e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 26 April 2022

DOI: 10.5604/01.3001.0015.8342

THE USE OF HYDROGEN PURIFICATION AND MIXTURE OF COSMETICS ACIDS, AND THE INFLUENCE ON ACNE SKIN PARAMETERS: A CASE REPORT

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

ABSTRACT

Background: Acne vulgaris is a common disease which causes physical and mental ailments that are associated with a significantly reduced quality of life. Contemporary cosmetology is looking for innovative and effective methods of treating acne vulgaris. The synergistic action of acids and hydrogen purification has a positive effect on the reduction of sebum secretion and thus the amount of skin eruptions.

Aim of the study: To check the effectiveness of hydrogen purification treatment combined with topical acids for the treatment of acne vulgaris.

Case report: The participant of this study is a 20-year-old female, struggling with acne vulgaris for 5 years. She has a problem with large sebum secretion and numerous eruptions on her skin. Before and 30 days after a series of treatments the sebum secretion was measured with Derma Unit SCC 3Courage + Khazaka electronic GmbH, which characterizes the hydrolipidic film of the skin. The severity of acne vulgaris was measured using the GAGS scale.

Conclusions: There was a significant improvement in skin condition after a series of treatments. Hydrogen purification combined with phytic, pyruvic, lactic and ferulic acids 40% (pH 1.4) was found to be safe and effective.

KEYWORDS: hydrogen purification, cosmetics acids, acne vulgaris, GAGS scale

Background

Acne vulgaris is a chronic inflammatory disease affecting the sebaceous unit. It is characterized by inflammatory cutaneous lesions, such as pustules, nodules, cysts, and inflammatory papules, as well as non-inflammatory lesions, such as open and closed comedones [1]. Acne vulgaris affects 85% of the population 12–25 years of age. The occurrence of Acne vulgaris is promoted by environmental factors, a high glycemic index diet, dairy product intake, highly processed foods, and genetic mechanisms. The disease evolution is favored by the presence of *Cutibacterium acnes* [2-4]. Hormones, especially androgenic ones, are also important, as their increased activity leads to excessive sebum production. About 20% of adolescents have skin changes in the form of scars. The quality of life can be impaired by the associated pain, irritation, and itching. Additionally, acne vulgaris may be accompanied by social and mental disorders, including decreased self-esteem, anxiety, embarrassment, feeling of shame, and a desire for social isolation, which may even lead to suicidal thoughts [1].

One of the most effective, non-pharmacological methods of treating acne vulgaris is chemical peels, which have been used for centuries. The main purpose of a chemical peel is the exfoliation of dead cells in the stratum corneum, stimulation of cell renewal in the living layers of the epidermis, and remodeling of the *dermis*. Depending on the intensity of the action of fruit acids, they cause cell necrolysis at various skin depths [5]. We used a mixture of phytic, pyruvic, lactic and ferulic acids. The phytic acid has an antioxidant, moisturizing, and weak exfoliating effect, in addition to reducing the production of sebum by the sebaceous glands. The pyruvic acid easily penetrates the epidermis by penetrating the sebaceous apparatus, and has antibacterial, sebostatic, comedolytic, and keratolytic properties. Lactic acid in low concentrations has a moisturizing effect; at higher levels, it provides some superficial exfoliation of the epidermis. The ferulic acid has antioxidant and lipophilic properties, which allow it to penetrate into acne-affected skin, thus accelerating wound healing. In contrast to pyruvic and lactic acid, ferulic acid does not exhibit keratolytic activity [5,6].

Preferred anti-acne medications often have an irritant effect, which is why cosmetologists use cosmetics containing mild plant-based substances. Mazarello et al. [7] demonstrated the effectiveness of a cream which included anti-inflammatory and antibacterial ingredients, such as propolis extract, *A. Vera* leaf juice, and tea tree oil, as a treatment for acne vulgaris [7].

However, modern cosmetology is looking for non-invasive apparatus treatments that are more effective than mild plant-based substances. One of the innovative methods is hydrogen purification. For this procedure, equipment is used that injects hydrogen-rich water under pressure, which is then discharged into a separate tank. The procedure allows for thorough cleansing of the skin of impurities, dead skin cells, and sebum. The hydrogen used in the treatment is an element found in the human body. It is used in cosmetology due to the small size of the molecule, which facilitates penetration through the epidermis and dermis [5]. Many studies have been carried out using molecular hydrogen as a treatment, due to its neutralizing effect on free radicals and anti-inflammatory properties [3,8]. During hydrogen purification, an electrolytic process takes place in which a direct current is passed between two electrodes, which are separated from each other by a semi-permeable membrane. This reaction leads to the elements contained in the water being decomposed into hydrogen ions (H+) and hydroxyl ions (OH-). The pH value of the resulting alkaline water fluctuates between 8 and 10 [8,9].

Both fruit acids and hydrogen purification have anti-inflammatory, superficial exfoliating, and sebostatic properties. The combination of hydrogen purification and fruit acids may have a positive synergistic effect on selected skin parameters relevant to patients with acne vulgaris.

Aim of the study

The aim of this report was to describe the effects of hydrogen cleansing in combination with a mixture of acids for acne-prone skin in a 20-year-old female.

Material and methods

Study design, setting and duration

This study was carried out between February 2021 and April 2021 at Opole University in Poland. The Hebe Hydrogenium + device was used, and a mixture of phytic, pyruvic, lactic and ferulic acids 40% (pH 1.4) was applied. The procedure was performed five times in 14-day intervals. Each treatment followed the same procedure. The first step was make-up removal using a micellar fluid, followed by hydrogen purification for 5 minutes using an apparatus set to a 10% vacuum. The next step was to tone the skin and protect particularly sensitive areas with petroleum jelly (i.e., the eye area, corners of the mouth, vermillion border, and melanocytic nevuses). The mixture of acids was then applied to the entire face for 2 minutes. Neutralization was performed and the face was washed with water at room temperature. At the end of the treatment, an SPF50 cream was applied.

Participant

This report described the case of a 20-year-old female who was struggling with a 5-year history of pustules, blackheads, whiteheads, and excessive sebum secretion.

Inclusion criteria

Inclusion criteria were: no dermatological treatment within 12 months, no current hormonal contraception, participant 19–22 years of age, with mild-to-moderate acne, as measured using the global acne severity scale (GAGS).

Exclusion criteria

The exclusion criteria that prohibited participation in this study were: taking oral medications within the last 3 months, taking isotretinoin within the last year, taking contraceptives, a tendency towards keloid formation, sun exposure after procedure, telangiectasias, skin cancers, pregnancy and breastfeeding, viral, bacterial and fungal skin diseases, hypersensitivity to acids, skin irritation, active inflammation, active rosacea, psoriasis, and atopic dermatitis.

Ethical considerations

The patient was informed that she could withdraw from the study at any time, was informed of the study intention, and provided written informed consent for research participation. This study was approved by Human Research Ethics Committee of the Opole Medical School (KB/54/NOZ/2019) and conducted according to the principles of the Declaration of Helsinki.

Data sources/ measurements

The GAGS scale was used to determine the severity of acne lesions. It includes the following areas: nose, cheeks, forehead, chin, as well as the back and chest. Each of them is assigned a number based on size: nose = 1; left cheek = 2; right cheek = 2; forehead = 2; chin = 1; back and chest = 3. Depending on the degree of severity, each lesion is given a grade: no cutaneous conditions = 0, comedones = 1, papules = 2, pustules = 3, and nodules = 4. The local score calculated for each area has the formula: Local score = factor × Grade (0–4). The global score is composed of the sum of the local results: 1–18 = mild acne, 19–30 = moderate acne, 31–38 = severe acne, >39 = very severe acne [9-11]. The participant was diagnosed with moderate acne (GAGS score = 22).

The amount of sebum was measured using the Derma Unit SCC 3 Sebumeter. Measurements were taken in the morning before 11 AM. The first measurement was carried out before the treatments began, and the next one 30 days after the end of the series. In the evenings before the day of the measurements, the patient was recommended to do only gentle make-up removal. The conditions in the measurement room were constant, the temperature was 22 °C and the humidity was 40–50%. The time for acclimatization to the abovementioned factors in the room was 25 minutes. Then, sebum was measured in specific places: between the eyebrows, on the chin, on the right nose petal, on the left nose petal, as well as on the right and left cheek.

The patient's home care was divided into a morning and evening routine. In the morning, it was recommended to clean the skin with just some micellar fluid, and to then apply a SPF50 cream. In the evening, it was recommended to clean the skin again with the same preparation, and to then apply a moisturizing cream. It was forbidden to use new cosmetics and perform other cosmetic or dermatological treatments during the study and 30 days after its completion. Additionally, they were asked not to use the solarium, sauna or swimming pool. It was also recommended not to take any dietary supplements that might affect the treatment outcomes.

RESULTS

After applying a series of five cosmetic treatments using hydrogen purification and a mixture of cosmetic acids, the skin parameters improved and the skin eruptions were reduced (Table 1). The amount of skin eruptions on the GAGS were reduced from 22 to 15. There was also a reduction in the amount of sebum on the surface of the epidermis: between the eyebrows from 198 to 123 (μg/cm^2), on the chin from 210 to 134 (μg/cm^2), on the right nose petal from 206 to 115 (μg/cm^2), on the left nose petal from 208 to 117 (μg/cm^2), on the right cheek from 212 to 125 (μg/cm^2), and on the left cheek from 209 to 130 (μg/cm^2).

Table 1. Sebum level before and after treatment

Area of measurement	Sebum level before the treatment (μg/cm^2)	Sebum level 30 days after the end of the treatment (μg/cm^2)
Between the eyebrows	198	123
On the chin	210	134
Right nose petal	206	115
Left nose petal	208	117
Right cheek	212	125
Left cheek	209	130

Discussion

Key results

In brief, our case study showed that alkaline water in combination with a mixture of phytic, pyruvic, lactic and ferulic acids 40% (pH 1.4) had a positive effect in reducing the level of sebum on the surface of the epidermis, as well reducing skin eruptions such as pustules, whiteheads, and blackheads.

Interpretation

The hydrogen purification treatment was an effective method of reducing acne lesions. Chilicka et al. [3] were the first to show that, under the influence of hydrogen purification, the secretion of sebum decreases, and the level of skin hydration increases. A gradual reduction of inflammatory eruptions is also noticeable [3].

The external use of alkaline water has not been widely researched so far, therefore access to scientific articles on the subject is limited. Studies to date have only investigated the intrinsic effects of alkaline water. Osada et al. [12] conducted a study in which a reduction of cholesterol and triglyceride levels was observed in people with hyperlipidemia, and a similar reduction in blood glucose levels in most subjects with type II diabetes mellitus (DM II). The participants were asked to consume 2 liters of alkaline water daily for a period of 2 months [12]. A similar study was conducted by Gadek et al. [13]. The authors showed that blood sugar levels decreased significantly in patients with DM II (n = 401) after drinking 2 liters of alkaline water daily [13].

The combined use of hydrogen purification with a mixture of phytic, pyruvic, lactic and ferulic acids in this study was considered innovative, and led to a more pronounced reduction in acne lesions in the index case.

The most used acid in anti-acne treatments is pyruvic acid, which is an α-keto acid with a keratolytic effect that stimulates the skin to produce collagen and elastin fibers. Pyruvic acid has antimicrobial and seboregulating properties; after coming into contact with water, which has a neutralizing effect, it transforms into lactic acid [5]. Jaffary et al. [14] compared the effectiveness of salicylic acid 30% and pyruvic acid 50% in the treatment of mild and moderate acne. The study involved 86 patients who were randomly assigned to one of two groups. In order to eliminate external factors that could distort the result, some unified care routine was applied in each of the respondents. Topical erythromycin 4% solution, trichloro carbon soap, and sunscreen was recommended. Participants in the first group were treated with salicylic acid, while the second group was treated with pyruvic acid. Therapy consisting of a series of five treatments resulted in a significant reduction in the number of comedones and papules [14]. Marczyk et al. [15] also compared the effects of 30% salicylic acid and 50% pyruvic acid on facial sebum secretion. Secreted sebum levels were measured in the T and U zones with the use of Sebumeter SM 815. Both peels reduced the amount of sebum on the epidermis surface. Additionally, it was noticed that the salicylic acid has a slight drying effect on the skin, which was not observed in the case of the pyruvic acid application [15]. Zdrada et al. [16] showed a significant effect for pyruvic acid on epidermal hydration and tyrosinase inhibition, which resulted in melanin reduction and lightening of post-inflammatory discoloration [16].

Nofal et al. [17] found that the action of a mixture of some acids on acne lesions is more effective than the use of only a single exfoliating substance. Another study found that a single acid used at high concentration had more side effects than using a mixture of acids. The treatment effects are, however, comparable [16].

An innovative study using a mixture of acids and hydrogen purification was carried out on a patient with a light skin phototype. In the case of dark skin struggling with acne, the use of acids is sometimes riskier due to the increased risk for discoloration and scars. The use of acids in high concentrations is not recommended in pregnant women due to the lack of sufficient research in this population [18]. The risk for side-effects after acid peels depend on the concentration and pH of the solution used for treatment [5].

Despite the abovementioned contraindications, treatments with acids are safe, effective and cheap procedures performed on a large scale in cosmetology [18]. Hydrogen purification is also a safe and effective treatment for Acne vulgaris. It does not cause redness, irritation, dryness, burning and itching of the skin [3].

Study limitations and recommendations

In the future, we plan to expand the research with more participants, a control group and include male sex. It is also planned to combine hydrogen purification with other treatments: microneedle RF and TCA acid.

Conclusions

The combination of hydrogen purification with acids is a safe and effective treatment, it does not require long convalescence, but it cannot replace dermatological treatment. It can be treated as an adjunct to the treatment of acne vulgaris.

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Word count: 2347 • Tables: 2 • Figures: 0 • References: 18

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Leja D, Dziedzic K, Chilicka K, Golombek M, Niestrój K, Połednik H, Koznarska-Buczkowska A, Rusztowicz M, Adamczyk E.
The use of hydrogen purification and mixture of cosmetics acids, and the influence on acne skin parameters: a case report.
Med Sci Pulse 2022;16(2):1–5. DOI: 10.5604/01.3001.0015.8342.

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Received: 08.11.2021
Reviewed: 19.04.2022
Accepted: 20.04.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 10 May 2022

DOI: 10.5604/01.3001.0015.8506

KNOWLEDGE OF POLISH NURSES AND TEACHERS ABOUT OVARIAN CANCER

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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: Ovarian cancer is difficult to diagnose, and often detected too late. It is also difficult to treat, and has a high mortality rate. In Poland, ovarian cancer constitutes 5% of all cancers found in women, making it the fifth most common malignant neoplasm in the female population.

Aim of the study: To raise awareness among nurses and teachers about the early detection and treatment of ovarian cancer based on their level of knowledge on the subject.

Material and methods: The study has been conducted using original survey questionnaire among the group of 391 Polish women (274 nurses and 117 teachers) from Garwolin district. The statistical analysis has been made using statistical package StatSoft Statistica 13.1 PL, as well as Microsoft Office.

Results: The majority (68.3%) of surveyed women had a low general level of knowledge about ovarian cancer. Only 3.6% of nurses had high level of general knowledge about ovarian cancer. The higher the level of knowledge in both groups, the more often women reported for gynecological check-ups and gynecologic ultrasound.

Conclusions: The level of knowledge of nurses about ovarian cancer is slightly higher than the level of knowledge among teachers. Unfortunately, the general level of knowledge of the respondents in both groups is unsatisfactory. The level of knowledge may have a significant impact on the frequency of preventive examinations performer by women.

KEYWORDS: ovarian cancer, knowledge, nurses, teachers, Poland

Background

The global incidence of ovarian cancer varies [1,2]. The epidemiological diversity of ovarian cancer can be attributed to its multiple known risk factors [3]. The highest prevalence of ovarian cancer is seen in non-Hispanic white women (12.0/100,000 population), followed by Hispanic (10.3/100,000 population), non-Hispanic black (9.4/100,000 population), and Asian/Pacific Islander women (9.2/100,000 population) [4]. About 30% of ovarian cancer cases occur in European countries [5,6]. However, due to differences in the availability of diagnostic and therapeutic services, the mortality rate of ovarian cancer is the highest in the African population [6]. Every year, over 200,000 new cases of ovarian cancer are diagnosed worldwide [7-9]. Even though ovarian cancer has a lower prevalence compared to breast cancer, its mortality rate is three times higher [2,10]. Mortality related to ovarian cancer is expected to increase significantly by 2040 [2].

In Poland, the Main Statistical Office has reported that ovarian cancer constitutes 5% of all cancers found in women, making it the 5th most common malignant neoplasm in females [11]. The National Cancer Registry reported that most cases of ovarian cancer are diagnosed in women aged 50 years or older, half of whom fall in the 50–69 year age range. Only germ-cell tumors are detected in younger women. In 2010, the incidence of ovarian cancer was 15% higher in Poland than other European Union countries [12]. Ovarian cancers are one of the most difficult subjects in oncological gynecology. According to the International Federation of Gynecology and Obstetrics (FIGO), the 5-year survival rate of stage I–II ovarian cancer is approx. 90%; in stage III–IV disease, the mortality

rate drops by half [8,12-15], remaining at the level of 20-40%. In women diagnosed with ovarian cancer, approximately 75% are already in stage III–IV of the disease [3,4,16]. Currently, only 30% of patients are diagnosed at an early stage [1,7]. Since there are no effective screening tests for ovarian cancer, the main opportunity to obtain an earlier diagnosis is to better identify symptoms early on [7,9].

The causes of ovarian cancer remain unclear. Biological and lifestyle factors influence risk for the development of ovarian cancer, which is more common in nulliparous women, those who have never used oral contraception, patients who use salicylates for rheumatoid diseases, and those exposed to talc and asbestos. The lower the number of ovulations, the lower the risk of ovarian cancer. Every pregnancy decreases the incidence of ovarian cancer by 10–15% [11,14].

In vitro fertilization, being unmarried or divorced, and other socio-economic risk factors are also associated with ovarian cancer. Genetic risk factors include the hereditary breast-ovarian cancer syndrome, Lynch syndrome, and *BRCA1/2* gene mutation carrier status [13]. Epidemiological data shows that 25% of ovarian tumors are malignant. Therefore, in cases where uterine appendage changes are detected in post-menopausal women, ovarian cancer should be suspected [14].

The early detection of ovarian cancer is further complicated by the lack of characteristic symptoms. This also explains why most patients are only diagnosed once they have stage III–IV disease [1,2,14]. Until recently, ovarian cancer has been called "a silent killer". However, many advances have been made in our understanding of cancer development. Nevertheless, knowledge concerning the illness is often limited among both lay persons and medical staff [14]. The majority (80%) of patients however show symptoms at the early stages of cancer development, when the disease is limited just to the ovaries [17]. This lack of awareness potentially generates most of the late diagnoses of ovarian cancer and contributes to a low survival rate. It is crucial for medical staff to be aware of the nature of medical afflictions reported by women. But based on epidemiological data it can be concluded that there is a critical gap in knowledge, among both the general population and medical staff, regarding ovarian cancer and its symptoms [17].

It is important to be aware of the current level of knowledge among staff concerning ovarian cancer, and to identify the areas that need improvement. It is also crucial to learn about the level of knowledge around ovarian cancer among both women and trained medical staff, in order to improve cancer detection, facilitate timely implementation of treatment, improve survival.

Aim of the study

The aim of this research was to raise awareness among nurses and teachers about the early detection and treatment of ovarian cancer based on their level of knowledge concerning the subject. Both groups are public trust professions and due to their character have an impact on shaping the health behaviors of average citizens. The Nurse Profession Act includes education and preventive care. Nurses should possess knowledge on health behaviors and early symptoms of cancer and provide suitable education in this direction. In contrast, the teacher group shapes the attitudes of young people. The level of knowledge concerning the risk factors, symptoms, prevention, diagnostic and epidemiological characteristics of ovarian cancer has been subject to analysis. In this study, the respondents were also asked questions concerning gynecological examinations.

