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Original scientific paper

The Opinion of Patients and Nurses About the Professional Appearance in Nursing

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Abstract

Aim. To examine the opinion of patients and nurses about professional appearance in nursing in relation to gender and age and to examine how they perceive professionalism.

Methods. Respondents in the cross-sectional study were nurses and patients. An anonymous questionnaire created for the purpose of this research was used to collect data.

Results. A total number of 764 respondents participated in the research. Male respondents show significantly more agreement with the statement that the physical appearance of the female nurse (p=0.003) / male nurse (p=0.005) affects the satisfaction with the health care provided. Respondents of older age groups show significantly more agreement with the statement that a female nurse dressed in a skimpier uniform will attract the attention of male patients and that during working hours she should cover the tattoo/piercing, unlike younger respondents. Compared to medical workers, patients show significantly more agreement with the statement that the physical appearance of female nurses is not related to their expertise (p=0.001), and that they would feel more comfortable if they were taken care of by a female nurse that is properly dressed (p=0.05). Both female and male nurses show significantly more agreement with the statement that the uniform should not put them in an uncomfortable situation (p=0.004).

Conclusion. Most respondents believe that both female and male nurses should be properly dressed in the workplace and respect the provisions of professional appearance.

Introduction

It is general knowledge that each individual creates their own opinion about certain things or people based on the physical appearance, character traits, and/or behaviour of these things/people. The opinion of people is greatly influenced by the environment in which they live and work, work experience, but also many other factors that contribute to the unique opinion of each person. The media, which present different situations every day, play a significant role in creating the opinion. The professional appearance of both male and female nurses contributes to the formation of public opinion about nursing as a profession. The survey on the opinion of general population and nurses themselves provides useful information needed to create a better image of nursing as a profession and to improve the reputation of nursing in society. Different types of research which provided an insight into the image of the nursing profession based on the appearance at workplace (1-4) were conducted. The uniform presents nurses as responsible, educated, and competent for providing health care in accordance with the level of education (1). Various studies indicate that wearing an uneven uniform does not contribute to professional reputation (2-4). Godsey et al. (2020) conducted a survey investigating registered nurses' perceptions of factors contributing to the inconsistent brand image of the uniform within nursing profession. Among other answers, respondents stated the increasingly frequent use of nurses' uniforms by other professions as one of the reasons, as well as the lack of identification cards with visible qualifications of the person wearing them, which contributes to the non-distinction of the nurses among each other as well as from other healthcare workers (5). Creating a confidential, professional, and therapeutic relationship with patients and their families partly depends on the way all involved interpret nurse's appearance (6). Cha et al. state that many patients admit the existence of a link between the nurse's uniform and the credit they put into nurse's work, as well as the public's perception of nursing (7).

Aim

The aim of this research is to examine the opinion of patients and nurses about professional appearance in nursing in relation to gender and age and to examine the way they perceive professionalism.

Methods

The cross-sectional study included patients from two family medicine practices and one dental practice, as well as nurses using the Internet and participating in online groups, partly from the Osijek Clinical Hospital Centre, of both genders and all ages. The research was conducted from February to April 2022. Data were collected online using an anonymous questionnaire designed and adapted exclusively to the needs of this study. The questionnaire consisted of two parts and contained a total of 18 questions, in which the respondents gave their opinions for male and female nurses separately. The first part included questions in terms of socio-demographic characteristics of the respondents: gender, age, level of education, years of work experience, whether they are a nurse by profession. The opinions of patients and nurses about the professional appearance of male and female nurses were examined in the second part. Respondents' agreement with each statement on a five-point Likert scale from 'I strongly disagree - 1' to 'I strongly agree – 5' was examined.

Statistics

Categorical data are represented by absolute and relative frequencies. Numerical data are described by the median and limitations of the interquartile range as well as the arithmetic mean and standard deviation. Differences in categorical variables were tested using the $\chi 2$ test. The normality of distribution of the numerical variables was tested with the Kolmogorov-Smirnov test. Due to deviations from normal distribution, numerical variables between two independent groups were tested with the Mann-Whitney U test. Numerical variables in the case of 3 or more independent groups

were tested with the Kruskal-Wallis test due to deviation from the normal distribution, and post hoc tests were used for the variables tested with the Kruskal-Wallis test. All *p* values are two-sided. The significance level was set at $\alpha = 0,05$. The SPSS statistical program (version 22.0, SPSS Inc., Chicago, IL, SAD) was used for statistical analysis.

The research was approved by the Ethics Committee of the Faculty of Dental Medicine and Health Osijek (2158/97-97-10-22-30) and the Committee for Ethical and Status Issues of Nurses for Health Care of the Clinical Hospital Centre Osijek (R1-1050-2/2022). Each respondent voluntarily participated in the research and could leave the research at any time. Anonymity was ensured for each respondent.

Results

A total of 764 respondents participated in the research, of which 203 (26.6%) were men and 561 (73.4%) were women. The arithmetic mean age is 33.7 years (SD=10.2) in the interval from 18 to 69 years. There were 485 (63.5%) nurses by profession included in the research (Table 1.).

Table 1. **Socio-demographic characteristics of the respondents**

		Number of respondents (%)
Gender	Male	203 (26.6)
	Female	561 (73.4)
Age	18 - 29	329 (43.1)
	30 - 39	221 (28.9)
	40 - 49	148 (19.4)
	50 - 59	58 (7.6)
	60 +	8 (1)
Are you a nurse by profession?	Yes	485 (63.5)
	No	279 (36.5)
Total		764 (100)

Table 2. shows variables (assertions) used in the research.

Table 2. **Variables used in the questionnaire (Statements)**

Number of the statement	Statement
1	Physical appearance leaves a first impression on a patient and is important in gaining trust in their work.
2	Physical appearance affects satisfaction with the health care provided.
3	Physical appearance is not related to expertise.
4	Neat appearance has a psychologically positive effect on patients.
5	It is necessary to have neatly combed hair during working hours.
6	It is necessary to have trimmed nails at the level of the fingertips.
7	The uniform should not hinder work performance.
8	The uniform must not lead to an uncomfortable situation (short and tight uniform).
9	Dressing in a skimpier uniform will attract the attention of patients of the opposite sex.
10	People dressed in a skimpier uniform are more accepted in their work environment.
11	I would feel more comfortable if I was taken care of by a person who is properly dressed.
12	Persons with tattoos/piercings in visible places should cover them adequately during working hours.
13	I would feel more comfortable if someone with more make-up took care of me.

Possible answers: 1 – I strongly disagree, 2 – I mostly disagree, 3 – I neither agree nor disagree, 4 – I mostly agree, 5 – I strongly agree

Men show significantly stronger agreement with the statement that the physical appearance of female nurse (Mann-Whitney U test, p=0.003, U=49214) / male nurse (Mann-Whitney test, p=0.005, U=49630) affects satisfaction with the health care provided, and strongly agree with the statement that the physical appearance of the female nurse (Mann-Whitney U test, p=0.001, U=48469) / male nurse (Mann-Whitney U test, p=0.005, U=49850,5) is not related to her/his expertise, which shows statistically significant stronger agreement compared to women in our research. Compared to men, women show significant-

ly stronger agreement with the statement that the uniform should not put the female nurse in an uncomfortable situation (Mann-Whitney U test, $p<0.001$, U=46979,5). Men show significantly stronger agreement with the statement that a female nurse dressed in a skimpier uniform will attract the attention of male patients (Mann-Whitney U test, $p=0.04$, U=51933,5). Women show statistically significant less agreement with the statement that a female nurse (Mann-Whitney U test, $p<0.001$, U=42906,5) or a male nurse (Mann-Whitney test, $p<0.001$, U=39840) dressed in skimpier uniform is more accepted in their work environment, as well as with the statement that a female nurse (Mann-Whitney U test, $p<0.001$, U=44331,5) or a male nurse (Mann-Whitney U test, $p<0.001$, U=44433,5) should adequately cover a visible tattoo/piercing and the statement that they would feel more comfortable if they were cared for by a nurse with heavy makeup (Mann-Whitney U test, $p=0.001$, U=48366) (Table 3.).

Table 3. **Respondents' opinion on the physical appearance of female and male nurses in relation to gender**

Statement	Female nurse (FN) and male nurse (MN)	Opinion / median (interquartile range)		*p**
		Male	Female	
2	FN	4 (2 - 5)	3 (2 - 4)	**0.003**
	MN	4 (2 - 5)	3 (2 - 4)	**0.005**
3	FN	5 (3 - 5)	4 (3 - 5)	**0.001**
	MN	5 (3 - 5)	4 (3 - 5)	**0.005**
8	FN	5 (4 - 5)	5 (5 - 5)	**< 0.001**
	MN	5 (4 - 5)	5 (4 - 5)	0.20
9	FN	5 (4 - 5)	4 (3 - 5)	**0.04**
	MN	4 (3 - 5)	4 (3 - 5)	0.16
10	FN	3 (2 - 4)	2 (1 - 3)	**< 0.001**
	MN	3 (2 - 5)	2 (1 - 3)	**< 0.001**
12	FN	3 (1 - 5)	2 (1 - 3)	**< 0.001**
	MN	3 (1 - 5)	2 (1 - 3)	**< 0.001**
13	FN	2 (1 - 4)	2 (1 - 3)	**0.001**
	MN	1 (1 - 2)	1 (1 - 2)	0.87

*Mann-Whitney U test; 1 – I strongly disagree, 2 – I mostly disagree, 3 – I neither agree nor disagree, 4 – I mostly agree, 5 – I strongly agree

Respondents within the 18-29 years age group show significantly less agreement with the statement that the physical appearance of a nurse affects the overall satisfaction with the health care provided, in contrast to the respondents within the 40-49 years age group (Kruskal-Wallis test, post hoc $p=0.042$). Furthermore, the respondents within the 50-59 years age group show significantly stronger agreement with the given statement in contrast to the respondents within the 18-29 years age group (Kruskal-Wallis test, post hoc $p=0.029$).

