularly the possibility of characteristic vaginal bleeding. If vaginal bleeding does occur, it is important to delineate the amount, character and color of the blood, and if the bleeding is accompanied by lower abdominal pain or uterine contractions. The patient should be thoroughly assessed, including vital signs such as blood pressure and heart rate, and monitored closely for signs of threatened miscarriage, preterm labor or placental abruption which can be life threatening conditions for both the pregnant woman and the fetus. In the described case the patient experienced vaginal bleeding, characteristic for placental pathology during first trimester, indicating threatened miscarriage. The ultrasound image showed subchorionic hematomas and vacuoles at that time. The extravasation of blood, mainly of maternal origin, into the space between the decidua and the chorionic membranes creates subchorionic hematoma and may lead to chorionic abruption, a life threatening condition for the fetus [13]. Hemorrhage and spotting in early pregnancy, as well as the presence of placental hematomas predisposes the neonate to anemia [7].

In this case, symptoms manifesting from the presence of a circumvallate placenta are consistent with those described by the other authors. The patient in this case was deemed to be at risk of preterm labor and required hospitalization at 35 weeks of pregnancy [4].

The limitation of the placental surface which occurs in cases of circumvallate placenta is associated with the failure to achieve fetal growth potential and may lead to fetal hypotrophy [15].

Fetal hypotrophy is a complication of pregnancy associated with a low birth weight of the newborn. IUGR leading to fetal hypotrophy commonly results from a combination of maternal, placental, fetal, and genetic factors. In the care of the pregnant women, the midwife assesses risk factors for fetal hypotrophy. Maternal factors influencing fetal hypotrophy in this case included a prenatal BMI of < 20, poor weight gain in pregnancy and primiparity. Placental factors influencing fetal hypotrophy in this case were the placental pathology and the presence of subchorionic hematomas in early pregnancy [9, 16]. Fetal hypotrophy refers to infants that are below the 10th percentile in weight according to gestational age at birth. This group of fetuses also includes SGA infants who are healthy but small. A fetus identified as an SGA with normal growth potential can be considered a physiologically small child without an increased risk of complications. SGA fetuses are around the 10th percentile, but gain weight appropriately and steadily throughout pregnancy. There is no increased risk of intrauterine death or hemodynamic abnormalities in SGA fetuses compared to IUGR fetuses [10].

The key role in caring for a patient with suspected or diagnosed IUGR is to scrupulously observe symptoms that may indicate poor condition of the fetus. In a patient with a complicated pregnancy where the wellbeing of the fetus may be compromised, CTG monitoring is frequently utilized, depending on the week of pregnancy. IUGR is an indication for keeping CTG records during pregnancy after 24 weeks [17]. This patient had additional CTG recordings performed at her private care obstetrician and did not require hospitalization on any of these occasions.

Time of delivery is a key decision to be made in cases of complicated pregnancies. The decision to deliver the fetus prior the due date should take into account if the risk of death or damage to the fetus as a result of leaving it in the uterus is higher than the risk of complications resulting from prematurity [10]. The decision

to deliver a fetus is taken after a thorough analysis of gestational age and assessment of the health state of the fetus. SGA pregnancies with normal growth potential should be continued until the due date [10]. Vaginal delivery is not contraindicated in these cases. The midwife should provide comprehensive and holistic care for a woman and her husband who are expecting a baby with a low birth weight (< 2,500g). She should give emotional support and explain any doubts based on current medical knowledge. Healthcare professionals should remember the benefits of vaginal birth for both mother and baby and delivery should be vaginally wherever possible [18]. In this case, the patient was prepared for a vaginal delivery.