Material and methods

Study design and setting

The study was conducted between March 2018 and June 2019. The criterium for including in the study was current occupation as a nurse or teacher. The teachers were assessed using a pen-and-paper survey, while nurses were assessed using an online questionnaire (Google form). Both occupational groups came from Mazovia Province in the Garwolin district, with a population of 108,981. Participants were informed about the study aim, and that participation in the study was voluntary and anonymous. The research was conducted according to the ethics guidelines enshrined in the Declaration of Helsinki. According to the regulations of the Local Bioethics Committee, this does not cover consent for survey research.

Participants

In total, 391 women participated in the study, 70.1% (n=274) of whom were nurses, and 29.9% (n=117) of whom were teachers. An even distribution of respondents in terms of place of residence was obtained (Table 1). The average age of respondents was 37.35 years for nurses and 41.7 years for teachers. The youngest surveyed nurse was 20 years old, and the oldest surveyed nurse was 65 years old, whereas the youngest teacher was 23 years old, and the oldest teacher was 60 years old. In the studied group, younger nurses and older teachers dominated. Almost half of the surveyed nurses had a tenure <5 years, and over half of the teachers had a tenure >15 years. In

total, 86.1% of surveyed nurses worked in a hospital, and 13.9% worked in primary health care (PHC). Over half of the teachers (58.1%) worked in integrated teaching (Table 1).

Survey questionnaire

An original survey questionnaire was designed for use in this study. The first part of the questionnaire contained questions about socio-demographic and occupational data of the respondents. The second part of the questionnaire consisted of specific questions assessing the state of knowledge about ovarian cancer, and included statistical data, risk factors, symptoms, prevention and diagnostic tests. The responses were compared between the two participant groups.

We examined the level of knowledge among respondents based on the number of correct answers. This was classified as follows: low (0–49%), average (50–69%), and high (70–100%). An assessment of General Level of Knowledge (GLK) was made, as well as with an examination of their level of knowledge regarding epidemiology, symptoms, diagnostics, risk factors and prevention strategies for ovarian cancer.

Statistical analyses

We assessed the level of knowledge among the respondents using quantitative analysis, including the frequencies of correct responses to for each survey item. Qualitative data were compared between patient groups using a non-parametric Pearson's Chi-squared test. The distribution of quantitative data was examined using the Shapiro–Wilk test. Normally distributed data were compared between patient groups using a t-test. Non-normal data were compared between groups using the Mann–Whitney U test (two groups) or Kruskal–Wallis test (three or more groups). Linear relationships between continuous numerical variables were described using Spearman correlations. Statistical significance was set at $p<0.05$. Statistical analysis was carried out using the statistical package StatSoft Statistica 13.1 PL as well as Microsoft Office software.

Table 1. Sociodemographic and occupational data of respondents

Characteristic of the group		Together		In detail			
				Nurses		Teachers	
		n	%	n	%	n	%
Occupation	Nurses	274	70.1	—	—	—	—
	Teachers	117	29.9	—	—	—	—
Place of residence	village	105	26.9	65	23.7	40	34.2
	small city	84	21.5	42	15.3	42	35.9
	medium city	96	24.6	82	29.9	14	12.0
	large city	106	27.1	85	31.0	21	17.9
Age	20–30 years	160	40.9	139	50.7	21	17.9
	31–40 years	68	17.4	36	13.1	32	27.4
	41–50 years	110	28.1	69	25.2	41	35.0
	51–65 years	53	13.6	30	10.9	23	19.7
Tenure in the profession	<5 years	151	38.6	131	47.8	20	17.1
	5–10 years	53	13.6	31	11.3	22	18.8
	11–15 years	33	8.4	18	6.6	15	12.8
	>15 years	154	39.4	94	34.3	60	51.3
Workplace of a nurse	hospital	236	60.4	236	86.1	—	—
	primary health care (PHC)	38	9.7	38	13.9	—	—
Work profile of a teacher	integrated teaching	68	17.4	—	—	68	58.1
	humanities	38	9.7	—	—	38	32.5
	sciences	11	2.8	—	—	11	9.4

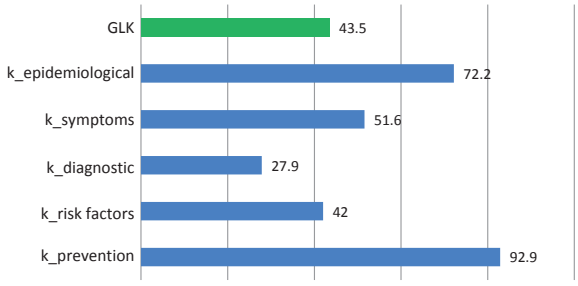
Results

Knowledge level of the respondents

Most respondents (68.3%) possessed a low general level of knowledge (GLK) concerning ovarian cancer; 29.2% of respondents had an average GLK, and 2.6% had a high GLK. Only nurses possessed a high GLK (3.6%). Teachers had a low GLK more often (74.4%) compared to nurses (65.7%).

All respondents correctly indicated 43.5% of the answers, which allowed us to conclude that they possessed a low GLK, even though it was close to average. All respondents most often correctly answered questions concerning preventive (82.9%) and epidemiological (72.2%) knowledge about ovarian cancer, which indicated a high state of knowledge in these specific fields. The respondents possessed the lowest state of knowledge in terms of diagnostic tests for ovarian cancer (27.9% correct responses). The level of knowledge concerning the symptoms (51.6%) and risk factors (42.0%) of ovarian cancer was also low-to-average (Figure 1).

The state of knowledge of surveyed nurses and teachers concerning ovarian cancer varied vastly



k_ – knowledge, GLK – general level of knowledge

Figure 1. State of knowledge of all respondents about ovarian cancer (0–100% range)

across almost all aspects assessed, except for prevention. Nurses provided correct responses more often (44.7%) compared to teacher (60.6%) in terms of their GLK regarding ovarian cancer. This pattern of a higher GLK among nurses vs. teacher was also evident for the epidemiology (74.6% vs 66.7%), symptoms (56% vs 41.2%), diagnosis (30.6% vs 21.5%) and prevention (84.5% vs 79.1%), of ovarian cancer but these correlations were statistically insignificant. Teachers had a significantly higher GLK concerning the risk factors for ovarian cancer compared to teacher (46.4% vs 40.1%) (Table 2).

Table 2. State of knowledge of the respondents about ovarian cancer depending on occupation

State of knowledge and occupation		M	SD	Me	Min	Max	MWU Test	p
GLK	Nurses	44.7	11.4	44.1	11.8	82.4	3.22	0.001
	Teachers	40.6	12.0	38.2	14.7	67.6		
Epidemiological	Nurses	74.6	24.7	66.7	0.0	100.0	2.48	0.013
	Teachers	66.7	27.0	66.7	0.0	100.0		
Symptoms	Nurses	56.0	25.2	60.0	0.0	100.0	4.65	<0.0001
	Teachers	41.2	24.5	40.0	0.0	100.0		
Diagnostic	Nurses	30.6	13.8	25.0	0.0	75.0	5.84	<0.0001
	Teachers	21.5	15.1	16.7	0.0	58.3		
k_risk factors	Nurses	40.1	18.9	41.7	0.0	100.0	–2.39	0.017
	Teachers	46.4	22.9	41.7	0.0	100.0		
k_prevention	Nurses	84.5	26.1	100.0	0.0	100.0	1.04	0.297
	Teachers	79.1	32.3	100.0	0.0	100.0		

* M – mean, SD – standard deviation, Me – median, Min–Max – minimum-maximum, GLK – General Level of Knowledge, MWU Test – Mann–Whitney U-Test, k_ – knowledge.

The majority of the respondents (86.2%) acknowledged that ovarian cancer is a serious health problem. The nurses indicated that ovarian cancer is currently a serious health problem more often compared to teachers (90.2% vs 76.9%). The teachers more often indicated "I don't know" than the nurses (18% vs 2.9%). More than a half of the respondents (56.3%) acknowledged that ovarian cancer does not show specific symptoms, while 25.8% reported that such symptoms are present. The nurses more often indicated the correct response that ovarian cancer does not have specific symptoms (32.5% vs 11.7%). Among these symptoms, the most commonly reported symptoms were pain in the pelvic area (79.5%) and post-menopausal bleeding from the genital tract (69.1%). The nurses more often indicated: pain in the pelvic area (82.8% vs 71.8%), bleeding from the genital tract (72.6% vs 60.7%); bloating, dyspepsia, constipation (44.9% vs 25.6%), ascites (37.6% vs 17.1%), and bladder pressure (42% vs 30.8%) as symptoms

of ovarian cancer. The teachers more often indicated that they do not know the symptoms of ovarian cancer (12.8% vs 1.5%).

Analysis of the state of knowledge depending on variables

Nurses working in PHC possessed a significantly higher GLK concerning ovarian cancer than those employed in a hospital (49.3% vs 44%), and significantly greater state of diagnostic knowledge on the subject of ovarian cancer than people employed in a hospital (36.6% vs 29.6%). The state of knowledge of surveyed nurses did not vary significantly in other assessed categories depending on the workplace. The nurses working in a hospital possessed greater epidemiological knowledge. In other categories, greater knowledge was shown by PHC workers (Table 3).

The place of residence of nurses (size and type of environment) was not significantly related to their state of knowledge concerning ovarian cancer. Nurses

Table 3. State of knowledge of surveyed nurses on the subject of ovarian cancer depending on the workplace

State of knowledge and workplace		M	SD	Me	Min	Max	MWU Test	p
GLK	hospital	44.0	11.0	44.1	11.8	76.5	–2.06	0.039
	PHC	49.3	12.9	47.1	29.4	82.4		
k_epidemiological	hospital	75.1	24.7	66.7	0.0	100.0	0.94	0.347
	PHC	71.1	24.7	66.7	33.3	100.0		
k_symptoms	hospital	55.3	24.9	60.0	0.0	100.0	–1.03	0.303
	PHC	60.0	26.7	60.0	0.0	100.0		
k_diagnostic	hospital	29.6	13.6	25.0	0.0	75.0	–2.94	0.003
	PHC	36.6	13.5	33.3	8.3	58.3		
k_risk factors	hospital	39.2	18.6	33.3	0.0	100.0	–1.76	0.078
	PHC	46.3	19.7	41.7	16.7	91.7		
k_prevention	hospital	84.5	26.2	100.0	0.0	100.0	0.08	0.933
	PHC	84.2	26.3	100.0	0.0	100.0		

* M – mean, SD – standard deviation, Me – median, Min–Max – minimum-maximum, k_ – knowledge, GLK – General Level of Knowledge, PHC-primary health care.

living in a small city possessed the highest GLK, and nurses living in an average-sized city the lowest GLK. The level of preventive knowledge and one related to the symptoms that may indicate the development of ovarian cancer increased along with the population of environment in which the respondents lived. Citizens living in small cities possessed the highest level of knowledge concerning risk factors, and citizens of large cities and villages had the lowest.

The age of surveyed nurses was not significantly related to their state of knowledge concerning ovarian cancer. Nurses aged 51–65 years had the highest level of general knowledge, and nurses aged 31–40 years had the lowest. Age was inversely correlated with epidemiological knowledge (r=–0.03) and knowledge concerning the symptoms of ovarian cancer (r= –0.11). Age was positively correlated with knowledge surrounding the diagnosis (r=0.07), risk factors (r=0.03) and prevention (r=0.05) of ovarian cancer.

Surveyed nurse with 5–10 years tenure had significantly greater state concerning the diagnosis ovarian cancer (36.3%) than nurses with shorter tenure (<5 years, 28.6%) or a longer one (11–15 years, 29.2%; >15 years, 31.6%). The tenure of surveyed nurses was not significantly related to their state of knowledge concerning ovarian cancer.

The teaching profile of surveyed teachers was not significantly related to their state of knowledge concerning ovarian cancer. The smaller the place of residence of the nurses, the lower their state of general knowledge concerning ovarian cancer. The less populated the place of residence of surveyed teachers, the greater their state of knowledge concerning the risk factors for ovarian cancer. Residents of small cities possessed significantly greater knowledge concerning the diagnosis of ovarian cancer. The state of knowledge of surveyed teachers in other assessed categories did not vary significantly.

The age of surveyed teachers was not significantly related to their state of knowledge about ovarian cancer. The respondents achieved a very similar rate of correct answers in the knowledge test. There were significant inverse correlations between age and the state of knowledge of teachers in terms of the risk factors for (r=-0.12) and prevention of (r=-0.01) ovarian cancer. In contrast, there were positive correlations between age and the knowledge of teachers in terms of other categories related to ovarian cancer.

The tenure of surveyed teachers was not significantly related to their state of knowledge concerning ovarian cancer. Respondents with a longer tenure possessed a greater GLK concerning ovarian cancer; those with a 5- to 10-year tenure experience had greater knowledge about the risk factors associated with ovarian cancer.

Reporting for examinations

More than a half of respondents (63.9%) declared that they report for preventive gynecological examinations once per year. A frequency of once every 2 years was indicated by 23.3% women, less frequent than once every 2 years by 6.6%, and 6.1% of respondents indicated that they do not attend such examinations at all. The nurses significantly more often than the teachers indicated that they report for preventive gynecological examination once per year (67.9% vs 54.7%), and the teachers more often indicated that they report once every 2 years (38.5% vs 16.8%).

In total, 54% of respondents declared that they report for preventive gynecologic ultrasound once per year. A frequency of once every 2 years was indicated by 25.8% women, less frequent than once every 2 years by 11.8%, and 8.4% of respondents did not perform this examination at all. The nurses significantly more often than the teachers indicated that they report for preventive gynecologic ultrasound once per year (55.8% vs 49.6%), and the teachers more often indicated once every 2 years (43.6% vs 18.3%).

Respondents that possessed a high level of knowledge concerning ovarian cancer more often performed preventive gynecological examinations once per year (90%) compared to those with an average (71.1%) or low (59.9%) level of knowledge. The place of residence and age were not significantly related to the frequency of performing preventive gynecological examinations. Women working as nurses in PHC (73.7%) and science teachers (72.7%) performed preventive gynecological examinations once per year significantly more often compared to other respondents.

The respondents that possessed a high level of knowledge concerning ovarian cancer performed preventive gynecological ultrasound more often (90%) than ones with an average (59.6%) or low (50.2%) level of knowledge. The place of residence and age were not significantly related to the frequency of performing preventive gynecologic ultrasound, $p>0.05$. Women working as science teachers performed preventive gynecologic ultrasound once per year significantly more often than others (72.7% vs others: 45.6%-55.3%), $p<0.001$.

Discussion

The surveyed sample of women possessed a low GLK about ovarian cancer. Nurses showed greater knowledge about epidemiological data, signs of ovarian cancer, and diagnostic examinations, whereas the teachers possessed a higher level of knowledge about risk factors. The knowledge about ovarian cancer, and above all knowledge of the risk factors as well as early symptoms of ovarian cancer, and in consequence possibility of their prevention and early treatment, is crucial in limiting its occurrence [17]. The majority of women are most often confronted with information about breast cancer and cervical cancer as female-specific cancers [18]. Polish studies have thus far limited their assessment to knowledge concerning breast cancer and cervical cancer among women. In contrast, studies with different sample sizes (n= =250–1200) conducted in the United Kingdom [19,20], the United States [21,22], Malesia [9,23,24], Jordan [25], Nigeria [26], and Oman [27] have examined the level of knowledge concerning the symptoms and risk factors of ovarian cancer.

Seeing the gap and the need of increasing the level of knowledge about ovarian cancer, which is the fifth most commonly occurring cancer in Polish women, a study of two occupational groups has been conducted, the profession of which includes education that should be implemented by them. However, the question arises; was the knowledge that they possess sufficient? There was also a desire to examine what the knowledge and behaviors related to ovarian cancer look like. Ovarian cancer does not show specific symptoms. In approximately 75% cases of ovarian cancer is thus detected too late, often at a stage III–IV FIGO classification [1].

Over the last decade, clinicians point out the symptoms, which can be described as "red flags" (bloating and stomach or pelvis area pain, feeling of fullness, and symptoms related to the urinary tract), which should arouse the vigilance of women, especially when these events are recurring, and which they should report to a doctor [28,29]. Healthcare professionals should consider diagnosing in the direction of ovarian cancer in women showing these symptoms, especially those 50 years of age or older. In the original study, over half of the respondents, more commonly those who were nurses, indicated that ovarian cancer does not show specific symptoms, and the vast majority of respondents stated that ovarian cancer is a serious health problem. In s study by Włodek et al. [28], about 70% of women had previously heard about ovarian cancer, whereas slightly above half (54%) of surveyed women in the United States stated that ovarian cancer is not a serious health problem [21]. Surveyed women were most aware of symptoms such as pain in the pelvis

area (79.5%) and post-menopausal bleeding from the genital tract (69.1%).

In the studies by Low et al. [20], 84% of women had also put pain in the pelvis area at the most common symptom of ovarian cancer. This is like the rate reported in study of women from Oman (67.7%) [27]. In contrast, a study by Brain et al. [19] found that post-menopausal bleeding from the genital tract was the most reported symptom of ovarian cancer. The knowledge of women regarding the symptoms of ovarian cancer, those related to the digestive tract, is low, across different populations globally, which are most often associated with irritable bowel syndrome and not with ovarian diseases [20,29,30]. The level of knowledge of women in Poland in this field is average, and slightly higher than in other countries. This may result from the fact that the researched group included nurses. However, taking into consideration the fact that this group of healthcare professionals has education and promotion of health written in its Professional Act, it should be concluded that this knowledge level is too low. Adeyemi et al. [30] observed a similarly low level of knowledge among 457 healthcare professionals, insofar as only 46.2% were able to recall at least one warning sign of ovarian cancer, whereas only 4.4% were able to indicate more than three such signs. It seems that this occupational group should be better informed and show significantly better knowledge. Similar conclusions were stated by Goldstein et al. [21], who conducted a study in the United States to examine the knowledge of nurses and physician assistants. Their study indicated that both occupational groups have large deficits in knowledge about symptoms and risk factors of ovarian cancer. In original research, nurses from PHC possessed greater knowledge than those employed at a hospital. Ofinran et al. [15] studied the knowledge of sixty English gynecological nurses, observing insufficient knowledge regarding the symptoms in almost half of the respondents (47%). Many more nurses working with hospitalized patients (60%) possessed greater knowledge than persons working in infirmary (40%), which is contrary to the results of original research.

Lack of awareness of gastrointestinal symptoms as an important characteristic in diagnosing ovarian cancer concerned primary care physicians as well, in a study by Gajjar et al. [7] conducted in the United Kingdom. Among 106 respondents, only 6.4% acknowledged that it is possible do diagnose the disease at early stage through symptoms reported by women. More than a half of them correctly pointed out that early clinical diagnosis is possible. Women experiencing recurring symptoms will, as expected, report in the first place to the primary care physician, who should possess such knowledge. A lack of recommendations regarding screening tests and subtle presentation of symptoms point out to the need of greater professional identification of symptoms and risk factors by healthcare professionals, which can lead to a fast diagnosis. However, for this to happen, they need to be equipped with such knowledge. Such state brings with itself the need to research factors related to this knowledge deficit and to plan programs to fill in this gap.

Original research has revealed that women were better informed about the symptoms than risk factors, which is consistent with the results of another research [31].