Respondents within the 40-49 years age group (Kruskal-Wallis test, post hoc $p=0.045$) and 50-59 years age group (Kruskal-Wallis test, post hoc $p=0.049$) show significantly stronger agreement with the statement that a female nurse dressed in skimpier uniform will attract the attention of male patients, in contrast to respondents within the 18-29 years age group. Respondents within the 40-49 years (Kruskal-Wallis test, post hoc $p=0.007$) and 50-59 years (Kruskal-Wallis test, post hoc $p=0.001$) age groups show significantly stronger agreement with the statement that a female nurse should adequately cover a visible tattoo/piercing during working hours, compared with the respondents within the 18-29 years age group who completely disagree with the above stated (Table 4.).

Respondents who are not medical professionals show significantly stronger agreement with the statement that the physical appearance of a female nurse is not related to her competence (Mann-Whitney U test, $p=0.001$, U=46979,5). Respondents in the field of medical profession show significantly stronger agreement with the statement that the uniform should put neither a female (Mann-Whitney U test, $p=0.004$, U=51933) nor a male nurse (Mann-Whitney U test, $p=0.01$, U=46979,5) into an uncomfortable situation and they also show significantly stronger disagreement with the statement that a female (Mann-Whitney U test, $p<0.001$, U=44331,5) or a male nurse (Mann-Whitney U test, $p<0.002$, U=44331) should adequately cover a visible tattoo/piercing during working hours, in relation to respondents who are not medical professionals and have a neutral attitude regarding the stated claim. Respondents who are not medical professionals show significantly stronger agreement with the statement that they would feel more comfortable if they were cared for by a nurse who is properly dressed (Mann-Whitney U test, $p=0.05$, U=49630) (Table 5.).

Respondents who are healthcare professionals show significantly stronger agreement with the statement

Table 4. **Respondents' opinion on the physical appearance of female and male nurses in relation to age**

Statement	Female nurse (FN) and male nurse (MN)	Opinion / median (interquartile range)					*p**
		18 - 29 years	30 - 39 years	40 - 49 years	50 - 59 years	60 + years	
2	FN	3 (2 - 4)	3 (2 - 4)	3 (2 - 5)	4 (2.75 - 5)	3 (1 -4.75)	**0.007**
	MN	3 (2 - 4)	4 (2 - 5)	3 (2 - 5)	4 (3 - 5)	3.5 (1 - 5)	**0.03**
5	FN	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	4.5 (3.25 - 5)	**0.03**
	MN	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4.25 - 5)	**0.001**
6	FN	4 (3 - 5)	5 (3 - 5)	5 (3 - 5)	5 (4 - 5)	4 (2.25 - 5)	**0.01**
	MN	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4.25 - 5)	**0.02**
9	FN	4 (3 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	**0.003**
	MN	4 (3 - 5)	4 (3 - 5)	4 (3 - 5)	4.5 (3 - 5)	5 (4.25 - 5)	**0.01**
11	FN	4 (3 - 5)	5 (3 - 5)	5 (4 - 5)	5 (3.75 - 5)	5 (4 - 5)	0.18
	MN	4 (3 - 5)	5 (3 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4.25 - 5)	**0.004**
12	FN	1 (1 - 3)	2 (1 - 3)	3 (1 - 4)	3 (1 - 4.25)	4 (1.25 - 5)	**< 0.001**
	MN	2 (1 - 3	2 (1 - 4)	3 (1 - 4)	3 (1 - 4)	3.5 (1.25 - 5)	**0.02**

*Kruskal-Wallis test; 1 – I strongly disagree, 2 – I mostly disagree, 3 – I neither agree nor disagree, 4 – I mostly agree, 5 – I strongly agree

Table 5. **Comparison of the opinions of patients and female/male nurses on the physical appearance of female and male nurses**

Statement	Female nurse (FN) and male nurse (MN)	Opinion / median (interquartile range)		*p**
		Female nurses and male nurses	Patients	
1	FN	4 (4 - 5)	4 (3 - 5)	0.09
	MN	4 (4 - 5)	4 (3 - 5)	**0.04**
3	FN	4 (3 - 5)	5 (3 - 5)	**0.001**
	MN	4 (3 - 5)	5 (3 - 5)	0.21
8	FN	5 (5 - 5)	5 (4 - 5)	**0.004**
	MN	5 (5 - 5)	5 (4 - 5)	**0.01**
10	FN	2 (1 - 3)	3 (1 - 4)	**< 0.001**
	MN	2 (1 - 3)	3 (1 - 4)	< 0.001
11	FN	4 (3 - 5)	5 (3 - 5)	**0.05**
	MN	4 (3 - 5)	5 (3 - 5)	0.30
12	FN	2 (1 - 3)	2 (1 - 4)	**< 0.001**
	MN	2 (1 - 3)	3 (1 - 4)	**< 0.001**

*Mann-Whitney U test; 1 – I strongly disagree, 2 – I mostly disagree, 3 – I neither agree nor disagree, 4 – I mostly agree, 5 – I strongly agree

that the physical appearance of a male nurse leaves the first impression on a patient and is important in gaining trust in his work (Mann-Whitney U test, p=0.04, U=51933), compared to respondents who are not healthcare professionals (Table 5.).

Discussion

The results of this research show that the majority of respondents believe that both female and male nurses should be properly dressed, and there are no significant differences in the opinions of the respondents in relation to gender and age when the statement about the connection between physical appearance and the first impression left by female and male nurses is taken into account. In this research respondents from the medical profession express the opinion that there is a connection between physical appearance and the first impression left by female nurses. Wills et al. (2018) state in their research that female nurses project their character through personal appearance. They also state that a patient forms an impression of a nurse within the first 12 seconds of their meeting. The results of their research also show that professional appearance leaves a lasting impression on the patient and expresses professionalism and competence (8). Similar results are shown in the work by Porr et al. where they note that the public perception, according to which a registered nurse is considered a professional health care provider based on the appearance of the uniform, has been maintained for generations (9). This especially applies to the female nurse-patient meeting and the impression during the first few moments of the meeting. Professionalism is primarily expressed in the appearance of registered female nurses, with uniforms being the main factor (9).

The results of the conducted research indicate that men show significantly more agreement with the statement that the physical appearance of female nurses affects satisfaction with the health care provided, but also that the physical appearance of female nurses is not related to their competence. In the conducted research Sparrow states that the uniform of female nurses, in addition to contributing to self-confidence, also instils security and confidence in patients (10).

Non-medical respondents agree that the nurse's physical appearance is unrelated to her competence in this study. The results of a study conducted at the Colleague of Health Sciences in the United Arab Emirates show that the majority of nursing students agree with uniforms presenting nurses as skilled and qualified, while a few surveyed students believe that uniforms and appearance are not related to one's knowledge and professional skills (11). One of the aims of a study carried out in Italy was to explore views of healthcare workers on the importance and meaning of their own nursing uniform. Professionalism (17.5%), identity (14%) and recognition (8.3%) were chosen more often (12). Sofer et al. state that people generally have a practice of combining positive characteristics with generally established specific appearance (13), while Bringsén et al. state that this also means that people with a non-specific appearance for a certain profession or situation have a much greater possibility of being associated with more negative characteristics that later lead to negative social perceptions (14). This is supported by the results of this research, where women and respondents from the medical profession are of the opinion that both female and male nurses dressed in skimpy uniforms are not accepted in their working environment. The reason for this may be the creation of negative opinions and prejudices based on appearance.

According to the results of this research, respondents over 60 years of age agree that both male and female nurses should have their hair neatly combed during working hours. Also, they are of the opinion that both male and female nurses should have their nails trimmed at the level of the fingertips. Pamela J. Carter writes about the same in *Lippincott's Textbook for Nursing assistants: A Humanistic Approach to Caregiving*. It is stated that the hair should be neatly arranged and not touch the face (15). It is recommended that nurses keep their nails short because long nails can potentially contribute to a faster spread of infection, as dirt and various bacteria often remain under the underside of the nail (16,17). In addition, it is recommended to avoid artificial and gelled nails because they are more difficult to clean, and precisely because of this, they contain a greater number of pathogenic microorganisms than natural nails (16). Research have shown that after washing hands, significantly more pathogens remain on gel nails than on natural nails (18).

According to Prlić, the uniform must not hinder the nurse at work or put her in an uncomfortable situation (19). The results of this research show that significantly more women than men agree with this statement. Respondents in the conducted research who work as nurses are of the opinion that the uni-

form should not put neither the female nor the male nurse in an uncomfortable situation.

As Muff (1982) points out, there are six most significant stereotypes related to nurses. They are presented as: angels of kindness, doctor's maids, ghosts in white, untamed, oppressors and sex symbols (20). In this research as well, men when compared to women, show significantly stronger agreement with the statement that female nurses dressed in skimpier uniforms will attract the attention of patients of the opposite sex.

Although stigmatization of tattooed healthcare workers is still present, research show that it is minimal. The results of this research show that women do not agree with nurses being demanded to adequately cover a visible tattoo/piercing. In contrast, Williams et al. (2019) showed, in the results of their research conducted among nursing students in America, that tattoos present in visible places pose problems for them during their stay in faculty premises and clinics where they perform practice. In the conclusions of the research, recommendations for covering tattoos in visible places were given (21). Furthermore, the results of this research show that patients are undecided about the need to cover tattoos/piercings in visible places. Conversely, in a 2012 American study by Westerfield and colleagues, patients expressed a more negative view of tattooed female nurses than tattooed male nurses (22).