Infants born as a result of a complicated IUGR pregnancy are at increased risk of perinatal death, meconium aspiration syndrome, pulmonary hypertension, hypothermia, hypoglycemia, hyperglycemia, hypocalcemia, polycythemia, jaundice, feeding difficulties, food intolerance, necrotizing enterocolitis, septicemia and pulmonary hemorrhage. Infants are also at higher risk of neurobehavioral disorders, where children are restless, tearful, and highly alert and sensitive to environmental stimuli [9]. During delivery a neonatal intensive care unit (NICU) team should be available, ready to help the newborn in the first minutes of life, if necessary. A child born from pregnancy where there was a pathological placenta is more likely to have infant respiratory distress syndrome and require hospitalization in the NICU [7]. Hypotrophic newborns may require rapid input from the neonatal team in the first minutes of life, and may require to be admitted to the NICU for further diagnostics. Admission to NICU is associated with preterm labor and prematurity. In the described case, immediate postpartum care was performed according to the usual standards of care for a full-term newborn. The child did not require respiratory support. Pulse oximeter monitoring was used on the right lower limb and demonstrated satisfactory oxygen saturation levels [19]. The satisfactory condition of the newborn allowed the child's father to initiate kangaroo care outside the operating room, whilst the infant's pulse oximetry was observed. Kangaroo care reduces infant's stress related to childbirth and reduces the effects of external stimuli, giving the child a sense of safety and having a positive effect on bonding with the parent. In this case the infant was then admitted to a warmed bed in the neonatal unit as a routine procedure.

In cases where a circumvallate placenta is diagnosed in the antenatal period, fetal growth assessment is performed every month. Where there is a suspicion of IUGR or evidence of abnormal placental blood flow, ultrasound examination is performed weekly, twice a week or even daily, combined with CTG monitoring [15]. This protocol was introduced by the department of obstetrics at Charité university hospital, one of the largest perinatal centers in Berlin and Germany. The described pregnancy required more detailed observation than normal physiological pregnancies and follow-up visits were more therefore more frequent as recommended by the obstetrician.

Different authors have reported that a pregnancy with a pathological circumvallate placenta predisposes the woman to increased bleeding during labor, hemorrhage, and placental abruption, which is a life threatening condition [4, 15]. The aim of care in these cases is to detect disturbing symptoms early, prevent complications, and to make the right decision regarding delivery. There should be increased observation of the woman during labor, including the measurement of vital signs and observation of maternal behavior. Frequent obstetric assessment should be conducted, with special attention paid to any possibility of vaginal bleeding. If bleeding does occur, there should be an accurate assessment of the amount and character of bleeding as well as observation of any symptoms indicative of placental abruption. Symptoms of placental abruption include rapid bleeding and the presence of dark colored blood. Abruption begins with internal bleeding, with external bleeding becoming apparent later. During uterine contraction, bleeding is noted to decrease. Bleeding persists after rupture of the amnion. Other characteristic symptoms include a strong, stabbing pain in the lower abdomen, near to the separating placenta. So far, indications for continuous CTG monitoring during labor include abnormal CTG on admission to hospital, abnormal colored liquor following rupture of membranes, and high risk pregnancies as in the described case [17]. In the case of placental abruption, CTG may show: bradycardia, features of a narrowing, sinusoidal pattern and presence of decelerations. There may also be a characteristic "saw tooth" pattern of frequent and low amplitude uterine contractions. In the woman in labor with placental abruption, symptoms of shock are typically observed. Using wireless CTG detectors enable patient mobility and therefore the patient can benefit from the pain relieving properties of warm water in a shower, as in the aforementioned case. Different positions, such as an upright position, may be used according to the patient's needs. Breathing techniques, relaxation exercises and physiotherapy methods such as massage may also be used. Pharmacological relief of labor pain through inhalation analgesia and intravenous administration of paracetamol are commonly used [18]. In this case, the patient declined epidural analgesia.

The delivery room team should be ready to perform an emergency caesarean section with the patient being prepared as recommended. A circumvallate placenta is not a contraindication to vaginal delivery [3]. However, as a result of perinatal complications, delivery may be expedited by a life-saving caesarean section. In the described case, there were no complications directly caused by pathology of the placenta. The decision to proceed to delivery by caesarean section was not due to placental problems, but due to an obstructed labor and fetal malpresentation.

In the early postpartum period, history of a pathological placenta predisposes to the occurrence of puer-

peral complications, including the increased risk of hemorrhage as other authors point out [3, 4]. The aim of postnatal care therefore is the early detection of abnormalities in the course of the puerperium and the early detection of symptoms that may suggest the occurrence of obstetric hemorrhage. Frequent and regular assessment of the obstetric condition including presence of vaginal bleeding, localization and height of the uterine fundus and estimated uterus size. Monitoring vital signs should be carried out, such as body temperature, blood pressure, heart rate, skin color and mucous membranes, as well as regular assessment of the wellbeing of the patient. In the described case, the early postpartum period proceeded without complications.