The state of knowledge of surveyed nurses and teachers varied significantly in almost every assessed aspect (except for the preventive one). Nurses correctly indicated a significantly larger number of answers than teachers regarding all questions testing the knowledge in the field of epidemiology, symptoms that may point out to ovarian cancer and in terms of diagnostic knowledge. Teachers possessed greater state of knowledge in the field of risk factors of ovarian cancer. It is surprising that it was teachers who showed greater knowledge about the risk factors. It may be worth it to include teachers in the health education program for young people to a greater extent. The knowledge of risk factors is crucial: this awareness can facilitate participation in screening test programs and early detection of diseases. That is why the low level of knowledge showed by nurses is even more worrying.

In the original research, the level of knowledge was not dependent on the place of residence, age, or tenure of either of occupational groups. In terms of the individual assessed aspects, we found a high, average, and low level of knowledge concerning the prevention and epidemiology, risk factors, and diagnosis of ovarian cancer, respectively. It is encouraging that knowledge concerning prevention was highest. However, knowledge should be followed by the actions, which is why questions concerning implementing this knowledge in practice were put forward. Most of the respondents (86.4%) acknowledged that women should perform preventive gynecological examinations at least once per year. However, only 63.9% of respondents declared that they did not report for preventive gynecological examinations once per year, and as many as 6.1% of respondents reported not performing such examinations at all. Włodek et al. [28] found similar results: the higher the knowledge level of respondents, the more likely the respondents were to report for preventive gynecological examinations and gynecologic ultrasound once per year. The place of residence and age were not significantly related to the frequency of performing preventive gynecologic ultrasound and reporting to the gynecologist.

The results of this study indicated a need to conduct health education among women regarding ovarian cancer. Education is a process during which the

attitude of self-responsibility for their own health should be formed in women. In the modern age of information, every woman having unlimited access to medical knowledge should realize that increasing the knowledge level about prevention and early detection of gynecological cancer grants an opportunity for early illness detection and intervention. In the case of surveyed women, the level of possessed knowledge also had an additional meaning which was related to the job performed. Medical staff, including nurses, should shape healthy habits among all members of society. This could help improve the awareness among women about the symptoms of ovarian cancer and change their attitude towards the early detection of lifestyle-related diseases as a part of health-promoting programs. It is important to teach the correct interpretation of symptoms and seeking medical help. Nurses are usually the first point of contact for most women when reporting for an appointment at the doctor. All healthcare providers need health education for women, and act as potential teachers during contact with patients.

There is one condition here: for medical staff to be able to educate others, they must possess the appropriate knowledge, which, as evident from this study, is not obvious. In addition, early education of young people is of key importance in forming health awareness. It may be worth it to take advantage of this profile in educational programs. Odukogbe et al. [8] examined women older than 15 years of age, and found that less than 25% of respondents had good knowledge of the functions of the ovaries, whereas about 50% correctly identified the anatomical location of the ovaries. Unfortunately, >50% of the women incorrectly included ovaries as part of the uterus or cervix. These findings are consistent with a lack of basic knowledge of female anatomy and physiology, which can be important in the lack of understanding symptoms of ovarian cancer. That is why the authors want to emphasize the role of teachers in passing knowledge on knowledge concerning ovarian cancer.

Limitations of the study

The limitation of the research included a small number of respondent and restriction to only one district, as well as the fact that both occupational groups were educated. Therefore, there was no possibility of referring to the results of respondents with a lower level of educational attainment.

Conclusions

The necessity of broadening the knowledge of women about ovarian cancer should be emphasized, and they should be mobilized to perform preventive examinations. For medical staff and teachers to accomplish this goal, additional training should also be planned.

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Word count: 4848 • Tables: 3 • Figures: 1 • References: 31

Sources of funding:
The research was funded by the author.

Conflicts of interests:
The author reports that there were no conflicts of interest.

Cite this article as:
Hreńczuk M.
Knowledge of Polish nurses and teachers about ovarian cancer.
Med Sci Pulse 2022;16(2):6–14. DOI: 10.5604/01.3001.0015.8506.

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Received: 23.11.2021
Reviewed: 27.04.2022
Accepted: 10.05.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 3 June 2022

DOI: 10.5604/01.3001.0015.8755

EFFECTIVENESS OF MASSAGE THERAPY IN REDUCING BACK PAIN IN OLDER ADULTS

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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: Lower back pain is one of the most common complaints in the elderly. Pain symptoms can be chronic and aggravated by comorbidities. Back pain leads to reduced function, difficulty performing activities of daily living, and prevents physical activity. Massage is one of the more commonly used forms of physiotherapy for these complaints.

Aim of the study: The purpose of this study was to assess the effectiveness of therapeutic massage for spinal pain in older adults.

Material and methods: Twenty-three participants, including 18 females and 5 males aged 61–85 years old, participated in the study. All patients had degenerative lesions of the spine that were diagnosed by their primary care physician. Patients received classical therapeutic back massages for a period of 3 weeks at a frequency of 2 times a week. Each treatment session was 40-minute-long. Analysis of pain was performed before and immediately after therapy to assess changes in pain. The McGill (short form) and the WHOQL-BREF questionnaires were used to assess the level and quality of life of the study participants. Pain intensity was assessed using the visual analog scale (VAS).

Results: There was a reduction in pain intensity (VAS) and pain perception after massage therapy, with changes in the sensory and emotional components of the pain score. The changes were statistically significant. Quality of life measured by the WHOQOL-BREF questionnaire was at a good level. Elderly participants rated social relationships the highest and physical components the lowest.

Conclusions: Massage therapy resulted in a reduction of spinal pain in older adults. Massage is an effective form of therapy for reducing back pain in older adults.

KEYWORDS: classical massage, back pain, older adults

Background

Back pain affects a significant portion of the population. According to numerous authors, 80% of the population experience at least one incident of back pain in their lifetime [1–2]. The prevalence of chronic and short-term back pain is increasing in Europe, America, and Scandinavia [3–4]. In addition, acute spinal pain is occurring in an increasingly younger population and diagnostic testing often identifies advanced lesions in the form of herniations and protrusions that are indications for neurosurgical treatment [5–6]. This trend has been inextricably linked to the lifestyles led by the younger generation. It is dominated by automation, digitization, convenience, minimum effort, and maximum satisfaction. In ad-

dition, they demonstrate a more sedentary lifestyle, an inability to cope with stress, and increased peer pressure. Nevertheless, the pathomechanism of spinal pain is different among the elderly. Overloading, degeneration, excessive stress on the bony elements, and senile changes in the soft tissues are compounded by comorbidities that aggravate symptoms and lead to the degeneration of spinal structures. In the elderly, pain is typically chronic with classic symptoms, but short-lived, paroxysmal pain with an acute course and nonspecific symptoms can be experienced as well [3,7].

Chronic spinal pain does not just mean functional dysfunction but also affects all other aspects of life leading to resignation from or significant limitation of professional, social, and family activities [9–10].

There are many studies evaluating the use of specific therapies to treat back pain. Treatment options are separated into distinct groups such as surgical treatment (decompression of compressed nerve roots, securing herniated intervertebral discs) and conservative treatment, which includes pharmacotherapy and physiotherapy. Physiotherapy consists of kinesiotherapy, physical therapy, and massage therapy. Among the physical treatments, the most common include transcutaneous nerve stimulation (TENS) and low-frequency laser therapy [7,11]. Craniosacral therapy, manual therapy, joint mobilization, and manipulations are also used [1,11]. Pilates exercises, stretching of the ischiocrural muscles, strengthening of the paraspinal muscles, yoga, tai-chi, and acupuncture are also applicable [7,12–14]. Many types of massage have been evaluated including Swedish, classical, traditional Thai, Chinese, Ayurvedic, aromatherapy (with ginger oil), deep tissue, therapeutic, and relaxation massage [1,11–21]. Studies on the effectiveness of therapy for low back pain measure the variability in clinical symptoms, such as quantitative and qualitative aspects of pain, current mood, ability to perform activities of daily living, and quality of performance of simple and complex functions. Assessing the effects of therapy involves using the Visual Analogue Scale (VAS) and questionnaires such as the McGill Pain Questionnaire (MPQ – short form), Oswestry Disability Index (ODI), Low Back Pain Scale, Neck Disability Index (NDI), WHOQOL-BREF and the Quality of Life (QoL) questionnaire [15,17–19,21].

Therapies aimed to reduce pain and return patients to their professional, social, and family activities. Because of this, therapeutic management should be used early, comprehensive, and combined with patient education [4,7,22–23].

Therapy is complemented by the consolidation of the therapeutic effects achieved through various forms of self-therapy in the form of self-massage and gymnastics performed on one's own. Additionally, teaching proper movement techniques in performing basic activities of daily living helps to prevent further painful incidents. This is of particular importance when it comes to the elderly, whose appropriate motivation and involvement of other family members are needed to achieve the full, intended, and expected therapeutic effects.

Massage can play an important role in this process by normalizing the tension of musculoskeletal soft tissues and improving their blood supply to produce significant reductions in pain.

Aim of the study

The purpose of this study was to evaluate the effectiveness of massage therapy in reducing lower back pain in older adults. Additionally, the QoL of the participants was assessed.

Material and methods

Study design, setting, and duration

Subjects were treated with a classic back massage for a period of 3 weeks, at a frequency of 2 times per week, with each session lasting 40 minutes. The treatment consisted of massaging the two sides of the back in a side lying position (Fig. 1). The use of the prone position was contraindicated in most participants due to advanced age, limited thoracic mobility, and inability to breathe freely during the procedure.

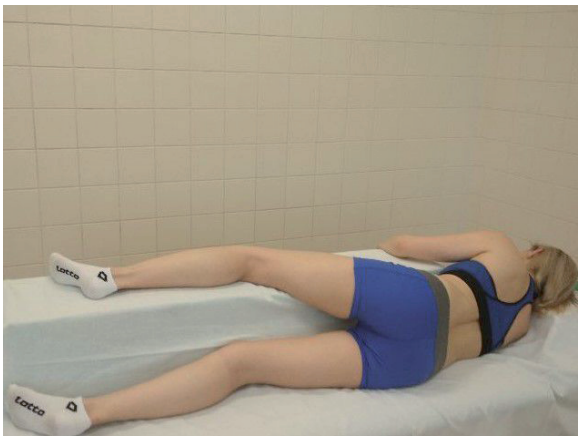

Figure 1. Massage position

Participants

Twenty-three subjects including 18 women and 5 men aged 61–85 years (mean: 68.9; SD=3.75) participated in the study. They were all residents of a large Polish city, Wroclaw. Study participants lived in sin-

gle-family homes with other family members. In 25% of respondents, systematic trips to health resorts (Polish sanatoria) with a frequency of once every two years were reported. Additionally, 40% reported that they receive various forms of physiotherapy from the National Health Service at least once a year. All patients had degenerative changes of the spine at the time of referral from their primary care physician. The cervical region was involved in 5 patients, the thoracic region in 2 patients, the lumbar region in 10 patients, and 6 patients had changes in both the cervical and lumbar segments of the spine. Most participants had one or more types of imaging studies performed in their medical records: magnetic resonance (MR), X-ray, or computed tomography (CT) scan of the spine. The structural changes most commonly seen in the studied patients were Schmorl nodes, osteophytes on the posterior edges of the vertebral bodies, degenerative and productive or degenerative and deforming changes to the edges of the vertebral bodies, exaggerated lumbar lordosis, intervertebral disc diseases such as bulging and herniations pressing on the meningeal sac and peripheral nerve roots, a history of inflammation of the nerve roots, overloading of a specific section of the spine, narrowing of the intervertebral spaces, and degenerative changes in the intervertebral discs. Among comorbidities, patients reported a history of painful shoulder syndrome, degenerative changes in the hip and knee joints, and golfer's and tennis elbow.

Ethics approval and consent to participate

The research was approved by the Ethics Committee of the University of Physical Education in Wroclaw, Number 2/2018. Before participating in the research, the patient's signed a consent form to participate in the project.

Data sources/ Measurement

After giving written consent to participate in the study, patients completed a questionnaire during their first visit. The questionnaire included basic information about age, sex, activities of daily living, diagnosed comorbidities, and type of hobbies. The MPQ (short version) was used which analyzed the sensory characteristics of pain (sensory characteristics describing pain, e.g. strength), affective characteristics of pain (emotional feeling of pain, e.g. anxiety), and current pain intensity expressed using the VAS. Pain analyses were performed before and immediately after therapy to assess changes in pain perception. The WHOQL-BREF questionnaire was also used to assess the level and QoL of participants.

Massage methodology

The massage treatment consisted of three parts: initial, main, and final. First, superficial and deep stroking of the back was performed by spreading a lubricant and familiarizing the patient with the touch. This was followed by the use of circular displacement and skin rolling to increase skin pushing and mobility. Spiral rubbing was then performed on the fascia of the back to improve the nourishment of the massaged tissue. During the main part, transverse kneading of the back's superficial muscles (latissimus dorsi and trapezius) was performed followed by spiral rubbing of the muscles located within the scapula including the rhomboids, supraspinatus, infraspinatus, and teres muscles. Next, the erector muscles of the spine and the quadratus lumborum were worked out by rubbing with the elbow or part of the hand using the transverse kneading technique. In the final part of treatment, superficial stroking was performed again (decreasing the strength of the stimulus) to calm the body. The entire treatment sequence was then repeated on the other side of the body.

Statistical methods

In order to check the normality of distribution, the Shapiro-Wilk test was used. The Wilcoxon test was applied to assess the results of the MPQ and the VAS. The results of the WHOQOL-BREF questionnaire were calculated according to the developer's guidelines [26–27].

Results

Descriptive data

The WHOQOL-BREF questionnaire assessed four domains of QoL: physical functioning, mental functioning, social functioning, and environmental functioning. In addition, two items were analyzed separately and included the individual overall perception of QoL and individual overall perception of self-reported health. Each answer was scored on a 1 to 5-point scale. A maximum of 20 points could be earned in each area. The higher the score, the higher the QoL. The obtained results were calculated according to reported guidelines [26–28]. The respondents rated their QoL as good with the best score in the social domain, which shows that they were satisfied with the social relationships in their lives. The physical domain was rated the weakest by study participants indicating that somatic symptoms are strongly perceived and significantly reduce QoL (Table 1).

Table 1. WHOQOL-BREF questionnaire scores reported by domain

Quality of life domain survey (n=23)	Minimum	Maximum	Mean	Standard deviation
Overall quality of life – WHO1	3	5	3.695	0.558
Life satisfaction – WHO2	2	4	3.130	0.694
Physical domain – DOM1	9	15	12.695	1.663
Psychological domain – DOM2	11	18	13.782	1.731
Social relations – DOM3	11	19	14.260	2.526
Environment – DOM4	10	17	13.565	2.232

The MPQ analyzed the sensory component of pain (four-item scale), the affective aspect of pain (four-item scale), current pain intensity (six-item verbal numerical rating), and pain intensity using the VAS.

The questionnaires are a subjective assessment of the patient's feelings, but the MPQ is designed to provide a quantitative and qualitative description of pain. The choice of words to characterize pain were varied and broad, making it easier to specify the nature of pain. However, when working with the elderly, making sure the words are understood and the grading of intensity is appropriate to the patient's current condition must be considered. It is also advisable to assist them in completing the questionnaire.

Every component of the pain score improved after treatment. Changes in the sensory and affective (emotional) components were manifested by the fact that after therapy, patients chose fewer adjectives to describe the pain they were experiencing and marked a lower (weaker) intensity of pain (Fig. 2 and 3).

Pain severity (pain intensity) expressed by the words "very severe" or "severe" changed to "light" or "mild" after therapy. After therapy, none of the participants experienced pain described by the words "awful — unbearable" expressed by a maximum score of 5 (Fig. 4). Pain intensity measured on the VAS scale reached a maximum value of 8 before therapy and 3 after therapy. The lowest value was 3 before therapy and 0 after therapy meaning no pain. The noted changes were statistically significant (Fig. 5).

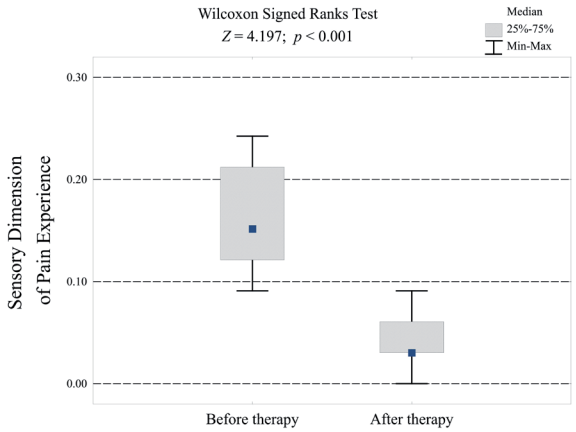

Figure 2. Sensory aspect of pain before and after therapy

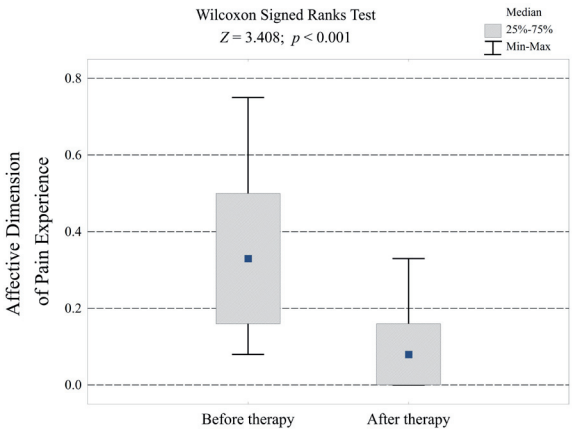

Figure 3. The affective aspect of pain before and after therapy

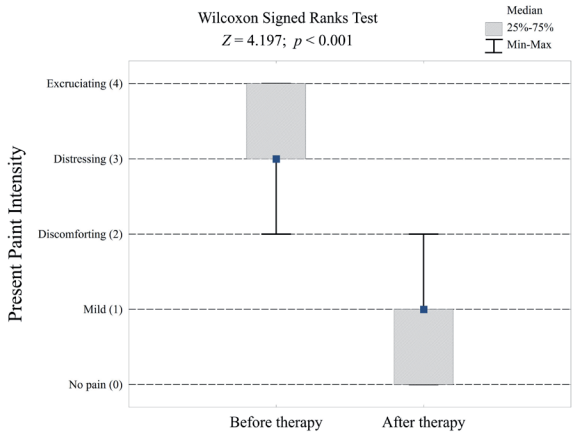

Figure 4. Current pain intensity (CPI) before and after therapy

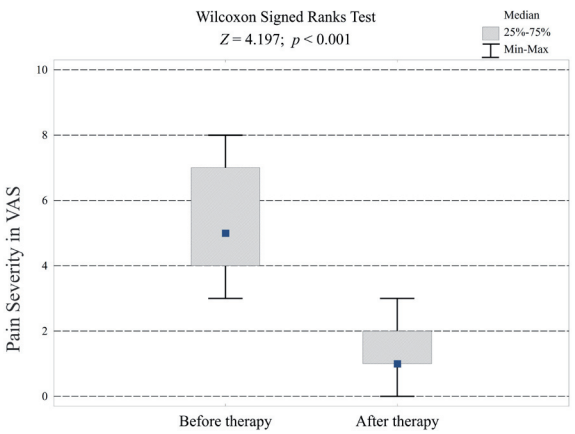

Figure 5. Pain intensity (VAS) before and after therapy

The patient's sensory and emotional experience of pain, as well as current pain intensity (CPI) and pain severity (VAS), changed positively immediately after therapy and were statistically significant (Table 2).