The female respondents in this research do not agree with the statement that they would feel more comfortable if they were cared for by a nurse with more make-up. In 2012, Sotgiu, Nieddu, Mameli et al. conducted a study that researched preferences of Italian patients in relation to doctors' clothing. Patients rated long flowing hair, visible tattoos, and piercings as inappropriate for men, and wearing pants and using excessive make-up for women (23). Although the results of their research are related to doctors' clothing, they indicate a general agreement among patients that health professionals should look professional and without excessively visible body features and decorations.

Conclusion

Men show significantly stronger agreement with the statement that the physical appearance of a female/male nurse affects satisfaction with the health care provided. Men and respondents of older age groups show significantly stronger agreement with the statement that a female nurse dressed in a skimpier uniform will attract the attention of male patients.

Respondents from the medical profession and women show significantly stronger agreement with the statement that the uniform should not put the female/male nurse in an uncomfortable situation and significantly stronger disagreement with female/male nurse being obligated to adequately cover a visible tattoo/piercing during working hours in relation to respondents who are not medical professionals and respondents of older age groups. Respondents who are not medical professionals show significantly stronger agreement with the statement that they would feel more comfortable if they were cared for by a properly dressed nurse.

The majority of respondents of all characteristics of opinion share the opinion that both female and male nurses should be properly dressed at the workplace, adhering to the provisions of professional appearance, which affects the perception of professionalism in the nursing profession.

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MIŠLJENJE PACIJENATA I MEDICINSKIH SESTARA/TEHNIČARA O PROFESIONALNOM IZGLEDU U SESTRINSTVU

Sažetak

Cilj. Cilj ovog istraživanja bio je ispitati mišljenje pacijenata i medicinskih sestara o profesionalnom izgledu u sestrinstvu u odnosu na spol i dob te ispitati kako percipiraju profesionalizam.

Metode. Provedeno je presječno istraživanje u kojem je sudjelovalo 764 ispitanika, medicinske sestre i tehničari iz Kliničkog bolničkog centra Osijek te pacijenti iz ordinacija obiteljske i dentalne medicine u Semeljcima. Za prikupljanje podataka upotrijebili smo anonimni anketni upitnik kreiran u svrhu ovog istraživanja. Podaci su obrađeni deskriptivnom statističkom obradom.

Rezultati. Statistički su značajne razlike između mišljenja ispitanika u odnosu na spol i dob. Muškarci su mišljenja da fizički izgled medicinske sestre / medicinskog tehničara utječe na zadovoljstvo pruženom zdravstvenom njegom i nije povezan s njihovom stručno*šću*, dok su žene mišljenja da uniforma ne smije dovoditi medicinsku sestru u neugodnu situaciju. Stariji su ispitanici mišljenja da fizički izgled medicinske sestre / medicinskog tehničara utječe na zadovoljstvo pruženom zdravstvenom njegom. Pacijenti se u odnosu na medicinske djelatnike značajnije potpuno slažu da fizički izgled medicinskih sestara nije povezan s njihovom stručno*šću* i ugodnije bi se osjećali kada bi o njima skrbila medicinska sestra koja je propisno odjevena. Medicinske sestre / medicinski tehničari značajnije se potpuno slažu da ih uniforma ne smije dovoditi u neugodnu situaciju.

Zaključak. Većina ispitanika smatra da bi medicinske sestre / medicinski tehničari trebali biti propisno odjeveni na radnom mjestu i poštovati odredbe profesionalnog izgleda.

Ključne riječi: medicinske sestre, medicinski tehničari, mišljenje, profesionalni izgled, sestrinstvo

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Original scientific paper

Attitudes of University of Applied Health Sciences Students Towards Obese Individuals

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Abstract

Obesity is the term used to describe the excessive accumulation of body fat in relation to lean body mass. Obesity has many potential causes, such as genetics, alcohol consumption, use of various medications, psychological issues, reduced physical activity, and metabolic diseases. Since healthcare professionals are in daily contact with overweight and obese individuals, they play a crucial role in providing psychological support. The aim of this study was to examine the attitudes of students at the University of Applied Health Sciences towards obese individuals, as well as some determinants in predicting attitudes towards obesity. The study involved 200 students from different years and programs at the University of Applied Health Sciences. The results show that there is a statistically significant difference between male and female students in expressing negative responses, with male students being more prone to expressing more negative attitudes towards obesity. It was also observed that there was no statistically significant difference between full-time and part-time students, and physiological data were not associated with expressing more negative attitudes towards obesity. The most significant predictor in predicting a negative attitude towards obesity was satisfaction with one's own body weight.

Introduction

According to the World Health Organization, obesity is defined as excessive fat accumulation in the body to the extent that it impairs health (1). Data collected from 1975 to 2016 show that the number of obese people has increased many times through years. More than 2 billion adults are overweight, of which more than 650 million are obese, while more than 340 million children and adolescents are obese or overweight. Recent research shows that 38.2 million children under the age of 5 are obese or overweight (2). Croatian Institute for Public Health reported that more than half of adults are overweight, (57.4%) of which 18.7% are obese. Research also showed that in Croatia 16.8% of women in are obese and so are 20.8% of men (3). Studies have found that attitudes toward obesity in both children and adults can be negative and lead to weight stigma (4,5). This stigma can have a negative impact on an individual's psychological well-being and their physical health. For example, research has shown that weight stigma can lead to increased stress, decreased self-esteem, and a decreased quality of life for those who experience it (6-8). In terms of healthcare students, studies have shown that negative attitudes toward obesity can be present among medical students and other healthcare professionals (9,10). This can lead to weight bias in clinical encounters and a lack of appropriate care for obese patients. However, there is also evidence that education and training can help reduce weight bias and improve the quality of care for obese patients (11). Research has also investigated differences in attitudes toward obesity based on age and gender. For example, studies have found that younger individuals may have less negative attitude toward obesity compared to older individuals (12,13). Additionally, research has shown that women tend to hold more negative attitude toward obesity compared to men (13). It is important to note that these findings should be interpreted with caution and more research is needed to fully understand the complex attitudes and beliefs surrounding obesity. It is worth mentioning that weight stigma and discrimination towards individuals who are obese are not acceptable, and health care professionals should strive to provide non-judgmental and evidence-based care. One study conducted in the United States found that college students held more negative attitudes towards obese individuals compared to those who were overweight or of normal weight (9). The study also found that these attitudes were related to weight bias and stereotype endorsement. Another study conducted in the United States found that medical students held implicit biases towards obese individuals and were less likely to provide appropriate care for patients with obesity (14). The study suggested that addressing these attitudes through education and training could improve the quality of care for obese patients. Overall, these studies suggest that negative attitudes towards obese individuals exist among student populations and may impact the quality of care and treatment they receive. It is important to address these attitudes in order to promote inclusiveness and reduce weight bias as obesity is a growing public health concern, and attitudes toward obese individuals can greatly impact the quality of care they receive. Healthcare students, as future providers, play a crucial role in shaping these attitudes. Negative attitudes towards obesity can lead to weight stigma, which can further contribute to the already significant burden of disease faced by individuals living with obesity. It is therefore important to examine attitudes toward obese individuals among healthcare students.

Aim

The aim of this research is to examine attitudes towards overweight individuals among a sample of students from the University of Applied Health Sciences. One of the objectives was to determine whether there were differences in attitudes towards overweight individuals based on gender, mode of study, and type of study. A specific goal was to determine whether attitudes towards overweight individuals among students from the University of Applied Health Sciences could be predicted based on gender, age, type of study, mode of study, BMI, and satisfaction with their own weight.

Research problems:

1. To investigate the attitudes of University of Applied Health Sciences students towards obese individuals.

2. To investigate whether there are differences in attitudes towards overweight individuals among students from the University of Applied Health Sciences based on gender.
3. To examine whether there are differences in attitudes towards overweight individuals between regular and part-time students.
4. To explore whether there are differences in attitudes towards overweight individuals among students from different fields of study.
5. To determine the extent to which variables such as gender, age, type of study, BMI, and satisfaction with one's own weight predict a positive or negative attitude towards overweight individuals.

Methods

Participants

The participants in this study were students of all years and majors at the University of Applied Health Sciences. Participants were invited to complete an online survey through the Student Council of the University of Applied Health Sciences in Zagreb. The survey was completely anonymous and included a sample of 200 participants, students of the University of Applied Sciences, with an average age of 22.79 (SD=5.32). The sample included more women, 125 (62.5%), compared to 75 (37.5%) men. Participants were students of the first, second, and third year of undergraduate studies, as well as the first and second year of graduate studies. There were 97 (48%) regular students, 89 (44.1%) part-time students, and 16 (7.9%) students attending graduate studies. The largest number of student respondents were from the physiotherapy major (N=78), followed by nursing (N=48) and sanitary engineering (N=28), while the fewest respondents were from the radiology major (N=14) and occupational therapy (N=10). The study was approved by the Ethics Committee of the University of Applied Health Sciences.

Procedure

The study was conducted online and lasted from March to June 2021. The questionnaire was created using the "Google Forms" page. Students were invited to participate through the social network Facebook and through the e-mail to representatives of the Student Council of the Zagreb University of Applied Sciences.

Instruments

Demographic data

In addition to the Revised Antifat Attitudes Scale, participants completed data on age, gender, year, major, type of study and year of study. Students were asked for their height and weight to calculate the average body mass index (BMI) in order to relate physiological factors to attitudes towards obese individuals. Body mass index indicates the degree of nutrition and is calculated using an individual's height and weight.

Revised Antifat Attitudes Scale (Revised Anti-Fat Attitudes Scale; Wrench and Knapp, 2008).