In this case the patient was educated in the field of newborn care. There is no variation in care for a low birth weight infant compared with a newborn with higher birth weight. The patient in this case was well prepared for independent care of the child at home after being discharged from hospital.

A further aim of the midwife during the puerperium is also to ensure the proper course of lactation. The correct latching of the baby to the breast is a prerequisite for effective feeding. Correct emptying of the breast and appropriate hygiene of the breast during breastfeeding provide prophylaxis against postpartum mastitis. Supporting the woman during lactation and breastfeeding is particularly important due to the benefits to both mother and child from exclusive breastfeeding. Breastfeeding is the recommended way to feed the baby to facilitate proper development and improve the results of anthropometric measurements according to percentile grids. In this case, the baby latched onto the breast more often than other babies. The child, despite the low birth weight, didn't show any difficulties in latching on to the breast or sucking, and was gaining weight appropriately. The patient was under the care of a certified lactation consultant.

The course of therapeutic processes during delivery and the postpartum period is individually developed according to the clinical situation, the needs of the patient and the environment.

Antenatal education includes the practical and theoretical preparation of the pregnant woman and her family for pregnancy, childbirth, the puerperium and parenthood. This is typically delivered by antenatal classes which play a key role in relieving fear and anxiety related to childbirth and caring for the newborn, and affects the health and wellbeing of mothers and children. Antenatal classes also facilitate the building of good relationships resulting from motherhood and fatherhood [18].

The above mentioned case is clinically important because it is an example of the unfathomable circumvallate placental pathology, which is associated with a higher incidence of serious perinatal complications. This case also highlights the need to preserve the intrauterine wellbeing of the fetus in cases of circumvallate placenta, as even minor neglect may result in miscarriage or fetal death at a subsequent stage of pregnancy.

Conclusions

Pregnancies known to have a circumvallate placenta requires special attention due to the potential for reduced uteroplacental blood flow and placental insufficiency and the subsequent risk of IUGR and fetal death. Particular attention should be paid to performing regular and in depth ultrasound examinations and CTG recordings in these patients.

Observation plays a key role in midwifery care. In caring for a pregnant woman, the midwife is the healthcare professional in constant contact with the patient and is therefore the most likely person to notice a deterioration in the condition of the fetus, based on observed symptoms.

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DIAGNOSING DEATH AND RESURRECTING THE MYTH OR REALITY OF CATALEPSY

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ABSTRACT

Death is medically described as the irreversible loss of essential characteristics and requires irreversible loss of capacity for consciousness and capacity to breathe. Death certification has legal, ethical, philosophical, biological, cultural, and religious characteristics and consequences. Its diagnosis is based on the best available scientific evidence: somatic, circulatory and/or neurological criteria.

Even if we accept that determination of death is 'scientific' and a set of criteria for its diagnosis have been established, death diagnoses still differ between countries. It is for this reason and for sporadic cases, such as one that occurred recently in Spain, that 'artistic' aspects of medicine and the mystery of the extensively described condition of catalepsy are revived.

Catalepsy is a medical condition characterised by inactivity, decreased responsiveness to external stimuli, and a tendency to maintain an immobile posture (muscular rigidity). This condition may be associated with psychotic disorders, nervous system drug toxicity, and other conditions. Moreover, its influence in artistic literature and mass media has led to the consideration of catalepsy as a cornerstone in the confluence of medicine, art, mystery, science, and society.

KEYWORDS: diagnosis of death, catalepsy, determination of death, narcolepsy

Background

'Man pronounced dead by three doctors "starts snoring" in mortuary hours before post-mortem' or 'Prisoner "back from the DEAD": Inmate comes to life on mortuary table' are examples of headlines from respected newspapers, such as, respectively, *The Independent* [1] and *Express* [2].

The case of the prisoner in Oviedo (Spain) who, on January 7th 2018, was confirmed to be dead by three doctors including a forensic pathologist but a few hours later was discovered to be alive, sets the tone for a renaissance of popular fear of catalepsy. Catalepsy is a condition that allegedly caused hundreds of live burials in the 18th and 19th century.