Table 2. McGill questionnaire scores in the study group before and after therapy

Parameter	Before therapy			After therapy			Test result p
	M±SD	Me [Q1; Q3]	Min–Max	M±SD	Me [Q1; Q3]	Min–Max	
VAS	5.4±1.5	5 [4; 7]	3–8	1.3±1.0	1 [1; 2]	0–3	**<0.001**
AIB	3.30±0.63	3 [3; 4]	2–4	0.87±0.69	1 [0; 1]	0–2	**<0.001**
Sensory	0.16±0.05	0.15 [0.12; 0.21]	0.09–0.24	0.04±0.03	0.03 [0.03; 0.06]	0.00–0.09	**<0.001**
Affective	0.34±0.20	0.33 [0.16; 0.50]	0.08–0.75	0.10±0.11	0.08 [0.00; 0.16]	0.00–0.33	**<0.001**

M – arithmetic mean; SD – standard deviation; Me – median (50%); Q1 – lower quartile (25%); Q3 – upper quartile (75%), Min – lowest value; Max – highest value.

Discussion

Massage is a treatment used for various ailments that occur in the elderly. It is very common for seniors to have a relaxing back massage, which, when performed slowly, calmly, and gently is intended to relax and facilitate falling asleep [4, 29]. Therapeutic abdominal massage is also to support the internal organs [30–31]. Common complaints in the elderly requiring physiotherapeutic intervention including therapeutic massage are degenerative changes in the knee and hip joints, spinal disorders, or chronic pain resulting from rheumatic diseases [21, 32–37].

Seniors should remain physically active for as long as possible, as the progressive and inevitable changes that occur with age in the body can lead to many dysfunctions.

We cannot stop time, we cannot stop the physiological changes that occur in the body, but we can and should prevent and keep the body in good physical condition and the mind in good mental condition [37].

Chronic diseases and comorbidities occurring in old age with predominant somatic symptoms affect other elements of life such as functioning in daily, social, family, and community life [24–25].

Interpretation

The results of the study regarding perceived and declared QoL are similar to those declared by young people diagnosed with chronic diseases. Young obese or overweight people face not only physical problems, but also resign from their social life, do not participate in social activities, and avoid integration at work over the course of the disease [28]. In one study, obese individuals obtained the lowest scores in the psychological domain while performing best in the social domain [28]. In our study, the seniors also scored highest in the social domain and lowest in the physical domain which confirms that somatic symptoms limit one's functioning and motor activities. The QoL of the studied seniors is perceived to be similar to that of women after mastectomy procedures. A patient's QoL is significantly affected by the surgical treatment of neoplastic lesions and removal of the breast. They often demonstrate resignation from life, isolation from family and friends, and a lack of desire to participate in social life. According to the study, the physical domain of female respondents was rated the worst which is similar to that of the elderly people in our study [38]. The social domain had the best results similar to the older adults surveyed. In the case of older people, advanced age and the associated limitations and dysfunctions within the musculoskeletal system, lack of independence, and need for assistance from third parties constitute factors leading to the abandonment of numerous forms of activity.

Various types of massage have been repeatedly used in spinal pain [15,18,37]. However, in many cases, the methodology of the procedure was not specified or described in detail, and the methods of performing each technique varied among numerous authors. The treatment duration, number of repetitions of each movement, types of techniques used, and duration of each session were all different. The measurement methods were also different making it hard or even impossible to compare the results of our study with other authors [29,37].

The positive effects of massage on pain reduction have been repeatedly reported in the literature, but the results have usually been short-lived [1,4,19]. However, even a short-term reduction in pain provides a good opportunity to participate in physical activity, especially for the elderly, whose activities are significantly reduced compared to younger people. The correct sequence of therapeutic measures is also

very important. Pain reduction is the first priority followed by motivation to undertake physical activity. Massage should play a special role in this process as it creates conditions for further improvements by alleviating pain [19].

Generalizability

It is also important to note that the elderly are very willing to undergo massage therapy. Nevertheless, they should be made aware that self-therapy in the form of self-massage or therapeutic gymnastics performed on their own are equally important and necessary. Self-therapy applied systematically allows for the consolidation of the therapeutic effects achieved and prevents future recurrences of pain, thus contributing to improved physical fitness and improved the QoL of the elderly [39–40].

Study limitations

The results of this study evaluated the state immediately after the end of therapy. In order to demonstrate the consolidation of therapeutic effects, the measurements should be repeated one, three, and six months after the end of treatment. The research should be continued on a larger group of patients.

Conclusions

Massage resulted in a reduction of spinal and lumbar pain in older adults. Massage is an effective form of therapy for reducing back pain in older adults. The pain complaints in the study group reduced their QoL.

Declarations/Acknowledgements

Registration: The Senate Committee for Ethics in Scientific Research at the University School of Physical Education approved this research project, entitled "Assessment of the effectiveness of massage in rehabilitation in back pain syndromes", on 09.02.2018.

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Word count: 2767 • Tables: 2 • Figures: 5 • References: 40

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Wilk I, Kowalczyk K, Nowak B, Andrzejewski W, Kassolik K.
Effectiveness of massage therapy in reducing back pain in older adults.
Med Sci Pulse 2022;16(2):15–21. DOI: 10.5604/01.3001.0015.8755.

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Received: 11.04.2022
Reviewed: 01.06.2022
Accepted: 03.06.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 10 June 2022

DOI: 10.5604/01.3001.0015.8819

TRADITIONAL PRACTICES DURING PREGNANCY, DELIVERY, AND PUERPERIUM USED BY WOMEN IN POLAND AND TURKEY

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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: Many traditional practices related to pregnancy, birth, and the postnatal period are used around the world.

Aim of the study: The purpose of this study was to determine and compare traditional methods used by women of different cultures during pregnancy, delivery, and the postpartum period.

Material and methods: This descriptive study was conducted in a maternity hospital in Turkey and gynecology and obstetrics outpatient clinics in Poland. The study sample consisted of 235 women from Turkey and 230 women from Poland. A self-administrated questionnaire was used to collect the data.

Results: It was found that pregnancy-related traditional methods using an increase in skin changes were perceived by 40.3% of the women in Turkey as a pregnancy indicator and a predictor of gender of the infant by the shape of the abdomen in 90.8% of women. Delivery-related traditional methods of burying the umbilical cord were used by 80.1% of women, and postpartum-related traditional methods using depilatory agents for perineal care were endorsed by 42.1% of women. Praying for protection from the evil eye and other evil situations was reported by 62.3% of women. It was found that pregnancy-related traditional methods using intuition were reported by 43.8% of the women in Poland, and the prediction of the gender of an infant was also based on intuitions. Delivery-related traditional methods to prevent the retention of the placenta with massage were reported by 66.7% of women. Postpartum-related traditional methods of taking a shower for perineal care were practiced by 92.2% of women in addition to using red items for protection from the evil eye and other evil situations.

Conclusions: It was found that there are various traditional practices during pregnancy, delivery, and the postpartum period in both countries that are similar, but differences also exist between the two countries.

KEYWORDS: pregnancy, delivery, puerperium, traditional practices, midwifery

Background

One's culture is determined by fully learned and socially transmitted behaviors that contain many different meanings and constantly evolve to include all values, principles, customs, and habits shared by society. Culture can affect many aspects of human life, from the shaping of one's personality to parental attitudes and from child-raising techniques to the language used in one's home [1]. People learn traditional beliefs and practices that develop as a reflection of a society's thoughts and life from previous generations to overcome material and spiritual difficulties. These beliefs are then transferred to the next generation. Thus, certain beliefs and practices can emerge that are difficult to change [2].

The traditional method of transmitting society's beliefs, traditions, values, and cultures is through oral teachings [3]. Every country has its own traditions and practices [4]. It has been observed that treatment methods become more irrational as one transitions from developed societies and regions towards undeveloped societies and regions in which people must become doctors of themselves where health care services are not sufficiently accessible. For example, the World Health Organization (WHO) reported that childbirths are mostly performed by traditional methods in African countries and that high fevers caused by malaria in Ghana, Mali, Nigeria, and Zambia are mostly (60%) treated with herbs at home [5].

Nowadays, in developing countries, many women lose their lives from complications experienced during pregnancy, birth, and the postnatal period. The most important required activities performed to reduce maternal mortality are the services provided during the prenatal, birth, and postnatal periods [6]. Thus, as a requirement of their profession, midwives must have knowledge about the cultural characteristics in the areas they serve. Also, they must know the needs, knowledge level, and practices of their communities in order to be able to provide adequate service, health care, and education [7]. A society cannot develop a health service model that excludes cultural features. Before planning the care services for a community, it is essential for the effectiveness of the services that health care professionals who engage in one-to-one communication with the community recognize the practices of the community to whom the care services will be given. It is important to know the individuals' socio-cultural characteristics that affect their health behaviors and allow them to use cultural practices that will not adversely affect their health together with more traditional medical treatments [8]. The physical, mental, and social damages caused by certain cultural practices are rooted in tradition and developed as a result of ignorance and misinformation. These practices are transmitted from generation to generation and present an opportunity for midwives to attain the desired result in each individual's own life [9]. In order to develop health-related behaviors in the community, midwives should know which cultural factors are behind these behaviors [2].

According to our literature review, Turkey has many traditional practices related to pregnancy, birth, and the postnatal period but different cultures were not addressed [2, 4, 7]. According to Eğri, women living in rural areas of Zambia do not want to give birth in the hospital due to the belief that traditional practices will not be performed on the placenta in the hospital [2]. It has been observed that Chinese women carry out both medical and traditional practices during the postnatal period [2, 10]. In the study carried out by Lee, Chinese women living in Hong Kong indicated that symptoms of postnatal depression were observed more frequently in women who did not perform traditional practices during the postnatal period [10]. Özsoy and Katabi reported that there are common beliefs and practices in Turkish and Iranian societies for protecting the mother and the infant from evil eyes [11].

In Poland, people have believed in the power of prayer for centuries as it is supposed to ensure prosperity during pregnancy and puerperium, similar to the baptism of a child during the sacrament of admission into the Christian community. Additionally, practices not associated with religion have also been observed, for instance, the attachment of a red ribbon to a pram. This practice is derived from the old belief that the color red protects against the "evil eye" [12].

Midwives have substantial responsibilities in the protection and development of a women's health plan. Especially in preventing problems related to fertility, the care given by midwives during pregnancy, birth, and the postnatal period is critical. In order for the care provided by midwives during these periods to be effective and appropriate to their patient's needs, they must address the woman as a whole with the characteristics of the environment in which she lives. In the philosophy of care, called "holistic care" in many primary patient care sources, knowing and using cultural factors can be influential [4, 8]. Based on the assumptions that pregnant and puerperal women who use traditional practices do not have an understanding of contemporary health and sufficient knowledge of the potentials of medicine, midwives have a duty to these women. The first duty is to inform the public about the drawbacks of conventional practices and the benefits of newer opportunities. The second duty involves ensuring the individuals to whom they provide pregnancy follow-ups, birth support, and puerperal-neonatal follow-up services are not harmed by the use of traditional behaviors. In this context, relevant healthcare professionals must

recognize traditional practices, know their positive and negative aspects of them, and use this information effectively in the region where they serve [8].

Aim of the study

This study is carried out to determine and compare the traditional methods used by women during pregnancy, delivery, and puerperium in different cultures.

Material and methods

Study design

The research was a descriptive cross-sectional comparative study. Data collection was carried out from June 1st to July 7th, 2015, in the Erzurum Nenehatun Maternity Hospital in Turkey and two outpatient clinics in Rzeszów and Koszalin in Poland.

Participants

The study sample consisted of 465 participants (230 from Poland and 235 from Turkey) who met the following inclusion criteria: age >18 years, patients who gave birth in the last 6 months, voluntarily agreed to participate in the study and had no communication difficulties. The exclusion criteria included: age <18 years, women who had difficulties with understanding the language, and those who did not agree to participate in the study.

Ethical consideration

The study was conducted in accordance with the Declaration of Helsinki for medical research. Before conducting the research, the necessary approval was obtained from the Ethics Committee Faculty of Health Sciences at Ataturk University (resolution no. 10/10/2013).

Data sources

A questionnaire prepared by the first author was used as the data collection tool. The choice to use standardized interviewing as the research technique was due to the desire to collect homogeneous and comparable data. The form was translated into English by linguists and assessed by the researchers. It was later translated into the Polish language. The questionnaire consisted of 17 questions accessing information about the socio-demographic characteristics, obstetric history, and traditional practices used during pregnancy, delivery, and the postpartum period of the women participating in the study. The researchers conducted a face-to-face interview with each woman at a time convenient for the respondent. The interviews took place in safe, quiet, and comfortable places and lasted between 10–15 minutes.

Statistical analysis

The data collected was analyzed using the SPSS 18.0 program. To verify the occurrence of differences between the groups of respondents, chi-square tests were used. The results were presented as descriptive statistics and frequencies within a table. The frequency distribution for each variable and the most common answer was defined with an assumed level of significance using a p-value of ≤0.05.

Results

Characteristics of the study group

Turkish respondents were most likely to be between the ages of 27–34 (47.2%), have a primary education (63.4%), be married (100.0%), not working (87.7%), live in an urban center (69.8%), have income equal to their expenses (75.7%), have their first marriage between the ages of 18–25 (76.2%), and have a nuclear family structure (81.3%) (Table 1).

It was observed that 54.8% of the women in Poland were 35 years of age and above, 72.6% were high school graduates, 82.6% were married, 96.1% worked, 83.5% were civil servants, 28.7% lived in a village, 56.5% had an income equal to their expenses, 58.7% had a nuclear family structure, and 82.2% had their first marriage between the ages of 18–25 (Table 1).

It was observed that 78.7% of women in Turkey had their first pregnancy between the ages of 18–25, 43.4% had 3–4 pregnancies, 70.7% had 1–2 living children, 92.8% had no history of stillbirth or abortion, 51.9% had a girl, 54.0% had a normal birth, and 51.5% of the babies were delivered by midwives. It is also observed that 66.0% did not receive information about pregnancy care, 74.9% did not receive information about birth care, and 68.9% did not receive information about postnatal care. When information was provided, 42.5% received information about pregnancy care from health workers, 44.1% received information about birth care from health workers, and 53.4% received information about postnatal care from midwives (Table 2).

Table 1. Distribution of the Descriptive Characteristics of Women by Country

Characteristics	Poland (n=230)		Turkey (n=235)	
	n	%	n	%
Age				
19–26 years	18	7.8	79	33.6
27–34 years	86	37.4	111	47.2
35 years and over	126	54.8	45	19.1
Educational status				
Literate	—	—	27	11.5
Primary education	3	1.1	149	63.4
High school	167	72.8	37	15.7
University	60	26.1	22	9.4
Marital status				
Married	190	82.6	235	100.0
Single	40	17.4	—	—
Employment status				
Employed	221	96.1	29	12.3
Unemployed	9	3.9	206	87.7
Profession				
Housewife	5	2.2	209	88.9
Civil servant	192	83.5	18	7.7
Worker	33	14.3	8	3.4
Place of residence				
City	74	32.2	164	69.8
District	34	14.8	29	12.3
Town	56	24.3	—	—
Village	66	28.7	42	17.9
Income status				
More than their expenses	37	16.1	25	10.6
Equal to their expenses	130	56.5	178	75.7
Less than their expenses	63	27.4	32	13.6
Social security				
There is social security	226	98.3	193	82.1
No social security	4	1.7	42	17.9
Family type				
Nuclear family	135	58.7	191	81.3
Extended family	60	26.1	44	18.7
Fragmented family	44	15.2	—	—
Age at first marriage				
Younger than 18	—	—	31	13.2
18–25	189	82.2	179	76.2
26–35	41	17.8	25	10.6

It was observed that 62.6% of the women in Poland had their first pregnancy within the age range of 18–25, 57.4% had 1–2 pregnancies, 75.7% had 1–2 living children, 94.8% had no history of a stillbirth or miscarriage, 54.8% had a girl, 68.3% had a normal birth, and 59.6% of babies were delivered by doctor-midwife collaboration. It was also observed that 70.0% received information about pregnancy care, 63.5% received information about birth care, and 60.4% received information about postnatal care. When information was provided, 67.1% received information about pregnancy care from their doctor, 49.3% received information about birth care from their midwife, and 52.5% of them received information about postnatal care from their midwife (Table 2).

Table 2. Distribution of the Obstetric Characteristics of Women by Country

Characteristics	Poland (n=230)		Turkey (n=235)	
	n	%	n	%
First pregnancy age				
Younger than 18	23	10.0	20	8.5
18–25	144	62.6	185	78.7
26–35	63	27.4	30	12.8

Table 2 contd.

Characteristics	Poland (n=230)		Turkey (n=235)	
	n	%	n	%
Number of pregnancies				
1–2	132	57.4	96	40.9
3–4	89	38.7	102	43.4
5 and more	9	3.9	37	15.7
Number of living children				
1–2	171	75.7	164	70.7
3–4	48	21.2	56	24.1
5 and more	7	3.1	12	5.2
Number of stillbirths				
0	218	94.8	218	92.8
1	10	4.3	17	7.2
2	2	0.9	—	—
Number of miscarriages				
0	167	72.6	213	90.6
1	46	20.0	19	8.1
2	13	5.7	3	1.3
3	4	1.7	—	—
Gender of the latest baby				
Female	126	54.8	122	51.9
Male	104	45.2	113	48.1
Mode of delivery				
Normal	157	68.3	127	54.0
Cesarean section	73	31.7	108	46.0
The person who delivered the baby				
Doctor	25	10.9	108	46.0
Midwife	68	29.6	121	51.5
Doctor and Midwife	137	59.6	6	2.6
Receiving information about pregnancy care				
No	69	30.0	155	66.0
Yes	161	70.0	79	34.0
From whom information about pregnancy care was received n=240				
Doctor	108	67.1	25	31.3
Midwife	33	20.5	21	26.3
Interdisciplinary team (doctor + midwife + nurse)	20	12.4	34	42.5
Receiving information about birth care				
No	84	36.5	176	74.9
Yes	146	63.5	59	25.1
From whom information about birth care was received n=205				
Doctor	39	26.7	11	18.6
Midwife	72	49.3	22	37.3
Interdisciplinary team (midwife + nurse + doctor)	35	24.0	26	44.1
Receiving information about postnatal care				
No	91	39.6	162	68.9
Yes	139	60.4	73	31.1
From whom information about postnatal care was received n=212				
Doctor	8	5.8	5	6.8
Midwife	73	52.5	39	53.4
Health workers (doctor + midwife + nurse)	58	41.7	29	39.7

Main results

In Turkey, 40.3% of women perceived increased skin changes as a sign of pregnancy, and 90.8% of women predicted the gender of the infant according to the shape of their abdomen. These were found to be traditional practices related to pregnancy. In 86.4% of women, pressure was applied to the abdomen to prevent placenta retention, and 80.1% of women buried the umbilical cord. These were observed to be the most used traditional practices related to birth. In 42.1% of women, a depilatory agent was used for perineum care, and 62.3% of women prayed to be protected from the evil eye and

other bad situations. These were determined as the most common traditional practices related to puerperality (Table 3).

Over 43% of women in Poland perceived their pregnancy intuitively, and all of them predicted the gender of the infant intuitively. These were found to be the most common traditional practices used related to pregnancy. In 66.7% of women, massage was used to prevent placenta retention, and according to religious beliefs, all of the children were baptized to help the umbilical cord to heal. These were observed to be the traditional practices used related to birth. In 92.2% of women, taking a shower was used for perineum care, and 97.0% of women used red goods to protect them from the evil eye and other bad situations. These were determined to be the traditional practices related to puerperality (Table 3).

It was observed that there are statistically significant differences between the two countries according to the use of traditional practices ($p < 0.05$). These practices included the sign used in predicting the pregnancy, predicting the gender of the infant, predicting a boy or girl baby, and predicting birth. Additionally, statistically significant differences were seen between the traditional practices used in easing the birth, preventing placenta retention, for the umbilicus, for perineum care, easing the return of the uterus to its former state, reducing swelling of the breasts, increasing breast milk, and in protecting the mother and baby from diseases and the evil eye (Table 3).