The original scale consisted of 12 questions, and Wrench and Knapp added another 12 questions with positive attitudes to create a newer and longer scale (15). This newly constructed scale contains 24 items. The scale consists of two subscales, the first of which relates to the general attitude of the participant towards obese individuals (Revised Antifat Attitudes Scale), and the second to the participant's negative opinions about obese individuals (Dislike Scale of Obese Individuals), but it can also be used as unidimensional (e.g. 16) as it was used in this study. Example questions include: "Obese people make me uncomfortable", "Obese individuals can be just as attractive as thin individuals". Participants were asked to respond to the statements on a scale of 1 (completely disagree) to 5 (completely agree), with a lower number indicating a lower degree of agreement with the statement. Negative statements were recoded as positive, so a higher score indicates fewer negative attitudes towards obese individuals. The reliability of the Scale in this study is α= .89.

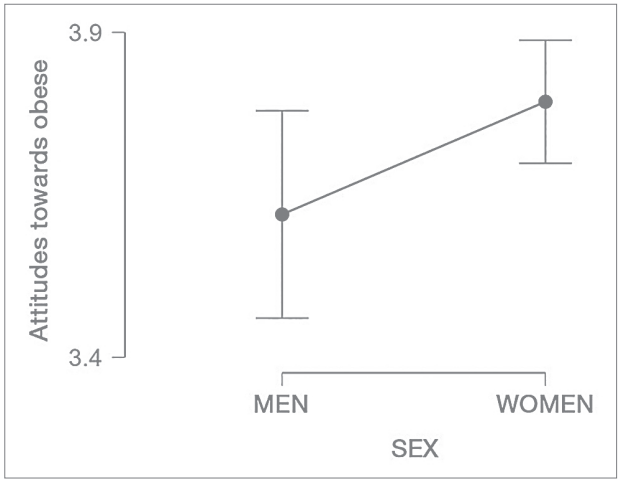
Statistics

The statistical analysis included descriptive and inferential statistics. The results of the Kolmogorov-Smirnov test showed deviations from normal distribution, but within an acceptable range. Since the sample size was sufficiently large, parametric statistics were used. Inferential statistics involved conducting t-tests to examine differences in attitudes towards obese individuals based on gender and study mode. Differences in attitudes based on study program were tested using analysis of variance (ANOVA) and appropriate post hoc tests. Hierarchical regression analysis was performed to examine the predictive ability of demographic variables, BMI, and satisfaction with own weight on attitudes among students. Values were considered statistically significant if they were equal or less than 0.05 ($p \leq 0.05$). IBM SPSS Statistics 25.0 software was used for data analysis.

Results

Descriptive analysis was conducted on the age, height, weight, BMI index, participants' satisfaction with their own weight, and their attitude towards obese individuals.

As it can be seen, altogether student have highly positive attitudes toward obese people. The normal range for body mass index (BMI) is between 18.5 and 24.9. From Table 1, the average of the sample falls within the normal range of BMI (M=23.54; SD=3.72), and the students are relatively satisfied with their weight (M=3.45; SD=1.34). Weight satisfaction will be examined in relation to its predictive role in attitudes towards obese individuals. Prior to that, the difference in attitudes towards obesity will be examined based on the participants' gender. To justify the use of parametric procedures, Kolmogorov-Smirnov tests were conducted, indicating that the distributions of attitude (p=0.19) and weight satisfaction (p=0.33) do not significantly deviate from normal. The first step was to calculate the statistical differences in attitudes towards obese individuals based on gender.

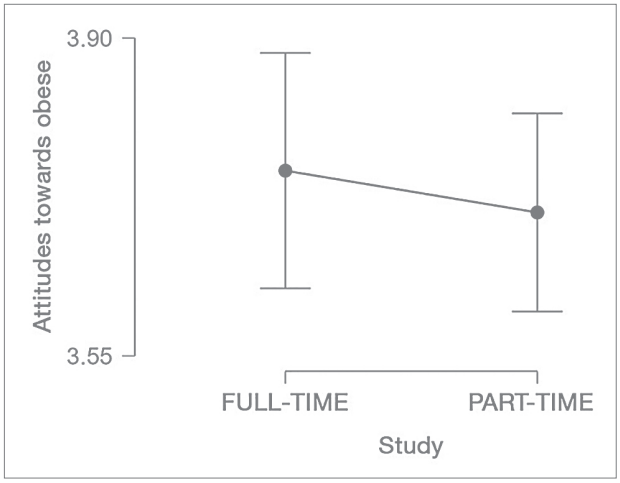


Graph 1. **Differences in attitudes towards obesity based on students' gender**

Table 1. **Descriptive parameters of the variables included in research (N=202)**

	Total	M	SD	Min	Max	Skewness	Kurtosis
Age	202	22.79	5.317	18	50	3.05	10.84
Height (cm)	202	172.33	9.806	153	200	0.41	-0.38
Weight (kg)	202	70.41	15.34	44	130	0.69	0.20
BMI	202	23.53	3.72	15.94	41.03	0.93	1.92
Weight satisfaction	202	3.45	1.34	1	5	-0.46	-1.04
Attitudes toward obese individuals	199	3.73	0.60	1	4.71	-1.31	2.76

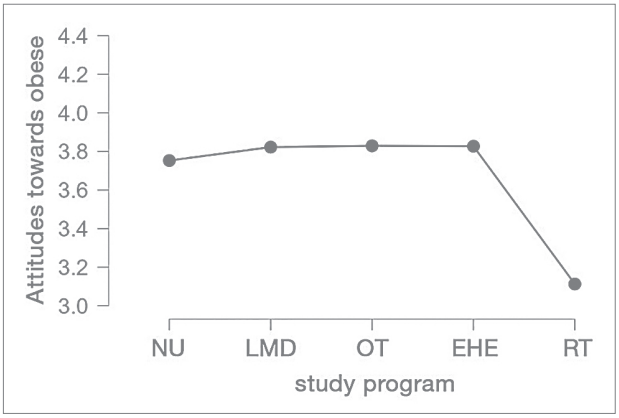
According to the above Graph 1, it is evident that males (M=3.62; SD=0.68) have a less favourable attitude towards obese individuals compared to females (M=3.79; SD=0.53). The conducted t-test has shown that this difference is statistically significant (t = -1.98; *p*=0.05). Males have significantly poorer attitudes towards obese individuals than females at the University of Applied Health Sciences. Further analysis was conducted to determine the differences in attitudes based on whether students are enrolled in a regular or part-time study program. The results are presented in Graph 2.



Graph 2. **Differences in attitudes towards obesity based on the type of study program**

Although students in regular study programs (M=3.75; SD=0.64) show almost the same attitudes towards obese individuals compared to part-time students (M=3.71; SD=0.56), this difference was not found to be statistically significant (t=0.54; *p*=0.59).

Given the larger number of study programs at the University of Applied Health Sciences, an analysis of variance was conducted to examine whether there are any differences in attitudes towards obese individuals at that level. It should be considered that there is a rather large difference in the sizes of the examined groups, so this result should be interpreted with caution. Indeed, the results indicate the existence of a difference among the examined study programs regarding attitudes towards obese individuals; however, it would be ideal if the number of participants in each group were more similar.



Graph 3. **Differences in attitudes towards obese individuals based on study programs**

There are statistically significant differences in attitudes towards obese individuals based on the participants' study programs. Specifically, post hoc analysis (Dunnett test) revealed that radiography students have a significantly more negative attitude towards obese individuals compared to nursing students ($p < .001$). There were no statistically significant differences among other study programs. It is evident that occupational therapy students (M=3.83; SD=0.49) and sanitary engineering students (M=3.83; SD=0.51) have equally high and most positive attitudes.

Table 2. **Attitudes toward obese individuals regarding the study program**

Program	N	M	SD	F (df)	*p*	η^2
Laboratory medical diagnostics	23	3.82	0.60			
Occupational therapy	10	3.83	0.49			
Radiological technology	14	3.11	1.03	4.46 (4)	**.00****	0.08
Environmental health engineering	27	3.83	0.51			
Nursing	125	3.75	0.52			

Considering the obtained results, the significant predictors of attitudes towards obese individuals will be examined. A hierarchical regression analysis was conducted, and the results are presented below. In the first step, demographic data of the participants (age, gender, study program and mode of study) were included as predictor variables, while in the second step, variables of self-weight satisfaction and body mass index were introduced. To meet the assumptions for calculating hierarchical regression analysis, the assumption of no multicollinearity (tolerance and variance inflation factor) was checked, and it was concluded that they are within acceptable values. Tolerance values range from .711 to .952, while variance inflation factor values range from 1.050 to 1.406. The assumption of correlation of residuals was tested using the Durbin-Watson criterion, which showed an acceptable result of 1.963. The results of the hierarchical analysis are presented in the table below.

The results of the first step of the hierarchical regression analysis show that sociodemographic variables such as gender, age, study program, year, and type of study explain 5% of the variance in attitudes towards obese individuals. Among individual contributions, gender stands out, with female gender contributing to a more positive attitude towards obese individuals to a greater extent. In the second step, body mass index and satisfaction with one's own weight were introduced. The explained variance increased by 7% and now accounts for 12%, which is a significant increase. This means that these two variables significantly contribute to explaining attitudes towards obese individuals among students at the University of Applied Health Sciences. Examining individual contributions, satisfaction with one's own weight significantly explains attitudes towards obese individuals. Students who are not satisfied with their own weight have a much more negative attitude towards obese individuals. This finding suggests that body mass index does not predict attitudes towards obese individuals as much as satisfaction with one's own weight does.