It seems incredible that in the 21st century there are still cases of people mistakenly diagnosed as dead. Apparent death seems like a concept for science fiction rather than reality. It occurs when someone takes on the characteristics and appearance of being dead. Are there still cases of people mistakenly buried alive? Is mistaken certification of death a type of medical negligence or is technology not advanced enough to assist the doctor to make an accurate diagnosis? Death-like symptoms of muscular rigidity and unresponsiveness are seen in catalepsy. However, what is catalepsy all about?

Our article aims to analyse the prevalence of catalepsy, the evolution of the diagnosis 'catalepsy' across history, the appearance of catalepsy in literature and arts, and the differential diagnosis of catalepsy and death.

Epidemiology

The definitions of catalepsy and related terminology have varied considerably over time within scientific literature. Until the mid-19th century, the label 'catalepsy' was used similarly to the way 21st century

medical literature employs 'catatonia', as used in psychiatry and neurology. Moreover, diagnostics have evolved with changing trends in psychiatric research. Consequently, the epidemiology of catalepsy is not clearly known across scientific literature. It is important to also recognise that cultural influences have impacted the determination of whether catalepsy symptoms were present or not.

Cases of catalepsy in humans appear rarely in scientific data [3–5]. However, within mass media, for instance, in the leading worldwide newspaper *The Guardian*, there is a higher prevalence of the term 'catalepsy'; this is partly due to the fact that it has been a conceptual topic in artistic works for the last three centuries [6,7]. Sometimes the word is used in a loosely figurative sense in the news on topics unrelated to medicine. Generally, the concept appears in 'Lifestyle' or 'Opinion' sections of media when describing the plot of a TV program, a film, a theatre play, an opera, etc. [8] (Fig. 1).

According to Spanish forensic psychiatrist José Cabrera, there are as many as three cases of catalepsy per year in Spain. Approximately one in every two million people presents with catalepsy [9].

History

Beginnings

Catalepsy, which literally means 'seizing' or 'grasping' (ultimately from ancient Greek *kata-* 'down' + *lambanein* 'to take'), was first described in Hippocrates' writings and appeared in Claudius Galen's work as he described the three forms of epilepsy in approximately 200 A.D. [10–12]. According to Galen, one form of epilepsy was catalepsy, which would present with fever and mental disorder.

In the 16th century, the Parisian surgeon Ambroise Paré associated catalepsy with hysteria [12]. In 1764 Friedrich Casimir Medicus described 'periodic catalepsy' as 'a repeated obtunding of the senses occurring at certain times, with a distinctive cramping or tonic stiffening of the body' [12]. In 1789 Samuel-Auguste André David Tissot documented that, during the cataleptic condition, the patient's limbs could be repositioned by someone else at will and the limbs would retain their new positions [11–13]. Thus, a new characteristic of catalepsy was described as 'waxy flexibility plus stupor'. By the 19th century, Jean Jacques Timothée Puel recorded up to 150 cases in the medical literature describing stiff limbs and stupor [14].

Birth of psychotherapy and hypnosis

Around the 1800s, catalepsy was side-lined into the hypnotism movement. It was associated with the German Franz Friedrich Anton Mesmer's original idea that hypnotism was grounded in physiology and the existence of a 'magnetic fluid' [15].

In 1843 the therapeutic possibilities of hypnotic sleep were first suggested. James Braid was one of the early pioneers, describing hypnotherapy in his work *Neurypnology* [16]. Several years later Jean-Martin Charcot, often described as the 'father of modern neurology', characterised the three hypnotic sleep states: lethargic sleep, catalepsy, and sleepwalking or somnambulism. However, Charcot associated hypnotism with a pathological alteration of the nervous system rather than a therapeutic resource. During these years Charcot used the concepts of 'hysteria', 'catalepsy', and 'catatonia' interchangeably.

Modern psychiatry and neurology

Though the term 'catalepsy' had been indistinctly used in the past, the first modern description of catalepsy came in the *Nosographie Philosophique* publication in 1803. It was written by Philippe Pinel, the founder of modern psychiatry [17]. In this publication catalepsy was defined as 'the sudden privation of sensory function and muscular movement'. Pinel said that waxy flexibility of the limbs and posturing could also be present. The core symptoms were listed as muscular tonic contraction that permitted waxy flexibility to take place, stupor, unresponsiveness to external stimulation, and eyes generally open. Pinel defined it as a condition appearing within distinct diseases, rather than an isolated independent cataleptic disease.