Table 3. Distribution of Women by Country According to Their Status of Performing Traditional Practices Related to Pregnancy, Birth, and the Postnatal Period

Characteristics	Poland (n=230)		Turkey (n=235)		Test and p-value
	n	%	n	%	
Using traditional practices as a pregnancy sign					
Yes	16	7.0	186	79.1	X^2=246.56
No	214	93.0	49	20.9	**p=0.000**
Traditional practices used as a pregnancy sign	**(n=16)**		**(n=186)**		
Intuitive	7	43.8	7	3.8	
Nausea	3	18.8	19	10.2	X^2=65.25
Inability to menstruate	6	37.5	11	5.9	**p=0.000**
Sticking/Proliferation of eyelashes	—	—	77	39.8	
Changes in the skin	—	—	75	40.3	
Using traditional practice in predicting the infant's gender					
Yes	3	1.3	174	74.0	X^2=260.86
No	227	98.7	61	26.0	**p=0.000**
Traditional practices used in predicting the infant's gender	**(n=3)**		**(n=174)**		
Intuitive	3	100.0	7	4.0	
If the abdomen is wide, it is a boy; if the hips are wide, it is a girl.	—	—	158	90.8	X^2=50.96
If the pregnant woman eats sweet food, it is a boy; if the pregnant woman eats sour food, it is a girl	—	—	5	2.9	**p=0.000**
If on the right side, it is a boy; if on the left side, it is a girl	—	—	4	2.3	
Using traditional practices to have a baby boy					
Yes	13	5.7	45	19.1	X^2=19.39
No	217	94.3	190	80.9	**p=0.000**
Traditional practices used to have a baby boy	**(n=13)**		**(n=45)**		
Intuitive	13	100.0	—	—	X^2=58.00
Sleeping on the right side after sexual intercourse	—	—	42	93.3	**p=0.000**
If the pregnant woman has a pointed abdomen, it is a boy	—	—	3	6.7	
Using traditional practices to have a baby girl					
Yes	12	5.2	33	14.0	X^2=10.35
No	218	94.8	202	86.0	**p=0.001**
Traditional practices used to have a baby girl	**(n=12)**		**(n=33)**		
Not too much nausea	12	100.0	2	6.1	X^2=16.43
If the abdomen is downward, it is a girl	—	—	2	6.1	**p=0.000**
Sleeping on the left side after sexual intercourse	—	—	29	87.9	
Using traditional practices as a sign of birth					
Yes	6	2.6	139	59.1	X^2=173.15
No	224	97.4	96	40.9	**p=0.000**
Traditional practices used as a sign of birth	**(n=6)**		**(n=139)**		
Intuitive	6	100.0	1	0.7	X^2=123.39
Lowering of the abdominal area	—	—	135	97.1	**p=0.000**
Changes in the color of the skin	—	—	3	2.2	
Using traditional practices to ease the birth					
Yes	11	4.8	158	67.2	X^2=195.95
No	219	95.2	77	32.8	**p=0.000**

Table 3 contd.

Characteristics	Poland (n=230)		Turkey (n=235)		Test and p-value
	n	%	n	%	
Traditional practices used in easing the birth	**(n=11)**		**(n=158)**		
Massage	4	36.4	—	—	
Movement	7	63.6	93	58.9	X^2=62.01
To shower	—	—	49	31.0	**p=0.000**
For Eating-Drinking (Date/Olive Oil/Butter/Onion Water)	—	—	11	7.0	
To pray	—	—	5	3.2	
Using traditional practices to reduce vaginal bleeding					
Yes	2	0.9	7	3.0	X^2=2.72
No	228	99.1	228	97.0	**p=0.099**
Traditional practices used in reducing vaginal bleeding	**(n=2)**		**(n=7)**		
Movement	1	50.0	—	—	
To shower	—	—	2	28.6	X^2=9.00
Breastfeeding	1	50.0	—	—	**p=0.061**
To sit on the hot soil	—	—	3	42.9	
To raise the legs up	—	—	2	28.6	
Using traditional practices to prevent placenta retention					
Yes	3	1.3	22	9.4	X^2=14.83
No	227	98.7	213	90.6	**p=0.000**
Traditional practices used in preventing placenta retention	**(n=3)**		**(n=22)**		
Massage	2	66.7	1	4.5	
Breastfeeding	1	33.3	—	—	X^2=18.68
Applying pressure to the abdomen	—	—	19	86.4	**p=0.000**
Tying shoes to the edge of the cord	—	—	2	9.1	
Using traditional practices for the umbilicus					
Yes	8	3.5	191	81.3	X^2=287.37
No	222	96.5	44	18.7	**p=0.000**
Traditional practices used for the umbilicus	**(n=8)**		**(n=191)**		
Religious beliefs (baptism)	8	100.0	—	—	
Burying the umbilical cord	—	—	153	80.1	X^2=199.00
Hiding at home	—	—	33	17.3	**p=0.000**
Putting a coin and wrapping	—	—	5	2.6	
Using traditional practices for perineum care					
Yes	64	27.8	19	8.1	X^2=30.89
No	166	72.2	216	91.9	**p=0.000**
Traditional practices used for perineum care	**(n=64)**		**(n=19)**		
To shower	59	92.2	5	26.3	
Herbal remedies	4	6.3	—	—	X^2=52.03
Insulation	1	1.6	6	31.6	**p=0.000**
Using a depilatory agent	—	—	8	42.1	
Using traditional practices to ease the return of the uterus to its former state					
Yes	16	7.0	161	68.5	X^2=186.80
No	214	93.0	74	31.5	**p=0.000**
Traditional practices used in easing the return of the uterus to its former state	**(n=16)**		**(n=161)**		
Massage	1	6.3	13	8.1	
Breastfeeding	13	81.3	—	—	X^2=151.11
For eating and drinking (cabbage juice, olive oil)	2	12.5	3	1.9	**p=0.000**
To wrap cloth to the abdomen	—	—	145	90.1	
Using traditional practices to reduce swelling of the breasts					
Yes	48	20.9	141	60.0	X^2=73.71
No	182	79.1	94	40.0	**p=0.000**
Traditional practices used in reducing swelling of the breasts	(n=48)		(n=141)		
Massage	2	4.2	18	12.8	
To shower	4	8.3	51	36.2	
Breastfeeding	4	8.3	10	7.1	X^2=60.85
Herbal remedies (onion application)	18	37.5	5	3.5	**p=0.000**
Milking	20	41.7	30	21.3	
Combing with a comb	—	—	27	19.1	
Using traditional practices to increase breast milk					
Yes	45	19.6	211	89.8	X^2=231.63
No	185	80.4	24	10.2	**p=0.000**

Table 3 contd.

Characteristics	Poland (n=230)		Turkey (n=235)		Test and p-value
	n	%	n	%	
Traditional practices used in increasing breast milk	**(n=45)**		**(n=211)**		
Breastfeeding	14	31.1	3	1.4	
Herbal remedies/tea	13	28.9	69	32.7	X^2=69.99
Milking	3	6.7	—	—	**p=0.000**
For eating-drinking (stewed fruits, tea, pilaf with burghul, water, lentil soup)	15	33.3	139	65.9	
Using traditional practices to protect the mother and baby from diseases					
Yes	53	23.0	116	49.4	X^2=34.80
No	177	77.0	119	50.4	**p=0.000**
Traditional practices used in protecting the mother and baby from diseases	**(n=53)**		**(n=116)**		
To shower	6	11.3	—	—	
Breastfeeding	7	13.2	—	—	
Religious beliefs (putting bread and the Quran on the side/praying, making amulets)	—	—	13	11.2	X^2=144.76 **p=0.000**
House cleaning	40	75.5	6	5.2	
Not leaving home for 40 days	—	—	97	83.6	
Using traditional practices to protect the mother and baby from the evil eye, etc.					
Yes	33	14.3	207	88.1	X^2=253.06
No	197	85.7	28	11.9	**p=0.000**
Traditional practices used in protecting the mother and baby from the evil eye, etc. (n=240)	**(n=33)**		**(n=207)**		
Using red goods	32	97.0	—	—	
To pray	—	—	129	62.3	X^2=231.73
Baptism/evil eye talisman/to wear an amulet	1	3.0	49	23.7	**p=0.000**
To put bread/onion/the Quran, etc. on the side of the baby	—	—	29	14.0	

Discussion

For ages people in every culture attached great importance to the so-called "transition periods" like birth, entry into adulthood, marriage, and death. Pregnancy and the birth of a new member of society have always remained shrouded in mystery, and the accompanying rituals reinforce the belief that it is an exceptional time, having a "mystical element" to it [12]. The conducted research confirms that despite medical progress, folk rituals and customs as well as superstitions related to the perinatal period are still deeply rooted in culture.

Pregnancy

Comparing the practices used in both countries during pregnancy, it can be seen that in Turkey many women still rely on folk beliefs, e.g. 79.1% of Turks pay attention to pregnancy symptoms such as eye stickiness and changes of the skin. Ozsoy and Katabi have described other symptoms believed by Turks and Iranians such as: "If her shoulders move while breathing or if she does not enjoy drinking tea". Foreseeing a child's sex, which is declared by 74% of Turkish women, is most often made based on the shape of the abdomen, which has also been reported by Ozsoy and Katabi [11]. Polish women rely less on unconventional traditions and the knowledge deficit is replaced by intuition and good feelings [12].

Labor

With regard to labor, women from both countries indicate activity and movement as methods of accelerating childbirth. As reported by Ozsoy, mothers in her paper also indicated a bath and prayer. According to Polish women, massage was helpful in giving birth to the placenta, and according to Turkish women pressing on the abdomen was helpful as reported in a previous study [11].

Our research confirms that in both countries despite women having medical knowledge, 81.3% of Turks still use traditional methods like the burial of the umbilical cord in the ground that in their conviction works for faster healing of the umbilicus.

During puerperium, many Turks stay at home for 40 days, a tradition similar to Indonesia and many other Asian countries [7, 13–17]. This custom was prevalent in old Poland, where young mothers were recommended to stay with their child at home until their baptism but is no longer practiced. In China, the province of Fujian has a tradition called "doing the month" (*zuo yuezi*) which requires women to stay

in bed for 30 days after birth [12]. In other reports, authors point out that isolation has several positive aspects, because apart from limiting contact with the environment (prophylaxis of infections), it gives the mother time to relax and adapt to a new life situation and, as confirmed by other researchers, influences postnatal depression [18–20].

Diet

The WHO recommends a balanced diet for women during lactation, as well as an increase in the daily caloric intake by 10–20% in "The Guide for Nursing Mothers" [21]. According to research, women in Turkey pay more attention to an appropriate diet during puerperium which affects both postpartum wound healing [11, 22, 23] and maintenance and stimulation of lactation [11]. Polish researchers have shown that sociodemographic, environmental, lifestyle, and pregnancy-related determinants affect the mother's quality of diet [24].

Hygiene

Almost half of Turkish and 23% of Polish women apply traditional practices to prevent infections. Mothers in both countries pay attention to the maintenance of personal hygiene as well as hygiene of the environment for the prevention of diseases and infections at home and in their child. In Ozsoy's study, surveyed mothers washed their crotch "with cologne or vinegar" [11]. Raven, in turn, describes that China's hygiene practices during puerperium are limited to intimate areas, deliberately omitting bathing the whole body and even brushing teeth [15]. Undoubtedly, body hygiene of women during the postpartum period prevents infections, including infections of the crotch [25, 26].

During puerperium, the process of uterus involution occurs and in the opinion of Polish women (81.3% use traditional methods) breastfeeding helps this process, and according to Turkish women (90.1%) the best method is to use oppressive underwear and half of the respondents admitted to using such underwear [27].

Evil eye

In the tradition of many cultures, there is the belief in the so-called "Evil eye", i.e. a situation when someone who wishes the mother, child, or family harm can bring disaster or illness to them. This conviction has survived in many cultures over time, which has also been confirmed by our research as 14.3% of Polish and 88.1% of Turkish women practice some form of protection. In order to protect against the "evil eye", Turks most often use prayer or special amulets, and Polish women use a red ribbon which they hang on a pram. Karahan et al. similarly reported that Turkish mothers use evil talismans, amulets, or prayer [28]. Similar behaviors are described by other authors, in many countries like Spain, Pakistan, and India where people use the color red to protect children for instance red thread on the wrist or a bracelet made of red beads [29–31]. In Goa, India, 50% of mothers believe and protect their family from the devil's eye [27]. In Dagestan, there is a custom to put silver coins, a small knife for boys or scissors for girls, or a small Qur'an under the child's pillow to protect newborns from the "evil eye" [16].

Pregnancy, childbirth, and motherhood is a special time in every woman's life, in which she tries to maintain the best possible health for herself and her child. In times when knowledge of obstetrics was negligible and medicine did not cope with problematic situations, people relied on beliefs, folk customs, or religion. With the passage of time, both spheres began to interweave creating superstitions that are still visible in the practices of women during pregnancy, birth, and puerperium in many cultures [30]. Some superstitions are not taken seriously today, but some are still cultivated with a pragmatic approach "just in case" as they do not cause any harm but can help. On the other hand, Demirel's results show that the incidence of postpartum depression was lower amongst women who used traditional practices [32].

Our research confirms that there are still many traditions and unconventional practices regarding the perinatal period, hence the important role medical staff, doctors, and midwives play in raising the knowledge and awareness of women through education.

Sometimes traditional, unconventional practices are treated with disdain. However, it is important to remember that they should not supplant evidence-based actions and behaviors. Lulling health care provider vigilance by believing that traditional approaches are harmless can lead to a variety of maternal and child complications. In the future, it is necessary to recognize the impact rituals have on the health of mothers and children from the point of view of current medical knowledge.

Limitations of the study

The conducted research provides important knowledge that is subject to a few limitations. A face-to-face interview with the patient may have caused embarrassment and talking about intimate activities is often difficult for the interviewee. This may cause respondents to avoid telling the full truth out of fear

of ridicule. Some women, even though they are educated in the understanding of their physiology and the perinatal period, may be influenced by women in their families and neighborhoods when faced with pregnancy and becoming a mother. As a result, they may engage in activities that are closer to superstition and beliefs than to scientific evidence.

Conclusions

It was found that there are various traditional practices belonging to pregnancy, delivery, and the postpartum period in both countries as well as differences between them. Turkish women support traditions related to pregnancy and the perinatal period to a greater extent than Poles. During pregnancy, Polish women more often rely on intuition, whereas Turkish women use folk beliefs, e.g. the determination of a child's sex depends on the position during sleep after intercourse. During labor, women in both countries know and apply some methods consistent with current obstetric knowledge (lowering the abdomen before childbirth, movement as a method to speed up labor). In the puerperal period, hygiene and diet are important for women from both countries. In both countries, religion during the perinatal period is important, though not decisive, and often appeals to mothers in difficult situations. The deficit of professional knowledge in difficult situations is replaced by practices derived from folk beliefs and religious rites. In both cultures, there is a belief in evil powers (evil eye) for which in Turkey the remedy is prayer and amulets, and in Poland red ribbons.

In both countries, there is a deficit of medical knowledge regarding pregnancy, delivery, and puerperium. This is why a woman's education should be optimized during these periods in accordance with current medical knowledge.

Acknowledgments

We would like to express our gratitude to the respondents for their willingness to share their time and opinions with us.

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Word count: 5224 • Tables: 3 • Figures: 0 • References: 32

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Ejder Apay S, Nagórska M, Sonmez T, Yagmur Gur E, Yilmaz F, Zych B, Lewandowska A, Lesińska-Sawicka M. Traditional practices during pregnancy, delivery, and puerperium used by women in Poland and Turkey. Med Sci Pulse 2022;16(2):22–32. DOI: 10.5604/01.3001.0015.8819.

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Received: 31.12.2021
Reviewed: 01.06.2022
Accepted: 10.06.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Reviews

Published online: 15 June 2022

DOI: 10.5604/01.3001.0015.8804

CAN SMOKING HAVE A POSITIVE EFFECT ON THE COURSE OF CERTAIN DISEASES? A SYSTEMATIC 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

Background: Smoking cigarettes is a process during which many harmful substances are introduced into the lungs and the influence of these substances on the human body is not completely known. There are many diseases caused by smoking. Interestingly, there are also reports of positive consequences of smoking on some disorders.

Aim of the study: The purpose of this article is to review the literature in regards to the diseases in which cigarettes might have a paradoxically beneficial effect – both on the onset and their course. We also want to focus on the mechanisms responsible for this impact.

Material and Methods: Electronic searching of PubMed was performed. We analyzed articles published in the last 10 years with a particular emphasis on the most recent publications. Combinations of the following words were used: "smoking", "nicotine", and "autoimmune". Publications were selected for reliability and non-bias.

Results: A total of 69 articles out of 2979 qualified for the review. Only studies involving humans were included. The positive effect of smoking cigarettes is observed especially in immunological diseases. It is possible that it is mediated by both stimulating and suppressing the immune system. It is assumed that cigarettes can reduce the risk of developing certain diseases. Smoking might also have an impact on the course of different comorbidities in the same patient.

Conclusions: There are many different mechanisms through which cigarette smoke and nicotine affect the human body. The harmful impact of these substances on one's health has been demonstrated and their addictive component disqualifies them as remedies. Analysis of the mechanisms responsible for the beneficial effects of nicotine can lead to the search for new forms of therapy and prevention.

KEYWORDS: cigarette smoking, health, autoimmune diseases, nicotine

Background

Cigarette smoking is among the most widespread addictions in Poland and worldwide [1]. A 2019 survey by the Centre for Public Opinion Research (CBOS) showed that a quarter of all Polish people smoke cigarettes. As much as a third of men stated that they have contact with cigarettes including the 26% of men who smoke regularly. Women reported less contact with cigarettes, amounting to 21%, including 17% of women who are regular smokers.

The tobacco in a cigarette is subject to incomplete combustion causing the formation of several thousand harmful compounds which are inhaled into the lungs with the cigarette smoke [2]. Their effects on

one's health are unambiguously adverse. According to the World Health Organization (WHO), 8 million people died of diseases related to tobacco exposure throughout 2017. This addiction increases the risk of premature death by as much as three times [3], has been proven to contribute to the pathogenesis of several dozen diseases [3], and reduces one's quality of life [4]. The best-known consequences associated with cigarette smoking are lung cancer and chronic obstructive pulmonary disease, as well as cardiovascular diseases [5–7]. However, there are certain autoimmune diseases and skin diseases affected by the substances inhaled with cigarette smoke that can cause or modify the course of the given disease [8,9].

Due to the complex composition of cigarette smoke, it is difficult to determine its unambiguous effect on organisms. However, the fact that it stimulates the production of autoantibodies and inflammatory cytokines, as well as affects the generation of oxidative stress [10,11]. The effect of inhaled cigarette smoke on the immune system is complex [12]. Besides the aforementioned triggered pathological response of the immune system and their inflammatory effect, some authors claim they can have a protective and anti-inflammatory effect mediated through acetylcholine receptors [12]. Stimulation of this receptor pathway results in an increase in the response of regulatory T cells, a reduction in the levels of inflammatory cytokines, and apoptosis of inflammatory cells [12]. Cigarette smoking has the greatest effect on T and B cells but can also impact macrophages and natural killer (NK) cells – making it an intervention on both the innate and adaptive immune responses [13]. This effect on the immune system by stimulating and inhibiting it simultaneously is one of the mechanisms that could explain the fact that cigarette smoking might have a favorable effect on some diseases – both in terms of protection against the development of the disease and the alleviation of its course.