Discussion

The aim of our research was to examine the attitudes of University of Applied Health Sciences students towards obese individuals and overweight individuals, as well as to investigate whether there is a statistically significant difference in attitude based on gender, mode of study, and type of program. One of the objectives was also to determine whether variables such as gender, age, field of study, type of program, BMI, and satisfaction with one's own weight can be used as predictors of attitudes towards obese individuals in our sample. Our research showed that male students have significantly more negative attitudes towards obese individuals compared to female par-

Table 3. **Hierarchical regression analysis scores for attitudes toward obese people**

Predictor	β	R	R^2	ΔR^2	F
Step 1					
Sex	.19**				
Age	.07				
Study programme	-.04	.227	.052	-	**2.08****
Year of study	.09				
Undergraduate/Graduate	.08				
Step 2					
Sex	.21**				
Age	.05				
Study programme	-.06				
Year of study	.04	.350	.122	.071	**7.64****
Undergraduate/Graduate	.08				
BMI	.07				
Personal Weight Satisfaction	**-.27****				

ticipants. These findings are consistent with other studies. Specifically, men believe that obesity is a lack of willpower, as well as a lack of control over one's weight, which leads to more negative attitudes towards obese individuals (13). Additionally, a study conducted in the United States by Himmelstein (17) revealed that men had a higher tendency to stigmatize obesity compared to women and were less supportive of policies and practices that combat the stigmatization of obese individuals. The same result was found in a study conducted on students in Osijek by Kovačević (18), where male students expressed a higher degree of prejudice than female students. Another objective of the research was to highlight the difference in attitudes towards obese individuals based on the mode of study. Although not significant, there was a slight difference in attitude, indicating that regular students showed more positive attitudes than part-time students. This aspect of the hypothesis was experimental as there are no known references to such results, and it would be interesting to explore some of the differences in attitudes towards obese individuals because regular and part-time students differ mostly in age, which was examined in this case, but also in whether they are employed or not. Namely, employed students more frequently come into contact with different patient profiles, including obese individuals, so it would be worthwhile to investigate whether there are differences between employed students in their field and unemployed students regarding attitudes towards obese individuals. After considering the difference in the mode of study, we wanted to examine whether there are differences in attitudes towards obese individuals based on the type of program that students are enrolled in. Analysis of variance revealed that students in the radiology program have significantly more negative attitudes than students in the nursing program. A study conducted on Australian radiologists showed that most participants exhibited implicit biases towards obese individuals when encountering an obese person coming for a radiological procedure. Most of the implicit biases involved blame and intolerance towards obese individuals. Another study on radiology students (19) mentioned the difficulties encountered by students because they did not learn how to modify radiological imaging for obese individuals during their practice due to technical difficulties that can arise from the patient's excessive body weight. They also stated that it became easier for them to approach obese patients after their practice supervisor instructed them on clear radiological techniques for examining obese patients. Such a lack of practical education can cause fear among radiologists in the workplace when examining obese patients due to the lack of skills they did not learn during their practice, leading to the perception of experiencing discrimination against obese patients. In the same study, some students reported the expression of negative attitudes by their practice supervisors towards obese patients. A hierarchical regression analysis was conducted to determine the extent to which body mass index (BMI) and body satisfaction contribute to attitudes toward obese individuals, while isolating the influence of demographic variables. As previously mentioned, significant differences were found in participants' attitudes toward obese individuals based on gender and type of study. Through hierarchical analysis, we aimed to examine whether BMI and body satisfaction significantly predict attitudes toward obesity, while controlling for other known predictors. In the first step, only gender was found to be a significant predictor of attitudes toward obesity, confirming the previous finding that female participants exhibited more positive attitudes toward obese individuals compared to male participants. After considering the effects of predictor variables in the first step of the analysis, BMI was not found to be a significant predictor, whereas participants' body satisfaction had a negative significant impact on attitude prediction. Specifically, the significant negative beta weight of body satisfaction indicates that participants expressing lower satisfaction with their body weight had more positive attitudes toward obese individuals, whereas those expressing higher levels of body satisfaction had more negative attitudes toward obesity. This result can be explained by the fact that participants who have no issues with body perception and show satisfaction with their body weight are less understanding of the problem of obesity and are more likely to adopt a critical attitude toward obese individuals. A study conducted on students in Osijek (18) did not find BMI or body satisfaction to be significant predictors. Another study (20) conducted on 184 healthcare professionals revealed that nearly 50% of the respondents witnessed some form of discrimination against obese individuals by their colleagues. The most common forms of inappropriate behaviour included mocking appearance (96.6%), expressing disgust and aversion (96.2%), lack of reaction to offensive remarks (92%), or frighteningly warning

patients about the need for weight loss. This study concluded that most discriminatory behaviours were a result of inadequate education among healthcare professionals about the causes and issues related to obesity.

Prejudices against obese individuals can lead to poor healthcare for obese patients. Negative attitudes of healthcare professionals can discourage obese individuals from seeking healthcare due to the negative attitudes and discrimination they experience from healthcare workers. The aim of this study was to examine the general attitudes of students of the University of Applied Health Sciences toward obese individuals while also exploring specific determinants of those attitudes. Examining the average values on the Revised Antifat Attitudes Scale it was found that students generally hold positive attitudes, although there are differences among certain study programs. Increased education of students about minority groups, in this case, obese individuals, should certainly be a priority in the education of future healthcare professionals. Working on oneself to achieve body satisfaction is a significant predictor of attitudes toward obese individuals, according to the results of this study. The limitation of the study lies in the small sample size, uneven distribution of participants by gender, and a smaller number of participants from certain study groups. However, this research aimed to highlight the need for increased investigations into attitudes toward obese individuals among students, in order to introduce education aimed at reducing negative attitudes toward individuals with compromised health conditions due to obesity. Additionally, it is important to include the reasons for obesity in education, where students should be educated to reduce blame on obese individuals for their condition and focus on providing concrete assistance to help them overcome it.

Conclusion

Based on this research, student at the University of Applied Health Sciences showed generally high positive results toward obese people. The results of this study indicate gender differences among students at the University of Applied Health Sciences, with female students showing significantly more positive attitudes towards obese individuals than male students. Additionally, the findings show that students in the radiological technology program exhibit significantly more negative attitudes compared to students in other study programs. Ultimately, after controlling for demographic variables, the most significant predictor of a positive attitude towards obese individuals was a lower level of satisfaction with one's own appearance, while body mass index (BMI) was not a significant predictor of attitude. In conclusion, although students generally demonstrated positive attitudes towards obese individuals, this research highlights the necessity of including information on the causes and prevention of obesity in the education of future healthcare professionals across all study programs.

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STAVOVI STUDENATA ZDRAVSTVENOG VELEUČILIŠTA PREMA PRETILIM OSOBAMA

Sažetak

Pretilost je izraz koji se upotrebljava za opisivanje prekomjernog nakupljanja tjelesne masti u odnosu na nemasnu tjelesnu masu. Pretilost ima mnogo potencijalnih uzroka, poput genetike, konzumacije alkohola, uzimanja raznih lijekova, psihičkih problema, smanjene tjelesne aktivnosti i metaboličkih bolesti. Budući da su zdravstveni radnici svakodnevno u kontaktu s osobama s prekomjernom tjelesnom težinom i pretilošću, imaju ključnu ulogu u pružanju psihološke podrške. Cilj ovog istraživanja bio je ispitati stavove studenata Zdravstvenog veleučilišta o pretilim osobama, kao i neke odrednice u predviđanju stavova prema pretilosti. U istraživanju je sudjelovalo 200 studenata Zdravstvenog veleučilišta, različitih smjerova i godina studija. Rezultati pokazuju da postoji statistički značajna razlika između studenata i studentica u izražavanju negativnih odgovora, pri čemu su studenti skloniji izražavanju negativnijih stavova prema debljini. Također je uočeno da ne postoji statistički značajna razlika između redovitih i izvanrednih studenata, a fiziološki podaci nisu povezani s izraženijim negativnijim stavovima prema pretilosti. Najznačajniji prediktor u predviđanju negativnog stava prema pretilosti bilo je zadovoljstvo vlastitom tjelesnom težinom.

Ključne riječi: pretilost, stavovi prema pretilim osobama, studenti zdravstvenih studija

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Original scientific paper

Frequency of Medical Checkups and Clinical Procedures in Oncology Patients Before and During the Coronavirus Pandemic (Covid-19) in the Department of Gynaecology and Obstetrics of the University Hospital Centre Zagreb

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Abstract

Introduction. At the end of 2019, an epidemic caused by a coronavirus broke out in China. A certain number of female cancer patients neglected their regular oncology treatment during the pandemic, at first because of quarantine, and later due to their incompetence in applying online medicine. The majority of cancer patients demand permanent care and diagnostic/therapeutic procedures. The coronavirus pandemic (COVID-19) led to numerous check-up cancellations and surgery postponements in healthcare, yet it is unknown to what extent it has affected the healthcare of female cancer patients.

Aim. To determine the frequency of check-ups and clinical procedures that female cancer patients underwent prior to and during the coronavirus (COVID-19) epidemic.

Methods. Gathering data on the number of clinical procedures in cancer patients was conducted through the hospital information system (BIS) of the Department of Gynaecology and Obstetrics of KBC Zagreb in the period of two years. The study group included female cancer patients during one year of the pandemic (March 11, 2020 to March 11, 2021), and the control group consisted of female cancer patients during the period of one year preceding the pandemic.

Results. In the Department of Obstetrics and Gynaecology of KBC Zagreb there were less laparoscopic procedures (LPSC) in 2020 than in 2019, with 24.6% less procedures administered in 2020. There were also fewer other gynaecological procedures in 2020, however, the difference was not statistically significant $p>0.05$. In the same period in Zagreb in 2020 there were 13.9% fewer patients treated for cancer than in 2019. Also in 2020, there were statistically significantly fewer patients treated throughout Croatia $p<0.001$, with a decrease of 16.3%.