In the late 19th century, there was still variation in the interpretation of the concept of catalepsy. Some British neurologists, like Samuel Charles Wilks, described it as resembling catatonia; whereas others, like Thomas Grainger Stewart, associated it with epilepsy or, like William Richard Gowers, hysterical states [18–20].

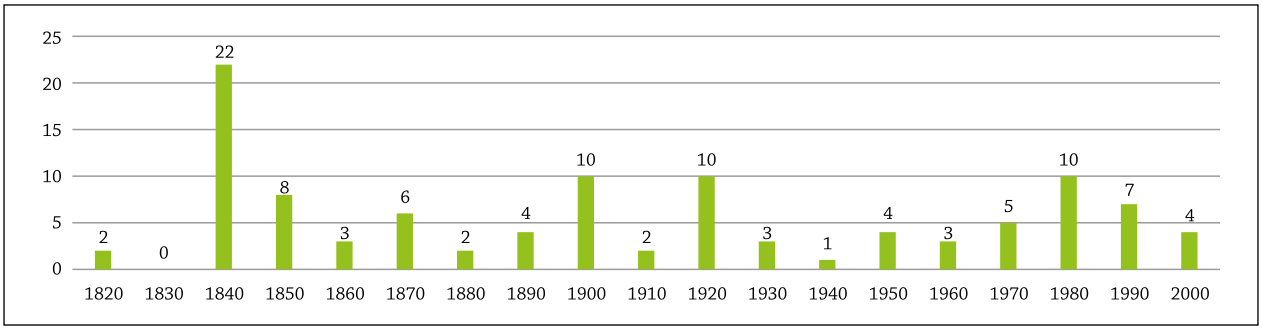

Figure 1. The prevalence (per decade) of the term 'catalepsy' in the archives of the print edition of The Guardian between 1821 and 2003. It appears in a total of 106 articles between 1821 and 2003.

In the 20th century, Samuel Alexander Kinnier Wilson, an American-born British neurologist, defined catalepsy as a 'state of sustained motionlessness with or without clouding of the sensorium' and concluded that it was usually hysterical [21]. It was also Wilson that stated that 'both narcoleptic and cataplectic attacks may comprise a component which corresponds to the usual conception of catalepsy and trance'.

Currently, catalepsy is described more as a symptom than as a disease on its own. There is no specific entry for this concept in the ICD-11 or DSM-5. However, catalepsy is discussed in diagnostic and neurological literature in sections on psychotic disorders, as well as under hypnosis and nervous system drug toxicity [22–24].

Artistic concepts

Art is a way to determine whether certain pathologic conditions are present or observed among persons not in the medical field in society in different eras. By examining in detail the contribution of different artists to specific disorders, we can better understand how perceptions of a certain condition evolved and how art may generate new ways of seeing medicine and diseases.

In recent centuries, great intellectuals used the term catalepsy in their work. It was a catalyst for narrative action, a tool for genre-making, and a vehicle for ethical and social discussions of medical conditions.

Catalepsy through Victorian literature

During the 19th century there were hundreds of cases reported of people mistakenly pronounced dead and buried alive. As a result, there was a deeply rooted fear of being buried alive in Western culture [25]. It was such a strong concern that coffins were occasionally equipped with emergency devices, such as bells, to allow the 'corpse' to call for help in case they were still alive, giving rise to contemporary idioms such as 'saved by the bell' and 'dead ringer'. There were even 'waiting mortuaries', a place where corpses were observed by nurses until they were sure of their death. Different organizations even founded the Society for the Prevention of People Being Buried Alive [26].

Catalepsy, being such a 'hot' topic, received attention from well-known Victorian authors such as Edgar Allan Poe (1835 'Berenice', 1839 'The Fall of the House of Usher', 1844 'The Premature Burial'), Alfred Tennyson (1847 'The Princess'), Gustave Flaubert (1857 *Madame Bovary*), Charles Dickens (1852 *Bleak House*, 1859 *A Tale of Two Cities*), George Eliot (1861 *Silas Marner*), Wilkie Collins (1883 *Heart and Science*), or Arthur Conan Doyle (1893 'The Adventure of the Resident Patient'). On many occasions in the early nineteenth century, there was not a clear distinction between epilepsy and catalepsy, so authors may have interpreted the concept of catalepsy slightly differently [27,28].