AIM OF THE STUDY

The goal of this article is to review the diseases for which there are reports concerning the potential paradoxically positive effects of cigarette smoking on their development and course. We also want to focus on the mechanisms responsible for this impact.

MATERIAL AND METHODS

The inclusion criteria used in the review were publication date, compliance with the foregoing topic, and reliability.

Eligibility criteria

We analyzed studies published within the last ten years with a particular emphasis on the most recent research.

Sample: Smokers, non-smokers, and ex-smokers suffering from diseases whose prognosis and course are positively related to smoking.

The phenomenon of interest: the positive effects of cigarette smoking on certain diseases.

Evaluation: Any patient reporting will be evaluated.

Design: All kinds of observational studies: cohort, case control, and individual case studies.

Research type: One can search for qualitative, quantitative, and mixed studies.

Search strategy

The search was conducted using the PubMed Database. The last time the source texts were reviewed was on 1/03/2022. Keywords such as "smoking", "nicotine", and "immunological diseases" were used.

Data collection process

Studies were divided into groups relating to specific diseases. Each of the three authors reviewed selected scientific articles for inclusion in the review. Each of the authors worked independently. First, abstracts were read, and then full articles for selected studies. The extracted data included the following information: the impact of smoking on the course or risk of diseases, the impact of passive smoking, or the impact of smoking in the past. The risk of bias for each study was assessed independently by the

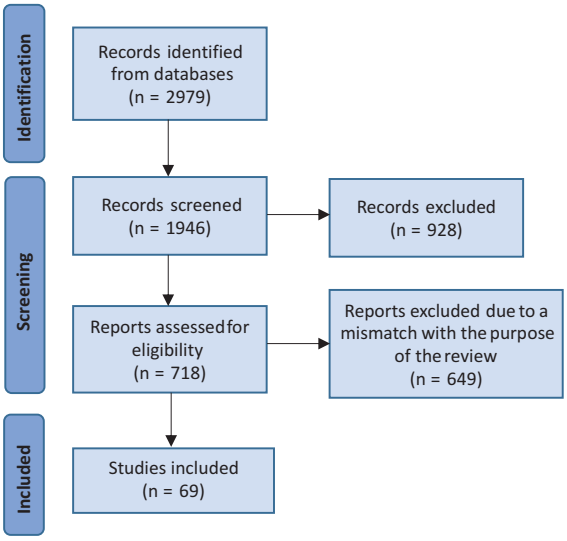

Figure 1. The search process

same authors. The third author will help settle any disputes. The collected data will be presented in text form to allow for a thorough understanding of the topic under discussion.

Results

Study selection

At first, 2979 articles were found and 69 were qualified for review as some studies did not meet the inclusion criteria after reviewing the abstract. Some studies that appeared to meet the inclusion criteria were excluded due to dishonesty or bias. The search process is presented in Fig. 1.

Discussion

UC is a chronic disease from the group of inflammatory bowel diseases. Its etiology has multiple factors including environmental, genetic, and immunological factors [13]. It is probably one of the best-known diseases in which cigarette smoking has

Table 1. Study characteristics

Study	Study design	Patients	Country	Observations
Park S et al. (2019) [14]	Retrospective cohort study	23,235,771	South Korea	Compared with nonsmokers, former smokers had a significantly higher risk of ulcerative colitis (UC) development.
Higuchi LM et al. (2012) [15]	Prospective cohort study	229,111	United States	Current smoking is associated with an increased risk of Crohn's disease, but not UC.
Khalili H et al. (2015) [16]	Prospective case-control study	121,700 116,430	United States	Smoking may influence the levels of androgens in women and the risk of UC.
Ng SC et al. (2015) [17]	Case-control study	442 incident cases and 940 controls	8 countries in Asia and Australia (Asia-Pacific)	Ex-smoking increased the risk of UC.
Blackwell J et al. (2019) [18]	Retrospective cohort study	9,616	United Kingdom	Smokers and never-smokers with UC had similar outcomes with respect to flares, thiopurine use, corticosteroid dependency, hospitalization, and colectomy.
Van der Heide F et al. (2009) [19]	Retrospective cohort study	675	Netherlands	In UC, active smoking shows dose-dependent beneficial effects.
Brenner S et al. (2001) [20]	Case-control study	126 pemphigus patients and 173 healthy controls	Bulgaria, Brazil, India, Israel, Italy, Spain, and the USA	The risk for pemphigus vulgaris was lower for ex-smokers and current smokers than for patients who had never smoked.
Valikhani M et al. (2007) [21]	Case-control study	210 pemphigus patients and 205 control subjects	Iran	Smoking has a protective factor in pemphigus.
Servioli L et al. (2019) [22]	Population-based cohort study	106	United States	Current smokers were less likely to have progressive systemic sclerosis (pSS).
Olsson P et al. (2017) [23]	Case-control study	63	Sweden	Current smoking was associated with a reduced risk in the subsequent diagnosis of pSS.
Stone DU et al. (2017) [24]	Case-control study	1,288	United States	Protective effects of tobacco on pSS manifestations.
Mofors J et al. (2020) [25]	Case-control study	815 patients and 4,425 controls	Sweden	Individuals who develop pSS smoke as much as the general population during early life but are more likely to have stopped.
Bartoloni E et al. (2015) [26]	Retrospective population-based cohort study	1,343	Italy	Smoking was less prevalent in women with pSS than in control subjects.
Manthorpe R et al. (2000) [27]	Prospective cohort study	300	Sweden	Cigarette smoking is negatively associated with focal sialadenitis-focus scores > 1 in lower lip biopsies in patients with primary Sjögren's syndrome.
Ungprasert P et al. (2016) [28]	Case-control study	345 patients and 345 controls	United States	Current smokers have a lower risk of developing sarcoidosis.
Newman LS et al. (2004) [29]	Case-control study	706	United States	A negative association between tobacco smoking and sarcoidosis risk.
Hattori T et al. (2013) [30]	Retrospective cohort study	388	Japan	There could be various relationships between smoking and the development of sarcoidosis in different populations.
Rivera N V. et al. (2019) [31]	Case-control study	3,713	Sweden	Sarcoidosis risk is modulated by smoking due to genetic susceptibility.

Table 1 contd.

Study	Study design	Patients	Country	Observations
Janot AC et al. (2015) [32]	Retrospective cohort study	109	United States	Tobacco exposure is an independent risk factor for ocular sarcoidosis.
Pérez ERF et al. (2013) [33]	Retrospective cohort study	142	United States	This study supports the harmful effects of cigarette smoking on chronic hypersensitivity pneumonitis (HP).
Mooney JJ et al. (2013) [34]	Retrospective cohort study	177 patients with HP and 224 patients with idiopathic pulmonary fibrosis (IPF)	United States	If HP develops in a cigarette smoker, it is more often chronic than in non-smokers and has a higher risk of death.
Wang P et al. (2017) [35]	Prospective cohort study	119	China and United States	No connection between cigarette smoking and the survivability of HP.
Ojanguren I et al. (2019) [36]	Prospective cohort study	160	Spain	No connection between cigarette smoking and the survivability of HP.
Lee YB et al. (2019) [37]	Retrospective nationwide population-based study	22,995,024	Korea	Decreased incidence of Behçet's disease (BD) in current smokers.
Malek Mahdavi A et al. (2019) [38]	Case-control study	192 patients with BD, 822 healthy siblings of patients with BD, and 373 controls	Iran	Smoking is not a significant risk factor for BD.
Lapi F et al. (2016) [39]	Retrospective population-based study	Almost 1 million	Italy	A protective effect of cigarette smoking on the risk of developing chronic spontaneous urticaria.

a potentially favorable effect, although this connection is not clear [40]. There are reports showing fewer smokers among UC patients than in control groups identifying the avoidance of smoking as a risk factor for the development of UC [14,41,42]. It is also possible that smoking is only a protective factor in men [14,15]. A probable cause for such an impact on only one sex may be related to the effect smoking has on the levels of sex hormones [16,43]. Former smokers are at a higher risk than people who have never smoked or are current smokers – the risk of developing UC in former smokers increases with the duration of the previous exposure to cigarettes [14,15,17]. The effect of cigarettes on the reduced risk of developing the disease has been best-proven, yet the "curative" effect of cigarettes on the course of an already existing disease is controversial. The available research in this regard is contradictory. There are reports that cigarette smoking does not significantly reduce the risk of exacerbations or reduce the frequency of hospitalization. In addition, smoking has not shown to affect the proximal colon less frequently or reduce the necessity of thiopurine treatment or colectomy [18,40]. Simultaneously, according to some researchers, current cigarette smokers may have a reduced risk of colectomy and a reduced necessity for the escalation of their current pharmacological therapy [19,44]. Due to the complex composition of cigarette smoke, it is difficult to pinpoint the mechanism responsible for its protective effects in UC. Cigarette smoke may be responsible for changes in the intestinal microbiome and an increase in the thickness of the intestinal mucus layer. Additionally, cigarette smoke reduces the activity of the innate immune response which plays the greatest role in protecting against the development of the disease [42]. It should be emphasized that the effects of the stimulant under consideration on the course of Crohn's disease – another member of the group of inflammatory bowel diseases – are completely different and considered adverse [41,45].

Pemphigus is an autoimmune disease involving the skin and mucous membranes causing blisters and erosions. Many types of pemphigus are described, but the most important ones include pemphigus vulgaris, pemphigus foliaceus, and paraneoplastic pemphigus [46]. As with UC, most studies on pemphigus (both vulgaris and foliaceus) report a smaller percentage of smokers than in the control group [47]. This shows that cigarette smoking may be deemed a protective factor against pemphigus occurrence [20,48]. According to some studies, its effect was more significant in men than in women [20,21]. Research determining the effect of cigarettes on the locations of pathological changes was conducted, however, it is inconclusive on their impact in this regard [49]. In both smokers and non-smokers, the most prevalent type of pemphigus is the form involving both mucous membranes and skin [49]. Faster remission was observed among smokers for pemphigus vulgaris [49]. Additionally, in the same study, remission after one year of treatment was obtained in a significantly larger number of smokers than in those avoiding tobacco [49]. However, the research in this regard is insuffi-

cient and needs to be deepened to enable the drawing of an unambiguous conclusion. The mechanism responsible for the described effects of cigarette smoke has not been precisely discovered so far. The stimulating effect of nicotine on the acetylcholinergic receptors present on keratinocytes is suspected to be of greatest significance [50].

Sjögren's syndrome is a chronic autoimmune disease characterized by the accumulation of lymphocytic infiltrations in exocrine glands resulting in their failure. There are two types of this syndrome: pSS and secondary (developing in the course of other diseases, mostly rheumatological) [51]. A lower percentage of cigarette smokers have been observed in many studies involving pSS patients [22]. Additionally, the status of being a former smoker has a higher risk of disease development [23,24]. A study was conducted in which the frequency of cigarette smoking in early youth was observed among pSS patients to be the same as in the control group, but this percentage decreased with aging patients who later developed pSS [25]. This might suggest a protective effect of cigarettes or suggest that the early emergence of discrete symptoms of the disease, even before the diagnosis, leads patients to change their habits and quit the addiction. Stone et al. [24] point out that the duration of tobacco exposure is significant and inversely proportional to the risk of developing pSS. There are also reports that smoking reduces levels of anti-Ro and anti-La antibodies [26]. However, this claim demands further research, since, according to Servioli et al. [22], cigarette smoking or lack thereof was unrelated to the impact on the levels of antinuclear, anti-SSA, and anti-SSB antibodies, as well as rheumatoid factor. Similarly, Manthorpe et al. [27] reported a lack of differences in tobacco smoking habits between pSS patients and the control group. However, during the biopsy of labial salivary glands utilized in the diagnosis of Sjögren's syndrome, the same study showed that tobacco smoking resulted in a smaller number of detected inflammatory foci in the biopsied material.

Sarcoidosis is a generalized granulomatous disease. It manifests itself usually by hilar lymph node enlargement and changes in the lungs [52]. Its etiology is unknown, yet there are studies showing that smokers are less at risk of developing sarcoidosis [28,29,53]. Again, in cases of this disease, the cause of such a relation is unclear. The already described positive effect of cigarette smoke on the suppression of T cells and macrophages may constitute the basis of this mechanism. Furthermore, through its effect on these cells, cigarette smoke may disrupt the process of granulomata formation [54]. On the other hand, a study conducted in Japan showed a higher percentage of smokers among sarcoidosis patients than in Western civilizations which might indicate the presence of additional (e.g. environmental) factors modulating the protective effect of nicotine [30]. A study by Rivera et al. [31], suggests that cigarette smoking may influence the development of sarcoidosis through gene modulation. On the other hand, Janot et al. [32] reported that cigarette smoking may be a risk factor for the development of the ocular form of sarcoidosis. It should be stressed that the reports are ambiguous and the effect of cigarettes on the development of the disease under consideration requires more thorough studying.

HP is a group of diseases resulting from repeated inhalation exposure to chemical compounds or organic particles, causing an immunopathologic response and lung damage in a predisposed person. An acute and chronic form has been described [55]. According to some reports, HP develops less frequently among cigarette smokers, however, studies in this regard have been published many years ago and are in need of updating [56,57]. Researchers suspect that the protective effect of nicotine consists mainly in the suppression of pulmonary macrophages [56]. However, it should be emphasized that if HP develops in a cigarette smoker, it is more often chronic than in non-smokers and entails a higher risk of death [33,34]. Simultaneously, studies have been performed in which no connection between cigarette smoking and the survivability of HP was confirmed [35,36]. On the other hand, due to the increased popularity of electronic cigarettes, severe cases of HP have been observed in recent years caused by the exposure (active and passive) to the e-cigarette aerosol [58,59]. E-liquids are artificially aromatized and rich in a range of substances that may be irritating to the airways [60]. Therefore, these cannot be considered a healthier alternative to traditional cigarettes.

Cigarette smoking may also play a role in other diseases, however, the available research is scant in this regard. There are studies indicating the possible protective effect of cigarette smoke in BD, yet others that mention smoking among the risk factors for developing the disease [38,61,62]. Some reports state that although smoking has no significant impact on the development of the disease and the manifested symptoms, the activity of the disease in smokers was higher at the moment of diagnosis [38]. A study by Lapi [39], suggests the protective effect of cigarette smoking on the risk of developing chronic spontaneous urticaria, yet this claim requires further research. The topic on the potential neuroprotective effects of nicotine was also raised in some studies in the context of protection against the development of Parkinson's syndrome [63–65].

Treatment of UC or sarcoidosis using nicotine has been attempted [66,67]. V. Kannichamy

et al. [68] analyzed the reports regarding the effects of nicotine treatment in the form of transdermal patches on mild and moderate forms of UC. Nicotine combined with conventional treatment was more efficacious than conventional therapy alone, however, this claim demands newer and better-controlled studies. Due to its undesirable effects, nicotine should only be introduced into the treatment of patients who do not react to standard methods [69]. Simultaneously, the activation of the cholinergic pathway triggered by nicotine is emphasized, meaning its neuroprotective and anti-inflammatory potential could be utilized in the search for a selective nicotine receptor agonist devoid of the unfavorable effects of nicotine [66,70]. Therefore, the processes described above and their effect on individual diseases may serve as a starting point for the analysis of mechanisms responsible for the observed favorable effects of nicotine and the search for new forms of therapy or disease prevention.

Limitations

Overall, there is not enough hard evidence to say that the effects of cigarette smoking are positive for certain diseases. Some studies have assessed a small number of patients or have not followed patients for long enough. It is necessary to conduct more detailed research on this topic, which will allow the drawing of broader conclusions.

Conclusions

The complexity of the effect of cigarette smoke and nicotine contained therein is very interesting, yet it's addictive and unhealthy nature places it in an unambiguously negative light. Cigarette smoking is highly harmful in many aspects, affecting many organs and systems. Therefore, it is obvious that tobacco smoking should not be recommended for the prevention of the diseases described above.

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Word count: 3146 • Tables: 1 • Figures: 1 • References: 70

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Moos J, Moos Ł, Brzoza Z.
Can smoking have a positive effect on the course of certain diseases? A systematic review.
Med Sci Pulse 2022;16(2):33–40. DOI: 10.5604/01.3001.0015.8804.

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Received: 10.02.2022
Reviewed: 10.06.2022
Accepted: 15.06.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 22 June 2022

DOI: 10.5604/01.3001.0015.8855

PREVALENCE OF SEXUAL DYSFUNCTIONS IN WOMEN IN THEIR EARLY AND MIDDLE ADULTHOOD FROM THE PODKARPACKIE VOIVODESHIP

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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: Sexual dysfunctions are disorders related to the physiology of sexual responses.

Aim of the study: Our study aimed to assess the prevalence of sexual dysfunctions in women in their early and middle adulthood.

Material and methods: The early adulthood group consisted of 125 women aged 20–30, and out of these 100 questionnaires qualified for the final analysis. The middle adulthood group consisted of 275 women aged 45–55 in which 200 complete questionnaires were analyzed. The study was conducted in 2016 using a diagnostic survey method and the author's own survey questionnaire, the Mell-Krat Scale for Women and the Female Sexual Function Index (PL-FSFI).

Results: Only 38.0% of respondents from the early adulthood group and 25.0% from the middle-adult group interviewed with a gynecologist about their sex life, possible disorders, and problems. Additionally, only 1.0% of women in the middle adulthood group benefited from the advice of a sexologist. According to the interpretation of the Mell-Krat scale, 41.0% of respondents in the early adulthood group and 76.0% of women in the middle adulthood group had a suboptimal score. These results indicate the possibility of sexual response disorders. All women in the early adulthood group and middle adulthood group scored below normal on the PL-FSFI scale indicating that the respondents are at risk for sexual disorders.

Conclusions: According to the PL-FSFI scale, all women in the study may be at risk of sexual disorders. According to the Mell-Krat scale, as many as ¾ of women might suffer from sexual response disorders or are at risk of sexual disorders. Taking into account the significance of a sex life, it is necessary to take action to provide women with professional medical and psychological help to improve their intimacy sphere of life.

KEYWORDS: sexual and physiological dysfunctions, woman, quality assurance, health care

Background

Sexual dysfunctions are disorders related to the physiology of sexual responses [1,2]. According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), developed by the Working Group for Sexual and Identification Disorders, sexual dysfunctions in women include orgasmic disorders, sexual interest/arousal disorders, and genital-pelvic pain/penetration disorders [1–3].

The literature is full of articles describing the factors influencing the development and maintenance of sexual dysfunctions. These are most commonly divided by etiologic factors into four main categories:

1) Biological factors (e.g. general health, current and past diseases such as heart disease, diabetes, hypertension, spine injuries, the influence of medications, and birth defects.

2) Psychological factors (e.g. experienced sexual traumas, personality variables, anxiety-related to sexuality, complexes, and low self-esteem).

3) Interpersonal factors (e.g. partner conflicts, sexual maladjustment of partners, incorrect communication, extramarital relationships, betrayals, fear of not meeting the partner's needs and expectations, lack of cooperation, and cooperation in the event of episodic disorders).

4) Environmental or socio-cultural factors (e.g. religious and educational conditions, dysfunctional beliefs about oneself as a sexual partner, sexual myths and stereotypes, and ignorance/inappropriate sexual awareness) [1–8].

The literature provides a lot of information about the various forms of female sexual dysfunction affecting women of different cultures and age groups [9, 10] in both developed and developing countries [11].

The incidence of sexual problems is 41.0% worldwide among women of childbearing age and is increasing among postmenopausal women, reaching 68 to 86.5% [12].