Conclusion. All aspects of healthcare, from diagnostics and therapy to research, have been distressed by the emergence of COVID-19. During the crisis caused by this disease, healthcare workers dealt with the problem of thorough and rapid reorganisation of the system, not only with the purpose of treating newly infected patients, but also in trying to maintain the quality of healthcare for cancer patients. The adjustment of the healthcare system with timely organisation in the Department of Obstetrics and Gynaecology managed to preserve the level of quality healthcare for its female cancer patients. For the future it would be necessary to prepare action plans which will assure adequate health care service without decreasing number of examinations.

Introduction

The coronavirus is a virus that belongs to the group of enveloped and non-segmented ribonucleic (RNA) viruses in the family Coronaviridae, order Nidovirales. The coronavirus has been known since 1967, when round viruses with spikes resembling a crown were observed under an electron microscope. Its appearance is from time to time, with symptoms of an acute febrile illness of the upper respiratory system, similar to a cold (1). COVID-19 is an infectious disease caused by the then-unknown SARS-CoV-2 coronavirus, which appeared in Wuhan at the end of 2019, and shortly thereafter an epidemic was declared in the People's Republic of China, and the virus began to spread throughout the world (1,2). The coronavirus pandemic was declared by the World Health Organization (WHO) on March 11, 2020. The first case of infection with the coronavirus in Croatia was recorded on February 25, 2020 (3). Since the beginning of the pandemic caused by the SARS-CoV-2 virus, over 8,500 people have died of cancer in Croatia (4). Considering the high mortality rate, the fight against cancer is by all standards a national strategic and security issue, and in the context of the COVID-19 crisis, it becomes an even greater challenge. The benefit of disease control should be evaluated in the context of the potential risk of complications and death related to COVID-19 (4). The health system faced a major problem in the reorganization of health care, with an extraordinary public health situation, and oncology patients and their care in the first weeks and months, until the system was reorganized, were deprived of chemotherapy, radiation, or postponement of operations. The WHO gave a recommendation at the beginning of the epidemic to postpone everything possible. In the Department of Obstetrics and Gynaecology of KBC Zagreb, which was also affected by the earthquake due to the pandemic, the implementation of therapy and surgery was not in operation for several days, until the staff, due to their own efforts, came up with a solution and provided conditions for work, care and treatment of patients in improvised premises. In a short period of time, hospital employees were faced with numerous challenges, private, business, uncertain forecasts, and the impossibility of forecasting and planning, which is of great importance for good health care

(4). The pandemic evidently had a great impact on the care and concern of already at-risk groups, and one of them is certainly those suffering from malignant diseases (4,5). Oncology patients have a greater tendency for a more severe form of the disease, considering the immune system that is compromised by cancer, and the method of treatment that is carried out. During the COVID-19 pandemic, the care of oncology patients had two, at first glance, opposite goals: to prevent or reduce the possibility of infection with the SARS-CoV-2 coronavirus, and to maintain the continuity of oncology treatment in such a way that conditions during the pandemic do not lead to worse treatment outcomes (6). It has been observed that oncology patients have an increased risk of secondary complications of COVID-19, which is not surprising given that they are often in an immunocompromised state (7). Oncology patients in relation to the SARS-CoV-2 virus pandemic can be divided into two groups: oncology patients with inactive oncological disease, who are in relatively long control monitoring and without the use of immunosuppressive therapy, and oncology patients with metastatic disease who are undergoing active oncological treatment. Oncology patients who have completed their immunosuppressive treatment relatively recently are certainly at a higher risk of having a more severe or complex clinical picture in case of infection with the coronavirus (8). The worst scenario would be that during the COVID-19 pandemic, we diagnose oncology patients later, in a more severe stage of the disease, treat them less effectively and consequently they have increased mortality from cancer (9). Chemotherapy at the time of COVID-19 infection should be prescribed in a smaller dose, taking care to achieve an equally successful method of controlling the disease, and oncology patients on hormone therapy should not have significant changes in the therapeutic principles of treatment, except for the fact that less frequent controls would be recommended (10-14). In cases of newly diagnosed infection with the SARS-CoV-2 virus, the accepted strategy of oncological treatment should be revised in oncology patients, and the further course of treatment should be individualized (15-17).

On the other hand, from an epidemiological point of view, there were a number of potential dangers for patients with a malignant disease, but also for the health system, i.e. health workers (18-23). The facts that should be taken into account in the organization of oncology care during the COVID-19 pandemic were that in case of infection with the SARS-CoV-2 virus, patients with a malignant disease have a higher risk of developing a more severe clinical status and a poor outcome compared to the healthy population (24-32). During the pandemic, it was necessary to limit gynaecological examinations only in cases of newly diagnosed malignant tumors of the genital organs or in patients who developed an acute condition during treatment or follow-up (32,33).

It was necessary to preserve the quality of life of patients who are in the terminal phase of the disease through a multidisciplinary approach and the cooperation of hospice services. Communication and consultation via telephone and video link enable a quick exchange of information and suggestions for the implementation of care (32,33,34).

Aim

Through retrospective analysis of data collected during the first year of the pandemic, and data collected during one year immediately before the pandemic, the goal was to gain insight into quantitative differences in the health care of oncology patients at the Department of Obstetrics and Gynaecology, University Hospital Centre Zagreb. The main goal was to examine the frequency of diagnostic/therapeutic procedures in oncology patients before and during the coronavirus (COVID-19) pandemic, and to investigate whether there is a negative relationship between the impact of the pandemic on the quality of health services and care in oncology patients.

Methods

Design

An observational study was conducted to monitor the frequency of control examinations and clinical procedures in a group of oncology patients during the pandemic, and the results were compared with the incidence of control examinations and clinical procedures during an earlier period. The research was conducted using the hospital information system (BIS) of KBC Zagreb. BIS is a program that covers segments of medical documentation management, economic aspects and other business records. The use and maintenance of the hospital's IT system increase the level of quality of health care and safety for the patient in case of complications, given the fast and accessible program of recorded data. In order for the hospital IT system to be effective and successful, it should be operated by trained personnel with the availability of technical and programming support.

Ethics

The conducted research was in accordance with the Nuremberg Code and the Declaration of Helsinki, where care was taken to respect personal integrity. At the 182nd session of the University Hospital Centre Zagreb Ethics Committee, held on May 10, 2021, a request for approval of the research entitled: "Frequency of control examinations and clinical procedures in oncology patients before and during the coronavirus pandemic (COVID-19) in the Department of Obstetrics and Gynaecology of the University Hospital Centre Zagreb - a two-year retrospective study" was considered. The Ethics committee agreed with the conduct of the mentioned research, given that the mentioned research does not contradict the ethical principles.

Data collection

The research group consisted of oncology patients treated during one year, from the beginning of the pandemic (March 11, 2020 to March 11, 2021), and the control group consisted of oncology patients treated during the previous period of one year before the pandemic, in 2019. After the approval of the Ethical Committee of KBC Zagreb to conduct research, BIS was approached. The research was conducted at the Clinic for Women's Diseases and Childbirth, KBC Zagreb from March 2020 to March 2021. The research collected descriptive data on the number of performed gynaecological procedures, in patients of the research and control groups, in the Department of Gynaecological Oncology of the Clinic for Women's Diseases and Childbirth of the KBC-Zagreb, Petrova 13. Data was collected on the number of performed diagnostic/therapeutic procedures; laparotomies, laparoscopic procedures, total laparoscopic hysterectomies, minor procedures, conizations and Lletz conizations, vulvectomies, hysteroscopies, modified radical hysterectomies, surgical procedures with the use of a laparoscope for vaginal removal of the uterus, combined procedures with hysteroscope and laparoscope, cervical amputations, and vaginal hysterectomies.

Statistics

In order to determine whether there was a statistically significant change in the frequency of performing of certain gynaecological procedures in oncology patients at the Clinic for Women's Diseases and Childbirth between 2019 and 2020, chi-square "goodness-of-fit" tests were conducted. According to the collected data from all regional offices of the Republic of Croatia in the Oncology Department of the Clinic for Women's Diseases and Childbirth of the KBC Zagreb; from the outpatient clinic for the control of patients treated for cancer, and for the sake of comparison, the same tests were used to compare and record the number of patients treated for cancer

between 2019 and 2020, for the city of Zagreb and the whole of Croatia. Two-tailed tests and an alpha value of 5% were used. Statistical processing was performed in SPSS, version 26.0 (2018, IBM Corp., Armonk, N.Y., USA).

Results

During 2019, which preceded the pandemic, a data on a total of 672 oncology patients was collected, who were the control group; while during the first year of the pandemic (2020), a total of 616 oncology patients, who were the research group, were collected over a period of one year. For the less frequently performed procedures (LAVH, hysc+lpsc, Amputation, Vag. Hyst.), the power of the performed test is extremely low, and there was little or no chance that the test would reveal statistically significant differences, but for the sake of data completeness, those test results are also listed. The laparoscopy (LPSC) procedure at the KBC Zagreb Obstetrics and Gynaecology Clinic was performed statistically significantly less often in 2020 than in 2019 (χ^2 (1)=4.78 p=0.029), with 24.6% fewer procedures performed in 2020. Other gynaecological procedures did not differ statistically significantly according to the frequency of performed procedures in 2019 and 2020 (p>0.05).

For the sake of comparison, from the available data, there were 13.9% fewer patients treated for cancer in Zagreb in 2020 than in 2019. This difference is statistically significant (χ^2 (1)=28.52 p<0.001).

Also in 2020, there were statistically significantly fewer female patients treated throughout Croatia (χ^2 (1) = 81.65 p<0.001), with a decrease of 16.3% (Table 2).