Poe wrote about the phenomenon on several occasions. 'The Premature Burial' is one of his best-selling short stories. It is a horror story published in 1844 in which a first-person unnamed narrator describes his own condition in which he randomly falls into a death-like trance ('attacks of the singular disorder which physicians have agreed to term catalepsy'). After reviewing a few examples of previous catalepsy cases, he admits his own phobia of being buried alive. In consequence of this fear, the narrator refuses to leave home and builds an elaborate coffin with equipment allowing him to signal for help in case he should awaken after 'death'. Since its publication this short story of catalepsy has become a thematic genre and has been adapted to films, TV series, and even PC adventure games [29,30].

Medical concepts

According to Medical Subject Headings (MeSH), the term 'catalepsy' is medically described as 'a condition characterized by inactivity, decreased responsiveness to external stimuli, and a tendency to maintain an immobile posture (muscular rigidity)'. It is also described as waxy flexibility when 'the limbs tend to remain in whatever position they are placed'. This condition may be associated with psychotic disorders, nervous system drug toxicity, and other conditions.

Several terms have similarities in spelling and similar presentations to catalepsy. In order to avoid confusion, the following is a list of those terms accompanied with their definition according to MeSH.

- Freezing or cataleptic reaction: an induced response to threatening stimuli characterised by the cessation of body movements, except for movements involved with breathing and the maintenance of an immobile posture.
- Cataplexy: the term is nearly a homophone to catalepsy, leading to confusion even among medical literature. Cataplexy (from the Greek, meaning 'to strike down') is a condition characterised by transient weakness or paralysis of somatic musculature triggered by an emotional stimulus or physical exertion.
- Catatonia: a behaviour syndrome of movement and mood, classically marked by stupor, mutism, posturing, rigidity, repetitive speech, and acts. It is usually acute in onset and its signs are now identifiable, verifiable and successfully treatable. Since 1871, when Karl Ludwig Kahlbaum first coined the term, catatonic symptoms have been described for a great variety of psychiatric and medical disorders. By DSM-5, even though there is uncertainty about its nosological position, it was placed as a clinical entity – not as an independent disorder – in the 'Schizophrenia Spectrum and Other Psychotic Disorders' section [22–24].
- Narcolepsy: a syndrome characterised by recurrent episodes of daytime somnolence and lapses in consciousness that may be associated with automatic behaviours and amnesia.

Differential diagnosis of death

The medical definition of death is primarily a scientific issue based on the best available scientific evidence. Death has legal, ethical, philosophical, biological, cultural, and religious characteristics and consequences. The process of making a diagnosis of human death should require common clinical standards for its diagnosis and legal regulation. However, even death certification can differ among countries [31,32].

Human death entails the irreversible loss of essential characteristics and requires irreversible loss of capacity for consciousness and capacity to breathe. There are mainly three sets of criteria to diagnose that these functions in the brain are lost irreversibly: somatic, circulatory, and neurological. Due to medical and technical progress and the need for a certain and definitive death diagnosis, the understanding and criteria for diagnosis have also evolved. Those criteria should be robust, rigorous, global, and specific, yet global variation remains in the process of diagnosing death.

In addition to the criteria, it is required to allow an additional minimum of five minutes observation period to confirm the diagnosis of death. Each country can choose to require a longer waiting period.

Even if we accept that the determination of death is 'scientific', the challenging case which occurred recently in Spain evokes the 'artistic' aspects of medicine and the mystery of the extensively described condition of catalepsy.

In conclusion, catalepsy is a medical condition characterised by inactivity, decreased responsiveness to external stimuli, and a tendency to maintain an immobile posture (muscular rigidity). This condition may be associated with psychotic disorders, nervous system drug toxicity, and other conditions. Moreover, its influence in artistic literature and mass media has led to the consideration of catalepsy as a cornerstone in the confluence of medicine, art, mystery, science, and society.

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