The latest research by Prof. Zbigniew Izdebski Fri called "Sexuality of Polish women and Poles during the COVID-19 pandemic", 48.0% of women reported concerns and difficulties regarding sexual intercourse. Additionally, 8.0% of respondents reported that during isolation their relationship deteriorated, and 5.0% stated that during the pandemic they thought about divorce for the first time. The greatest concern with having sexual intercourse was related to fatigue and stress which was declared by 25.0% of women, as well as the presence of children and other people at home (18.0%). The study showed that the COVID-19 pandemic particularly affected young people aged 18 to 29, where 39.0% of people believed that during the pandemic they experienced increased tantrums and feelings of chronic fatigue, weakness, sleepiness, difficulty concentrating, aggression, or frustration. Loneliness was also felt the most by young people. Increases in this feeling was declared by 41.0% of respondents, and 44.0% experienced periods of depression or more severe depression symptoms [13, 14].

Aim of the study

This study aimed to assess the prevalence of sexual dysfunctions in women during early and middle adulthood and to assess health conditions and their impact on the need to change one's sex life.

Material and methods

Study design

Our study was conducted from March to December 2016, in paper form at the University of Rzeszow in the Provincial Clinical Hospital No. 2 St. Jadwiga Queen, University of the Third Age in Rzeszow, and Postgraduate Education Center for Nurses and Midwives in Rzeszow. The research was approved by the directors of these institutions. An attempt was made to investigate the occurrence of sexual dysfunctions in women during early and middle adulthood and to assess health conditions and their impact on the need to change one's sex life.

Participants

The study group consisted of 125 women in the early adulthood group and 275 women in the middle adulthood group. The inclusion criteria consisted of sexually active women aged 45–55 and 20–30 years old, completion of an informed consent form after obtaining detailed information about the study, and a correctly completed questionnaire. The exclusion criterion included women younger than 20, 30–45, and over 55 years old, incorrect or incomplete completion of the questionnaire, and refusal to consent to the study. Ultimately, 100 women in the early adulthood and 200 women in the middle adulthood correctly completed the questionnaire and were included in the data analysis.

Data sources/measurement

The data collection method used a questionnaire developed by the author, which included questions about health conditions within the women and the seeking of help from specialists regarding difficulties with sexual intercourse. The Mell-Krat Scale for Women and the Female Sexual Function Index (PL-FSFI) were also used in this study.

The Mell-Krat scale for women, adapted by Z. Lew-Starowicz (1991), is designed to study sexual needs and responses. The version used consisted of 20 features scaled from 1 to 4. The maximum number of points was 80 with an optimal level of 55 points. Results below 55 in women indicate the possibility of sexual dysfunction. The reliability of the female version was found to be 0.69.

In turn, the PL-FSFI consists of a total of 19 questions relating to the basic emotional and physiological areas of sexual contact within the previous 4 weeks and includes 6 domains: desire (questions 1 and 2), arousal (questions 3–6), lubrication (Questions

7–10), experiencing orgasm (Questions 11–13), satisfaction with the emotional and sexual relationship with a partner (Questions 14–16), and pain during vaginal intercourse (Questions 17–19). Individual responses were assigned point values which made up a total score from 2 to 36. The reliability of the PL -FSFI version was found to be >0.70.

Ethical considerations

This study was anonymous and voluntary, and the respondents were informed about the purpose of the study. The research was approved by the Bioethics Committee of the University of Rzeszow, no. 11/12/2015 on December 2, 2015.

Statistical analyses

Statistical analysis was performed using Statistica v. 13.1 software (StatSoft, Hamburg, Germany). For the purposes of this study, the following coefficients were used for questions using nominal scales to assess the relationship between selected variables: Cramer's V, Phi, descriptive statistics, median, first quartile, and third quartile were calculated for numerical variables.

Non-parametric tests used for statistical analysis included the $\chi 2$ test of independence of variables and the Mann-Whitney U test. The level of statistical significance was defined as $p<0.05$.

Results

Participants

The median age was 23 (min. 20 years, max. 30 years) for women in the early adulthood group and 50 (min. 45 years, max. 55 years) for women in the middle adulthood group. The group of respondents included 162 women (54.0%) living in rural areas, 77 women (25.7%) living in a city with a population of more than 100,000, and 61 women (20.3%) living in a city with a population of up to 100,000. Unmarried women (70.0%) made up the vast majority in the early adulthood group and married women (94.0%) in the middle adulthood group. The early adulthood group had the highest number of women with a first-cycle (bachelor's) degree (66 respondents, 66.0%). The education of women in the middle adulthood group varied. Most respondents in this group had a secondary education (64 persons, 32.0%) or second-cycle (master's) degree (57 persons, 28.5%). The median age for husbands or partners of women in the middle adulthood group was 52 (min. 40 years, max. 70 years), while the median age for husbands or partners of women in the early adulthood group was 25 (min. 21 years, max. 40 years). Women in the middle adulthood group had significantly longer relationships with an estimated averaging 25 years in this group of women and an average of 4 years in the early adulthood group.

Main results

The presence of chronic diseases was found in 14 women (14.0%) in the early adulthood group and 52 women (26.0%) in the middle adulthood group ($p=0.018$). The chronic diseases reported by the early adulthood respondents included hypothyroidism (6.0%), asthma (2.0%), hypertension (2.0%), allergies (1.0%), multiple sclerosis (1.0%), chronic urticaria (1.0%), and ulcerative colitis (1.0%). In contrast, the chronic diseases that were prevalent in the middle adult group included hypothyroidism (7.5%), hypertension (10.0%), allergies (1.0%), osteoporosis (1.0%), and other (6.5%). Twelve women (12.0%) from the early adulthood group and 60 women from the middle adulthood group (30.0%) reported taking chronic medications ($p<0.001$; Table 1).

Table 1. Presence of a chronic disease and continuous use of medications by women in the early and middle adulthood groups

The presence of a chronic disease	Early adulthood group		Middle adulthood group		Total	
	n	%	n	%	n	%
No	86	86.0	148	74.0	234	78.0
Yes	14	14.0	52	26.0	66	22.0
Total	100	100.0	200	100.0	300	100.0
Significance (p)	$\chi^2(1)=5.59$, p=0.018, Phi=–0.14					
Taking medications on a permanent basis	**Early adulthood group**		**Middle adulthood group**		**Total**	
	n	%	n	%	n	%
No	88	88.0	140	70.0	228	76.0
Yes	12	12.0	60	30.0	72	24.0
Total	100	100.0	200	100.0	300	100.0
Significance (p)	$\chi^2(1)=11.84$, p<0.001, Phi=–0.20					

n – number of observations; % – percent; χ^2 – Pearson's chi-square score; p – level of significance of differences.

The medications taken on a regular basis by the women in the study included EUTHYROX N, VALIDOL, SIOFOR, BISOCARD, DIRONORM, PRESTARIUM, AMLOPIN, CORONAL, AGEN, SYSTEN SEQUI, LOKREN, TERTENSIF SR, CLARITINE, METFORMAX, CONCOR COR, HORMONES, VITAMINS, MINERALS, VANATEX HCT, LETROX, BETALOC,

WARFIN, NOLIPREL BI-FORTE, NEBISPES, ATENOLOL, SYLEVIA, SYMBICORT, AZATHIOPRINE, and ASAMAX.

The analysis of the results of our study found that there were no statistically significant relationships between the general health status of women in early and middle adulthood and their thoughts concerning changes in their sex life (p=0.178, p=0.606, Table 2).

Table 2. Think about changing your sex life and the general health of women in the early and middle adulthood group

Think about changing your sex life – the early adulthood group	She is not chronically ill		She is chronically ill		Total	
	n	%	n	%	n	%
She doesn't think about changing	76	88.4	14	100.0	90	90.0
Thoughts about change	10	11.6	0	0.0	10	10.0
Total	86	100.0	14	100.0	100	100.0
Significance (p)	$\chi^2(1)=1.81$, p=0.178					
Think about changing your sex life – in the middle adulthood group	**She is not chronically ill**		**She is chronically ill**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
She doesn't think about changing	132	89.2	45	86.5	177	88.5
Thoughts about change	16	10.8	7	13.5	23	11.5
Total	148	100.0	52	100.0	200	100.0
Significance (p)	$\chi^2(1)=0.26$, p=0.606					

n – number of observations; % – percent; χ^2 – Pearson's chi-square score; p – level of significance of differences.

In the early adulthood group, the majority of women gave birth once (10 respondents – 66.7%), while in the middle adulthood group, the majority of women gave birth twice (88 women – 46.8%). This difference was statistically significant (p=0.016), although the strength of the relationship was relatively weak.

Women's sexual responses were also assessed in general, based on the total points they scored across the whole Mell-Krat scale. The maximum possible score was 80 points. The median score for women in the early adulthood group was 56, while the median score for women in the middle adulthood group was 45.5. The scores of women in the early adulthood group were statistically significantly higher than those of women in the middle adulthood group (p<0.001).

An optimal score was achieved by 59 women (59.0%) in the early adulthood group and 48 women (24.0%) in the middle adulthood group (p<0.001) (Table 3).

Table 3. Assessment of sexual reactions and interpretation of the Mell-Krat Scale for women

Mell-Krat scale [0–80 points]	Descriptive statistics					
	n	Me	Min.	Max.	Q1	Q3
Early adulthood group	100	56.00	15.00	76.00	50.00	62.00
Middle adulthood group	200	45.50	7.00	70.00	36.50	54.00
Total	300	50.00	7.00	76.00	39.00	57.00
Significance (p)	Z=–7.04, p<0.001					
Interpretation of the Mell-Krat scale	**The result is below optimal**		**Optimal result**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
Early adulthood group	41	41.0	59	59.0	100	100.0
Middle adulthood group	152	76.0	48	24.0	200	100.0
Total	100	100.0	100	100.0	300	100.0
Significance (p)	$\chi^2(1)=5.59$, p<0.001, Phi=0.34					

n – number of observations; Me – median; Min. – minimum; Max. – maximum; Q1 – lower quartile; Q3 – quartile upper; % – percent; Z – Mann-Whitney U score; χ2 – Pearson's chi-square score; p – level of significance of differences.

Statistically significant differences between the two groups of women for specific domains in the PL-FSFI scale were noted for desire, arousal, satisfaction, and pain. Women in the early adulthood group experienced desire, satisfaction, and pain statistically more strongly than women in the middle adulthood group. In contrast, women in the middle adulthood group experienced stronger arousal. The level of lubrication and the experience of orgasms were similar in the two groups of women (Table 4).

Table 4. Erotic experiences of women in the early and middle adulthood groups were assessed on the PL-FSFI scale

FSFI Scores for Individual Domains	Early adulthood group	Middle adulthood group	Total	Significance (p)	
	Me	Me	Me	Z	p
Desire	4.20	3.60	3.60	–6.57	<0.001
Excitement	2.40	3.15	3.00	6.90	<0.001
Hydration	3.60	3.60	3.60	1.36	0.174
Orgasm	3.20	3.20	3.20	1.89	0.058
Satisfaction	4.40	4.00	4.00	–5.50	<0.001
Pain	6.00	5.20	5.60	–3.13	0.002

Me – median; Z – Mann-Whitney U-score; p – level of significance of differences.

Overall, respondents could score between 2 and 36 on the entire PL-FSFI scale. The median score for women in the early adulthood group was 23.25, while the median score for women in the middle adulthood group was 22.8. Higher scores on the entire scale were therefore obtained by women in the early adulthood group (p=0.003).

All subjects scored below normal on the PL-FSFI scale (less than 27.5 points, Table 5). The test results indicate that women are at risk for sexual disorders.

Table 5. General assessment of the surveyed women and interpretation of the PL-FSFI Scale

PL-FSFI scale [2–36 points]	Descriptive statistics					
	n	Me	Min.	Max.	Q1	Q3
Early adulthood group	100	23.25	15.90	27.40	21.90	24.25
Middle adulthood group	200	22.80	17.00	26.60	21.35	23.80
Total	300	23.00	15.90	27.40	21.55	24.00
Significance (p)	Z=-2.94 p=0.003					
Interpretation of the PL-FSFI scale	**The result is below normal**		**Normal result**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
Early adulthood group	100	100.0	0	0.0	100	100.0
Middle adulthood group	200	100.0	0	0.0	200	100.0
Total	300	100.0	0	0.0	300	100.0
Significance (p)	$\chi^2(1)=0.00$ p=1.000					

n – number of observations; Me – median; Min. – minimum; Max. – maximum; Q1 – lower quartile; Q3 – upper quartile; % – percent; Z – Mann-Whitney U score; χ^2 – Pearson's chi-square score; p – level of significance of differences.

Table 6. Conversation with a sexologist and a gynecologist about your sex life, possible disorders, and problems for help in solving intimate problems

Using a sexologist's advice	Early adulthood group		Middle adulthood group		Total	
	n	%	n	%	n	%
No	100	100.0	198	99.0	298	99.3
Yes	0	0.0	2	1.0	2	0.7
Total	100	100.0	200	100.0	300	100.0
Significance (p)	$\chi^2(1)=1.00$ p=0.315					
Talking to a gynecologist about your sex life, possible disorders, and problems	**Early adulthood group**		**Middle adulthood group**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
No	61	61.0	145	72.5	206	68.7
Yes	38	38.0	50	25.0	88	29.3

Table 6 contd.

Talking to a gynecologist about your sex life, possible disorders, and problems	Early adulthood group		Middle adulthood group		Total	
	n	%	n	%	n	%
Does not know	1	1.0	5	2.5	6	2.0
Total	100	100.0	200	100.0	300	100.0
Significance (p)	$\chi^2(2)=5.87$, p=0.053					
Help from a gynecologist in solving intimate problems	**Early adulthood group**		**Middle adulthood group**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**
No	65	65.0	155	77.5	220	73.3
Yes	35	35.0	45	22.5	80	26.7
Total	100	100.0	200	100.0	300	100.0
Significance (p)	$\chi^2(1)=5.32$, p=0.021, Phi=0.13					

n – number of observations; % – percent; χ^2 – Pearson's chi-square score; p – level of significance of differences.

None of the women in early adulthood and 2 women (1.0%) from the middle adulthood group took advantage of the sexologist's advice. Thirty-eight women (38.0%) from the early adulthood group and 50 women (25.0%) from the middle adulthood group talked to a gynecologist about their sex life, possible disorders, and problems (p=0.053). Thirty-five women (35.0%) from the early adulthood group and 45 women (22.5%) from the middle adulthood group could count on a gynecologist for help with intimate problems (p=0.021) (Table 6).

Discussion

Key results

The literature states that sexual dysfunctions are increasingly common due to the fast pace of life and high-stress levels. The decline in general health status and the continuous increase in civilizational diseases also contribute to this [15].

The results of our research show that there are sexual dysfunctions in women in early and middle adulthood. According to the PL-FSFI scale, all examined women may be at risk of sexual disorders. According to the Mell-Krat scale, as many as ¾ of women in middle adulthood and ⅓ of women in early adulthood indicate the possibility of sexual dysfunction.

Interpretation

Current research indicates that in the vast majority of cases, there is a trend toward increased sexual

disorders among women in middle adulthood. Based on the results obtained by the authors of this study, it was shown that 76.0% of women indicate the possibility of sexual reaction disorders. Confirmation of the results obtained can be found in the research undertaken in Africa in 2010, where the highest rate of sexual dysfunctions in women during menopause was reported in 92.0% of women. Available literature shows that approximately 60.0% of women aged 40 to 64 worldwide report a variety of sexual dysfunctions [16,17]. It is estimated that 40.0% of women in the United States have sexual problems [18].

The authors of this study used a questionnaire (PL-FSFI) to assess women's sexual function and found that all respondents in the middle adulthood group scored below normal, i.e. these women have or may have sexuality problems that may affect the quality of their sexual life. Very similar results were reached by Carranza-Lira et al., where a significant decrease in FSFI scores was noted between the ages of 50 and 54, indicating that age may be a significant factor in one's sex life. In the group of women aged between 40 and 44, sexual function was more apparent in terms of desire, arousal, and lubrication. In terms of orgasm and pain experienced during intercourse, the group of women aged 45 to 49 had lower scores, and greater sexual dysfunction was characteristic of women over 50 [19]. In a study by Safdar et al., respondents under the age of 40 had significantly lower satisfaction scores than those over 40, and it was found that Indians and Filipinos had lower scores than Chinese and Malay respondents on lubrication (p=0.02) and pain (p=0.02) [4].

In our study, 41.0% of respondents from the early adulthood group indicated the possibility of sexual reaction disorders. Also, the Canadian study by O'Sullivan et al., confirmed that sexual problems also occur among young, healthy people [20]. In a study by Jablonska et al., sexual dysfunctions were demonstrated in almost 20.0% of women in early adulthood, with a mean FSFI score of 29.44 [1]. Different results were obtained in our study, where all subjects obtained PL-FSFI scores below the norm (at a level lower than 27.5 points), which suggests that women are at risk for sexual disorders.

In the author's study, the most often indicated chronic diseases in the middle adulthood group were hypothyroidism and hypertension. Drugs used in the treatment of thyroid diseases may aggravate sexual dysfunction [21]. A study of 390 women, including 152 with hypothyroidism and 238 without thyroid disease, investigated the effect of levothyroxine therapy on sexuality. It has been proven that women suffering from hypothyroidism and taking levothyroxine are more likely to develop sexual dysfunction (31.6%) compared to the group of healthy women, where the probability was 16.4%. Moreover, women with thyroid diseases, despite introducing the body into the euthyroid state, showed a greater probability of developing disorders than women without coexisting thyroid diseases [22]. Patients with cardiovascular diseases may be afraid of engaging in sexual activity, associating the accompanying effort with health risks. It is therefore worth mentioning at this point that there are rules for assessing the cardiological risk related to sexual activity. Sexual health should be a routine topic undertaken when collecting the medical history of patients suffering from arterial hypertension, both before and during treatment [23].

Medications can interfere with sexual performance. These include psychotropic drugs, blood pressure lowering drugs, histamine antagonists, and hormonal drugs. The group of drugs most likely to impair sexual performance are antidepressants. They mainly cause orgasmic disorders, decreased desire, and arousal [15,24]. In our study, among the medications taken permanently by the women surveyed, the most common were hypothyroid drugs, sedatives, blood pressure lowering drugs, hormonal drugs used to treat estrogen deficiency symptoms associated with menopause, and oral contraceptives, which may have affected sexual activity in both groups.

A review of 135 studies from 41 countries identified many factors that influence female sexual problems, confirming their multi-dimensional nature [25]. The review revealed that factors such as: having an intimate relationship with a partner, good communication, getting married in old age, and favorable body image have a preventive effect on sexual dysfunctions in women [26]. Unfortunately, women report a negative impact of menopause on their interpersonal relationships, marital intimacy, satisfaction, and stability that can lead to divorce [27]. Barnaś et al. concluded in a study that the health status of perimenopausal women affects sexual activity. The occurrence of health problems in middle adulthood has an impact on the poorer evaluation of sexual quality of life among respondents [28]. Reading the reports by Lee et al., where the author states that there are women who together with age report better sexual functions and greater frequency of orgasms during ratio or that with age, however, the frequency of orgasms [29] did not decrease.

The available literature indicates that 62.0% of women surveyed in middle adulthood report the presence of sexual changes and complaints. Most women report vaginal dryness, irritation, itching of the vagina and vulva, dyspareunia, bleeding and decreased vaginal lubrication during intercourse, disorders or lack of sexual desire, difficulty in achieving orgasm, disturbed sexual arousal, burning during intercourse, lack of orgasm, and delayed sexual intercourse feel-

ing. These symptoms are often accompanied by pain, frequent urination, and urgency [30–32]. A reduction in hormones including estrogens and androgens is considered to be the cause of these disorders. Low estrogen levels result in a decrease in intercourse frequency, and a lack of testosterone reduces interest in sex [26,33].