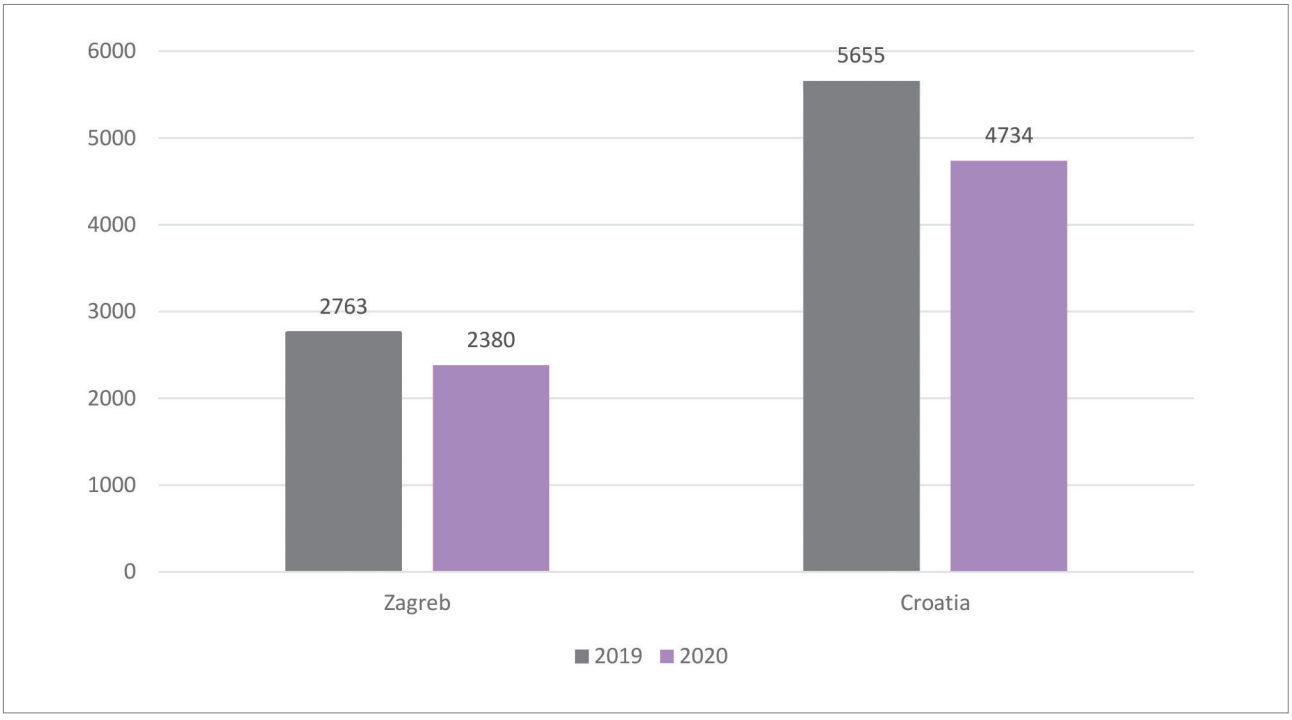

Figure 1. **Representation of female patients treated for cancer in 2019 and 2020 in Zagreb and throughout Croatia**

Table 1. **Descriptive data on the frequency of implementation of certain gynaecological procedures in 2019 and 2020 and the results of chi-square "goodness-of-fit" tests**

Gynaecological procedure	2019		2020		X^2	*p*
	f	%	f	%		
LAP	187	48.1	202	51.9	0.58	0.447
LPSC	138	57	104	43	4.78	0.029
TLH	113	48.1	122	51.9	0.35	0.557
Small	88	56.8	67	43.2	2.85	0.092
Con/Lletz	64	54.2	54	45.8	0.85	0.357
Vulva	34	47.2	38	52.8	0.22	0.637
Hysc	24	61.5	15	38.5	2.08	0.150
Rutledge	10	55.6	8	44.4	0.22	0.637
LAVH	5	71.4	2	28.6	1.29	0.257
Double (hysc+lpsc)	3	75	1	25	1.00	0.317
Amputation	2	50	2	50	0.00	1
Vag. Hyst.	2	66.7	1	33.3	0.33	0.564

Note: f - frequency, % - percentage of the total number of procedures in both years, χ^2 - chi-square test result (degrees of freedom are 1), *p* - statistical significance; Gynaecological procedures: LAP - laparotomy, LPSC - laparoscopy, TLH - total laparoscopic hysterectomy, Small - small procedures, Con/Lletz - miniconization, Vulva - vulvectomy, Hysc - hysteroscopy, Rutledge - modified radical hysterectomy, LAVH - surgical procedure of using a laparoscope in vaginal removal of the uterus, Double (hysc+lpsc) - hysteroscopy with laparoscopy, Amputation - amputation, Vag. Hyst. – vaginal hysterectomy.

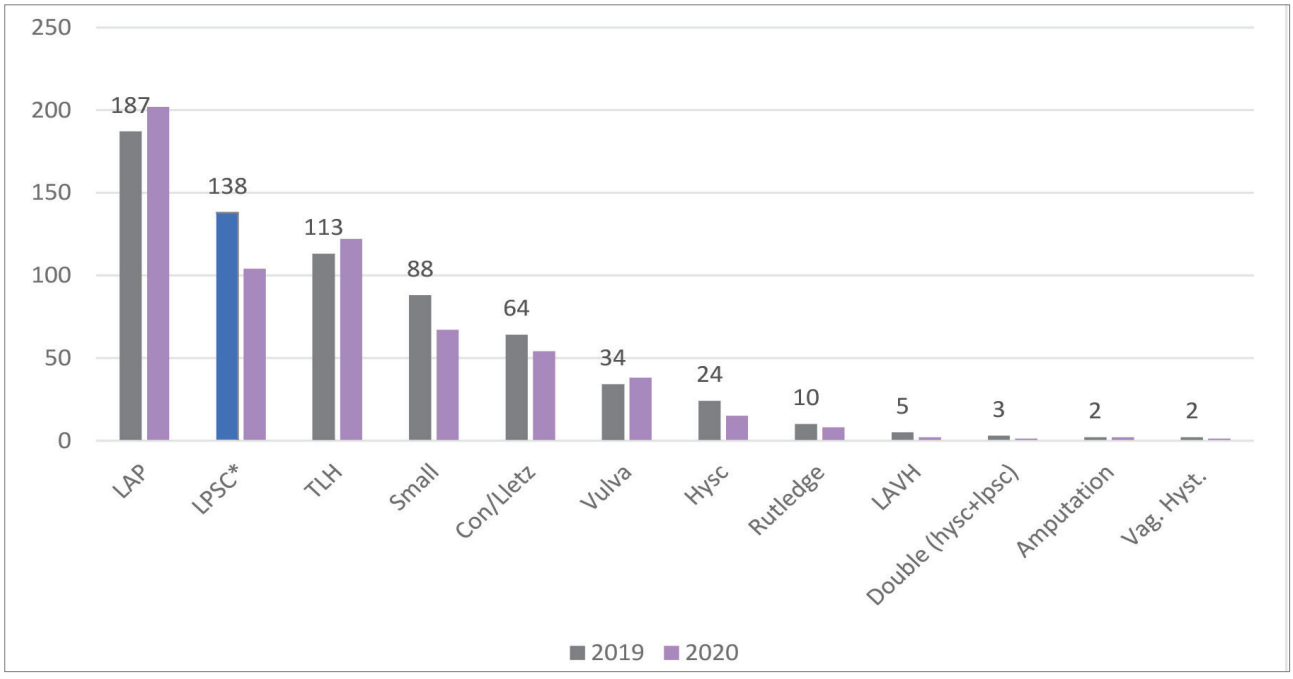

Figure 2. **Representation of certain gynaecological procedures in 2019 and 2020 at the Department of Obstetrics and Gynaecology, University Hospital Zagreb**

Table 2. **Descriptive data on the number of female patients treated for cancer in regional offices during 2019 and 2020, and the results of chi-square "goodness-of-fit" tests**

Area	2019		2020		χ^2	*p*
	f	%	f	%		
Zagreb	2763	53.7%	2380	46.3%	28.52	<0.001
Croatia	5655	54.4%	4734	45.6%	81.65	<0.001