Orgasm disorders are recurring difficulties, delays, or the inability to achieve orgasm as a result of sufficient sexual stimulation. Problems with reaching orgasm ranks second on the list of the most frequently reported problems related to sexual functioning in women of all ages. Based on a study conducted in southern India, it was found that the incidence of orgasm-related difficulties was 28.6% in perimenopausal women [34].

The research material analyzed by the authors showed that only a small proportion of women from both study groups talked to a gynecologist about their sex life, possible disorders, and problems. As many as 58.0% of women have never spoken to their gynecologist about sexual changes and complaints that have occurred or may occur during menopause [2]. Many women believe that sexual problems in old age are inevitable and natural. Due to this view, they do not seek professional help. They often feel embarrassed if the specialist is a young man or when the doctor is in a hurry [35].

In the Middle East and Lebanon, very few studies have been carried out to understand sex life from the perspective of women. As reported by authors in Arab societies, talk about sexual disorders is a very sensitive topic and in the Lebanese language, sexuality and sexual issues are still the subjects of taboos, especially for medium and older people. Health professionals rarely talk about sexual problems with their patients, and women rarely seek help for sexual problems, probably because they are unaware of their problem or simply ashamed [26,36].

The authors of this study found that in the early adulthood group, no woman had received advice from a sexologist. Studies that are consistent with the authors' findings can be found in the literature and state that women aged 21–26 rarely seek advice from a sexologist. Thus, in the study by Müldner-Nieckowski et al., only one person consulted a sexologist. In contrast, 5.0% of women expressed a need for a sexologist's advice or sexological treatment [37]. The data provided shows that young people are increasingly becoming patients of sexologists. According to a study conducted in the National Medical Specialty Clinic of the Society for Family Development in Warsaw, men predominate this group, accounting for 70.7% of the study group between 2004 and 2010 [38]. In contrast, 1.0% of women in the middle adulthood group received advice from a sexologist.

The literature states that women do not treat sexual dysfunctions because of barriers to reporting problems and feeling embarrassed during conversations with a specialist (doctor). It also turns out that problems with sexual activity depend not only on the state of health but above all on the level of activity in the previous phase of life [2]. In the study by Pal et al., who reviewed 237 patients reporting to a sex clinic, he found that only 0.8% were women, which indicates a gross gender difference [39].

Overall, the effectiveness of the treatment of sexual dysfunctions must require an understanding of the mental and physical factors that contribute to female sexual problems [40].

Recommendation

The results of our study can be used to improve the medical care provided by midwives and gynecologists to women of all ages**.**

Limitations of the study

This study was an attempt to assess the prevalence of sexual dysfunctions in women of all ages. The collected material and statistical analyses made it possible to conclude that women may be at risk of disorders of the sexual sphere. The authors of this article believe that there is a certain insufficiency when it comes to showing the scale of the problem of sexual dysfunction among women because for many women it is still a difficult topic to discuss. This study was conducted with the use of our own funds and used paper questionnaires, which translated into the size of the research group. Currently, there are more modern solutions for acquiring a research group, i.e. research using a google questionnaire placed on social networks, which increases research costs. In future research, a larger female population would be ideal, which would enable the recruitment of a more representative research group.

CONCLUSIONS

According to the PL-FSFI scale, all women in our study may be at risk of sexual disorders.

According to the Mell-Krat scale, it was demonstrated that as many as ¾ of women might suffer from sexual response disorders or be at risk of sexual disorders. Taking into account the significance of sexual life, it is necessary to take actions to provide women with professional medical and psychological help in order to improve their intimate sphere of life.

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Word count: 4402 • Tables: 6 • Figures: 0 • References: 40

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Kremska A, Wróbel R, Zych B.
Prevalence of sexual dysfunctions in women in their early and middle adulthood from the Podkarpackie Voivodeship.
Med Sci Pulse 2022;16(2):41–49. DOI: 10.5604/01.3001.0015.8855.

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Received: 13.02.2022
Reviewed: 21.06.2022
Accepted: 22.06.2022

e-ISSN 2544-1620

Medical Science Pulse 2022 (16) 2

Original papers

Published online: 30 June 2022

DOI: 10.5604/01.3001.0015.9054

THE EFFICIENCY OF PRECAUTIONS FOR PULMONARY FUNCTIONS TEST LABORATORIES DURING THE COVID-19 PANDEMIC: A REAL-LIFE SETTING

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ABSTRACT

Background: Recommendations were developed for pulmonary function test (PFT) laboratories during the Coronavirus Disease 2019 (COVID-19) pandemic. However, it is unknown whether these recommendations are effective and safe.

Aim of the study: To assess how effective and safe the recommendations for PFT laboratories were during the COVID-19 pandemic.

Material and methods: This is a single-center, questionnaire-based study performed between June and August of 2020 at the Akdeniz University hospital. We performed the questionnaire over the phone with technicians from different centers in Turkey. We asked the age, gender, years on the job, routines performed during the pandemic, how many PFTs per day they performed, features of the test room, use of personnel protective equipment, whether they performed triage before the test, and the results of those who had a COVID polymerase chain reaction (PCR) test or a COVID antibody test.

Results: A total of 74 technicians from 69 centers were included in the study. Of the centers, 67 (90.5%) were located in tertiary hospitals. At the beginning of the pandemic, 65 (94.2%) centers closed for an average of 2.15 months. The average number of tests performed per day was 14.41±11.88. All centers triaged patients before performing the tests. In 19 (27.5%) centers, a transparent nylon separator was placed between the patient and the technician. Two (0.27%) technicians tested positive for COVID using PCR testing. Among the 12 (16.2%) technicians screened for COVID-19 antibodies, none of them were found to have COVID-19 antibodies.

Conclusion: The recommendations for PFT laboratories seemed to be effective and safe, and the adherence to these recommendations by the technicians was optimal.

KEYWORDS: COVID-19, pulmonary function test, technician, respiratory

Background

Coronavirus Disease 2019 (COVID-19) is a disease caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a virus from the Coronaviridae family. This virus is responsible for a pandemic and is a worldwide threat. Despite very strict precautions during the first 6 months of the pandemic, many people died from this disease. There was no other option but to protect oneself from this rapidly

spreading and deadly virus until an effective treatment could be found. For this reason, many new rules were required to prevent the spread of the virus.

Numerous precautions were instituted at hospitals during the normalization period of the COVID-19 pandemic as part of the return to normalization plan in hospitals. The recommendations for pulmonary function test (PFT) laboratories were created based on the fact that COVID-19 is transmitted from person to person via pulmonary secretions (1). However, these recommendations were developed based on experience gained from previous pulmonary infections, not COVID-19, and thus no one knows how effective and safe they are in real life.

Herein, a questionnaire-based study was conducted to evaluate how PFT laboratories adjusted and whether the precautions taken were safe for technicians during the COVID-19 pandemic in Turkey.

Aim of the study

This study aimed to evaluate the effectiveness and safety of recommendations developed for PFT laboratories during the COVID-19 pandemic.

Material and methods

Sample

This is a single center, cross sectional, observational study, conducted between June and August of 2020 at the Akdeniz University hospital in Turkey. A list of technicians working in the PFT laboratories was obtained and from the list, 100 out of the 389 technicians were randomly selected. We performed the questionnaire over the phone with each technician. The technicians that were able to be reached by phone voluntarily accepted to participate in the study. We developed the questionnaire using the guidelines on working in health institutions and infection control measures during the COVID-19 pandemic, developed by the Ministry of Health, the European Pulmonary Society (ERS), the American Thoracic Society (ATS), and the British Thoracic Society (BTS) (2–5).

Methods

A total of 389 technicians were currently working from the list provided by the Turkish respiratory technicians group. We aimed to perform the questionnaire on 100 of these technicians to provide 95% confidence levels, a standard deviation (SD) of 0.5, and a confidence interval of ±8%. For these reasons, PFT laboratories (university hospitals and training and research hospitals) located in 7 different regions of our country, primarily in the most populated cities, were searched. The accreditation of private hospitals and other small medical centers is not well known. Therefore, we only included technicians working in large, major centers. A total of 74 technicians participated in the study. We obtained data about age, gender, comorbidities, medications, years in the job, work routines during the pandemic, and how many patients per day performed PFTs. Regarding the PFT room, we collected data on the use of negative pressure, ultraviolet radiation, windows, carpets, and curtains. Regarding the order of work, we asked questions about whether they performed triage before the PFT, required an appointment, used personal protective equipment, and how many times they repeated the test in a patient. The results of those who received a COVID polymerase chain reaction (PCR) test or a COVID antibody test were also obtained over the phone.

Ethics

Approval for our study was granted by the Clinical Research Ethics Committee of Akdeniz University Faculty of Medicine (decision no: 457, dated: 23.06.2021). We also received approval from the Turkish Ministry of Health to perform the study.

Statistical analysis

The SPSS 21.0 package program (SPSS IBM Corp; Armonk, NY, USA) was used for the analysis. A p-value of <0.05 was considered statistically significant. Descriptive statistics were presented using frequencies, percentages, means, SDs, medians, and minimum (min.) and maximum (max.) values. Fisher's Exact or Pearson chi-square tests were used to analyze the relationships between categorical variables. For the distribution of numerical measurements, the Kolmogorov Smirnov test was used. For the comparison of groups, a t-test, Mann Whitney U test, ANOVA, and Sidak's test were used.

Results

Descriptive data

A total of 74 technicians from 69 centers were included in our study (Table 1). Of the centers, 67 (90.5%) were in tertiary hospitals. Of the technicians, 60 (81.1%) were female and the mean age was 42.38±7.68 years old. The mean years of experience in their job was 8.48±7.38 years. Twenty-six (35.1%) technicians had at least one comorbidity with the most

common ones being asthma and hypertension. During the first few months of the pandemic, 65 (94.2%) of the centers were closed for an average of 2.15 months. The average number of tests per day was 14.41±11.88 for spirometry, 1.90±3.22 for diffusion tests, and 4.59±3.92 for the six minute walking test.

Table 1. Characteristics of the technicians, downtime, and number of the tests during the pandemic

Number of technician	74
Age(years) Mean ±SD	42.38±7.68
Gender, n (%) Male Female	 14 (18.9%) 60 (81.1%)
Hospital Tertiary Non-tertiary	 67 (90.5%) 7 (9.5%)
The year in the job Mean ± SD	8.48±7.38
Comorbidity n (%) Yes No	 26 (35.1%) 48 (65.9%)
Downtime Mean ±SD	2.15±2.06
Number of PFT in a day Mean ±SD	14.41±11.88
Number of Diffusion tests in a day Mean ±SD	1.90±3.22
Number of 6MWTs in a day Mean ±SD	4.59±3.92

SD – Standard Deviation; n – Number; PFT – Pulmonary Function Test; 6MWT – 6 Minute Walking Test.

Main outcomes

Regarding the testing rooms, none of the centers had negative pressure ventilation and 6 (8.7%) of them had no windows. None of the centers had carpet, while 15 (21.7%) of them had curtains in the test rooms. There was an ultraviolet light in 19 (27.5%) of the centers and one center had a HEPA filter/aspirator device in the test room. A transparent nylon separator was placed between patients and technicians in 19 (27.5%) of the centers (Table 2). Regarding the order of work, all centers were performing triage prior to the test. One center was performing COVID-19 PCR tests before conducting PFTs. Sixty-two (89.9%) centers required an appointment. All technicians wore surgical masks during testing, and 53 (71.6%) of them wore N95 masks under their surgical mask. The rates of not wearing glasses, bonnets, visors, and aprons as part of their personnel protective equipment were 56 (76.7%), 56 (76.7%), 35 (47.9%), and 30 (41.1%), respectively. The mouthpiece/filter used was disposable in all centers, as were the nose clips used in 38 (55%) centers. During the test, the distance between the patient and technician was less than 1 meter in 15 (21.7%) of the centers.

Table 2. Characteristics of the centers and the use of personnel protective equipment during pandemic

Total number of centers	N=69 (100%)	Total number of technician	N=74 (100%)
Triage before the test Yes No	 69 (100%) 0	Surgical mask n Yes No	 74 (100%) 0
Appointment before the test Yes No	 62 (89.9%) 7 (10.1%)	N95 Yes No	 53 (71.6%) 21 (28.3%)
Shift work Yes No	 32 (43.8%) 41 (56.2%)	Gloves Yes No	 37 (50.0%) 37 (50.0%)
Negative pressure room Yes No	 0 69 (100%)	Face shield Yes No	 38 (51.3%) 36 (48.6%)
Ultraviolet Yes No	 19 (25.7%) 50 (74.3%)	Glasses Yes No	 18 (24.3%) 56 (75.7%)
Window Yes No	 68 (96.6%) 1 (3.4%)	Bones Yes No	 18 (24.3%) 56 (75.7%)
Carpet Yes No	 0 69 (100%)	Box Yes No	 44 (59.5%) 30 (40.5%)
Curtain Yes No	 64 (92.8%) 5 (7.2%)	Separator Yes No	 19 (25.7%) 45 (74.3%)
Printer Yes No	 33 (47.8%) 36 (52.2%)	Distance <1 meter 1–2 meters >2 meters	 15 (20.3%) 57 (77%) 2 (2.7%)

Table 2 contd.

Total number of centers	N=69 (100%)	Total number of technician	N=74 (100%)
Test attempts		Nose clip	
2 times	64 (92.8%)	Disposable	38 (51.4%)
3 times	5 (7.2%)	Re-use after sterilization	4 (5.4%)
		Manual-closing	32 (43.2%)
Surface cleaning with 0.1–0.5 NaOCl or 62–71% C_2H_6O		Mouthpiece	
		Disposable	69 (100%)
Yes	69 (100%)	Re-use after sterilization	0
No	0		

NaOCl – Sodium hypochlorite; C_2H_6O – Ethanol.

During the pandemic, 30 (40.5%) technicians were tested for COVID-19 using a PCR test and 2 (0.27%) of them were positive. The diagnosis was made while one technician was actively working in the test room, and the other technician was working in a different department while the testing room was closed. A COVID-19 antibody test was performed on 12 (16.2%) technicians for screening purposes but none of them were found to have COVID-19 antibodies (Table 3).

Table 3: Distribution of COVID-19 PCR and COVID-19 antibody test results

Total	N=74 (100%)
COVID-19 PCR	
Positive	2 (2.7%)
Negative	28 (37.8%)
Not examined	44 (59.5%)
COVID-19 antibody	
Positive	0 (0%)
Negative	12 (16.2%)
Not examined	62 (83.8%)

COVID PCR – Coronavirus Disease Polymerase Chain Reaction.

Discussion

In this study, we investigated the working order and the precautions taken in PFT rooms and the risk and prevalence of COVID-19 among technicians during the pandemic in Turkey. We observed that the centers were generally well-adapted to the guidelines regarding pulmonary function laboratories. The technicians wore personnel protective equipment and followed the recommendations on using the equipment. The prevalence of COVID-19 was not higher than that of the general population. Our study revealed that the precautions taken in pulmonary laboratories were sufficient to prevent the transmission of COVID-19 among pulmonary technicians.

We have to deal with the pandemic by primarily avoiding the virus until the development of an effective antiviral drug. However, the suggestions to protect oneself from SARS-CoV-2 are based on the general features of the Coronaviridae family. Although SARS-CoV-2 displays many characteristics similar to its origin, it can exert different behaviors. There are some reports on the function and organization of pulmonary function laboratories and the personal protection measures of the pulmonary technicians, developed by various associations and health ministries of the countries. Many of these reports suggest that PFTs are high aerosol-generating procedure. Based on this, a series of changes in pulmonary laboratories have been developed for the protection of both healthcare professionals and patients. However, it is unknown whether these measures are sufficient. Besides this, the debate over whether PFTs are aerosol-generating procedures or not is still ongoing. Therefore, there is an urgent need for evidence-based information on whether the protective precautions are sufficient.

Initially, some authors recommended that PFTs be performed in patients with chronic lung diseases requiring immediate treatment and in patients with hematological malignancies before and after hematopoietic stem cell transplantation. The ERS recommends dividing the pandemic into phases according to the prevalence in the population and developing recommendations based on safety levels at each phase. They also recommend restricting PFTs to patients requiring urgent/essential tests for the immediate diagnosis of a current illness during the pandemic phase which is characterized by a high community prevalence. We observed that the majority of PFT laboratories were closed for an average of two months during the pandemic period in Turkey. After the first few months, all PFT rooms started to reopen, operating under new precautions and significantly reducing the number of daily tests performed in PFT laboratories in Turkey.

Our study shows that the number of daily spirometry and diffusing capacity tests were reduced in PFT laboratories located in Turkey. No center performed body plethysmography as it was found to be inappropriate by our national guidelines. However, ERS recommends primarily spirometry and diffusing capacity tests for the evaluation of lung function but included whole body plethysmography in cases where droplet contamination control achievement in need-

ed (3). Moreover, ERS recommended cardiopulmonary exercise tests and broncho-provocation tests if they are necessary and if the patient does not have a risk of COVID-19. However, we observed that these tests were not performed in any center in Turkey during the pandemic.

Self-protection of technicians is a standardized procedure in our national report (2). Protective personal equipment (PPE) such as aprons, FFP2/ N95 masks, visors, and gloves should be worn during testing. Due to the risk of aerosolization, a maximum of 2 test runs per test is recommended. In our study, most technicians used N95 masks during testing but the use of bonnets and glasses were much less. All the technicians were performing one to two test runs per test. It is recommended to evaluate the possibility of COVID-19 before the test in reports. We observed that triaging was applied to all patients before tests in all 69 centers, and moreover, COVID-19 PCR testing was performed before tests in two centers.

There are reports that also provide recommendations for equipment. High specification disposable bacterial and viral filters and disposable nose clips should be used during spirometry. If there is a negative pressure room, it is recommended to perform the tests in these rooms. But, there are no official recommendations by the center of disease control regarding the use of portable HEPA cleaners for the decontamination of airborne SARS-CoV-2 (6). In our study, we observed that in general, centers obeyed the recommendations regarding equipment and room design. Moreover, we determined that a transparent nylon separator was placed between patients and technicians in four centers. We do not know whether this is effective or not. Its efficacy and safety still need to be investigated. However, if it is scientifically proven to be effective, it can be a good solution especially for low-income countries as it is practical and inexpensive.

The ultimate goal of all these regulations is to protect technicians and patients from COVID-19. Our study observed that the prevalence of COVID-19 in technicians working in PFT laboratories was not higher than that in the general population. Only two technicians were PCR positive and none of them had antibodies against SARS-CoV-2. In summary, all precautions being implemented in pulmonary testing rooms are sufficient to protect technicians from COVID-19.

Limitations

There are some limitations of our study. It is a questionnaire-based study and the results are based on the technician's statements. Most technicians worked in tertiary hospitals. We randomly phoned technicians in different regions of Turkey with different disease prevalence rates.

Conclusion

To our knowledge, this is the first study comprehensively examining this issue in Turkey, and despite the single-center design, a significant number of technicians were screened. In conclusion, the organization of pulmonary test rooms in Turkey are effective and safe. The prevalence of COVID-19 in technicians working in PFT laboratories is not higher than the general population. The lower prevalence may be related to the well-done determination of pre-test indications, pre-test COVID-19 risk assessments, adherence to precautions about room arrangement, and effective use of personnel protective equipment.

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Word count: 2391 • Tables: 3 • Figures: 0 • References: 6

Sources of funding:
The research was funded by the authors.

Conflicts of interests:
The authors report that there were no conflicts of interest.

Cite this article as:
Dirol H, Bal H, Ozbudak O.
The efficiency of precautions for pulmonary functions test laboratories during the COVID-19 pandemic: a real-life setting.
Med Sci Pulse 2022;16(2):50–55. DOI: 10.5604/01.3001.0015.9054.

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Received: 12.05.2022
Reviewed: 28.06.2022
Accepted: 30.06.2022