Discussion

During the global pandemic of the COVID-19 disease, the Republic of Croatia, like the rest of the world, was exposed to extraordinary measures to prevent the spread of the infection, which had profound consequences on the life of the entire society, as well as on the availability of oncology care (35-38). The consequences of isolation measures on the timely detection, diagnosis, treatment and outcomes of oncology patients at the Department of Obstetrics and Gynaecology are still being analyzed. During the escalation of the SARS-CoV-2 virus pandemic, health systems in Europe and the world came under great pressure. The questions related to the impact of the epidemic on oncology patients and the steps in the prevention and treatment of malignant tumors, and how will COVID-19 affect the expected outcomes of treatment, and how to improve the results of treatment, were discussed at numerous gatherings, congresses and professional meetings around the world, which gather experts who exchanged experiences, results and offered effective methods of oncology care in one place. Research on the impact of the COVID-19 pandemic on cancer treatment, conducted by the Initiative of Pharmaceutical and Biotechnology Companies in six Eastern European countries, including Croatia, showed that there was a drop in the number of patients treated by oncologists/haematologists. Other researchers point us to a significant drop in the number of cancer diagnoses and the number of diagnostic procedures during the epidemic; confirmed a significant difference in the frequency of diagnostic procedures and interventions before and after the start of the pandemic (35,36). Stah et al. found that 1218 exams (cancer prevention program) were performed in the pre-pandemic period and 857 in the pandemic period, a 29.6% decrease (37). If we compare our results with Sthal et al., and decrease of 16.3% we can conclude that our action measures gave some results (Table 2) (37). This retrospective research during the first year of the pandemic precisely showed the immediate negative impact of the pandemic on the number of diagnostic procedures performed, on a smaller number of therapeutic procedures, as well as, in accordance with the results, on the consequent worse outcome of the treatment of oncology patients at the Clinic for Women's Diseases and Childbirth of the KBC Zagreb. According to an insight into the recorded data, the number of diagnostic and therapeutic procedures during the first year of the pandemic (Table 1) recorded 24.6% fewer laparoscopic procedures in 2020 than in 2019, before the pandemic (χ^2 (1)=4.78, p=0.029); which means statistically significantly less laparoscopies compared to 2019. Other gynaecological procedures did not differ statistically significantly according to the frequency of application in 2019 and 2020 (p>0.05), although there were fewer of them. Thus, small procedures, conization/LETZ (Loop Excision of the Transformation Zone-LETZ) biopsy of the cervix, hysterectomy, Rutledge, LAVH (Laparoscopic Assisted Vaginal Hysterectomy-LAVH), hysterectomy+LPSC and vaginal hysterectomy were less prevalent during the pandemic year 2020, than during 2019, but without a statistically significant difference. During the pandemic year 2020, there were slightly more laparotomies, TLH (Total Laparoscopic Hysterectomy) and vulvectomies, but without a statistically significant difference compared to 2019, while cervical amputations were equally represented during 2019 and 2020. Such results, with a slightly higher frequency and more extensive procedures during the pandemic year, can be interpreted as a result of a direct connection due to the spread of the underlying disease and the need for surgical intervention as quickly as possible, despite the pandemic. Thus, other relatively small interventions according to the scope of surgical treatment were less common during the year of the pandemic, but without a statistically significant difference. In Table 1 (Descriptive data on the frequency of certain gynaecological procedures in 2019 and 2020, and the results of chi-square "goodness-of-fit" tests), as well as the graphic display (Figure 2) shows the frequency and order of all represented diagnostic and therapeutic procedures of oncology patients at the Department. The most common procedures were laparotomies, while the least common were vaginal hysterectomies. According to the results of the Department, there were indicators of a total of fewer number of treated gynaecological/oncological patients at the level of Zagreb, but also significantly fewer number of treated gynaecological/oncological patients in the whole of Croatia. Thus, in Zagreb in 2020, during the pandemic, there were 13.9% fewer patients treated for cancer than in 2019. That difference was statistically significant (χ^2 (1)=28.52, p<0.001). Also, in 2020, there was statistically significantly fewer number of treated patients at the

level of the whole of Croatia (χ^2 (1) = 81.65, p<0.001), with a decrease of 16.3%. The same results are shown graphically (Figure 1) for the city of Zagreb and the whole of Croatia, where it is evident that there were statistically significantly less represented and treated gynaecological/oncology patients during the 2020 pandemic in Zagreb and Croatia than in 2019. Cancer patients mostly accept the new situation and its impact on the healthcare system, and are most often inclined to accept all suggested preventive measures, even though there is an increasing need for psychological support. Most hospitals have adapted by reserving their capacities in intensive care units for potential complications of COVID-19 (35). Continuation of regular operations would call into question the possibility of treatment for all patients who need intensive care, i.e. mechanical ventilation. Due to the potential burden on the system, the number of elective operations, which also include primary tumor operations, has been significantly reduced (38). Liang et al., as well as many other researchers, report an increased incidence of complications in oncology patients from COVID-19 (20). Considering the relatively small number of studies that investigated the impact of SARS-CoV-2 infection on oncology patients with malignant diseases, conclusions are drawn from cohort analyses. In general, older oncology patients with significant comorbidities or recent surgical procedures had a higher probability of needing hospital treatment, a higher risk of developing a more severe clinical picture and death from COVID-19 (39). With a retrospective insight into the results of the Clinic for Women's Diseases and Childbirth during the first year of the pandemic and one year before the pandemic, we had consistent results, like the vast majority of researchers who, in the conducted studies, emphasized the need to reduce the intensity or postpone specific oncological treatment whenever possible, considering on the risk of infection for patients. The risk of disease progression due to delaying therapy increases with the duration of the pandemic, which can have negative consequences for oncology patients (40-42). The rapid spread of severe acute respiratory syndrome caused by the SARS-CoV-2 coronavirus required urgent and coordinated health care, and maintaining continuity of care for diseases other than COVID-19 (42). The European Society for Medical Oncology (ESMO) approved three different levels of access to treatment (high, medium, low) for patients with gynaecological cancer, who are particularly at risk of complications caused by COVID-19, due to age and the prevalence of comorbidities (43). Frey et al report that more than one-third of gynaecologic cancer patients at three affiliated hospitals in New York experienced a delay, change, or cancellation of treatment during the first two months of the COVID-19 pandemic (44). These changes in the treatment plan are a direct correlation and consequence of the overloading of the health system by the spread of the pandemic (44,45). Our experiences and retrospective research through the first year of the pandemic in the Clinic for Women's Diseases and Childbirth of the KBC Zagreb showed similar problems in the organization of health care for oncology patients, as in most other oncology centres worldwide. Through timely organization and a selective approach, it was possible to maintain the continuity of the necessary procedures and diagnostics, which resulted in minor deviations from the usual approach to such patients.

Conclusion

All aspects of healthcare, from diagnostics and therapy to research, were affected by the emergence of COVID-19. During the crisis caused by this disease, health workers deal with the problem of a thorough and rapid reorganization of the system not only for the purpose of taking care of newly infected persons, but also to avoid causing a loss of quality of treatment for other patients. The treatment of malignant diseases of gynaecological patients is one segment that requires continuity even in the era of the pandemic, considering the nature of the disease itself and the impact on survival, which is made possible by specific oncological treatment.

Based on this retrospective research, it can be concluded:

- the overall number of diagnostic/therapeutic interventions during the pandemic is lower, from which it can be indirectly concluded that due to the pandemic and the limited number of control examinations, fewer diagnoses were made on time

- during the year of the pandemic, statistically significantly fewer laparoscopic procedures were performed than during the year preceding the pandemic
- in total, during the year of the pandemic, a smaller number of other diagnostic/therapeutic procedures were performed, but still without a statistically significant difference, thanks to the good reorganization of the health care system

All available and conducted studies have indicated a reduced total number of diagnostic/therapeutic procedures, with a reduced intensity or delay of specific oncological treatment, whenever possible considering the risk of infection for oncology patients. Most hospitals have adapted by reserving their capacities in intensive care units for potential complications caused by COVID-19.

For the future, it would be necessary to prepare action plans which will assure adequate health care service without decreasing the number of examinations.

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UČESTALOST KONTROLNIH PREGLEDA I KLINIČKIH POSTUPAKA KOD ONKOLOŠKIH PACIJENATA PRIJE I ZA VRIJEME PANDEMIJE BOLESTI COVID-19 U KLINICI ZA ŽENSKE BOLESTI I PORODE KBC-a ZAGREB

Sažetak

Uvod. Krajem 2019. u Kini je izbila epidemija izazvana koronavirusom. Određeni broj oboljelih od raka zanemario je redovito onkološko liječenje tijekom pandemije, najprije zbog karantene, a kasnije zbog nestručnosti u primjeni *online* medicine. Većina onkoloških bolesnika zahtijeva stalnu njegu i dijagnostičko-terapijske postupke. Pandemija bolesti COVID-19 dovela je do brojnih otkazivanja pregleda i odgađanja operacija u zdravstvu, no nije poznato u kojoj je mjeri utjecala na zdravstvenu skrb žena oboljelih od raka.

Cilj. Utvrditi učestalost pregleda i kliničkih zahvata kojima su bile podvrgnute oboljele od raka prije i tijekom pandemije bolesti COVID-19.

Metode. Prikupljanje podataka o broju kliničkih postupaka u onkoloških bolesnika provedeno je kroz bolnički informacijski sustav (BIS) Klinike za ženske bolesti i porode KBC-a Zagreb u razdoblju od dvije godine. Ispitnu skupinu činile su oboljele od raka tijekom jedne godine pandemije (od 11. ožujka 2020. do 11. ožujka 2021.), a kontrolnu skupinu činile su oboljele od raka tijekom godine dana prije pandemije.

Rezultati. U Klinici za ženske bolesti i porode KBC-a Zagreb bilo je manje laparoskopskih zahvata (LPSC) 2020. nego 2019., s 24,6 % manje obavljenih zahvata 2020. Manje je bilo i ostalih ginekoloških zahvata 2020., ali razlika nije statistički značajna ($p > 0,05$). U Zagrebu je u istom razdoblju 2020. od karcinoma liječeno 13,9 % manje pacijenata nego 2019. Također je 2020. statistički značajno manje liječenih u cijeloj Hrvatskoj ($p < 0,001$), uz pad od 16,3 %.

Zaključak. Svi aspekti zdravstvene skrbi, od dijagnostike i terapije do istraživanja, pogođeni su pojavom bolesti COVID-19. Tijekom krize izazvane ovom bolešću zdravstveni su se djelatnici uhvatili ukoštac s problemom temeljite i brze reorganizacije sustava, ne samo u svrhu liječenja novooboljelih nego i u nastojanju da održe kvalitetu zdravstvene skrbi za oboljele od raka. Prilagodbom zdravstvenog sustava pravodobnom organizacijom Klinika za ženske bolesti i porode uspjela je očuvati razinu kvalitete zdravstvene zaštite svojih onkoloških bolesnica. Za budućnost bi bilo potrebno izraditi akcijske planove koji će osigurati adekvatnu zdravstvenu uslugu bez smanjenja broja pregleda.

Ključne riječi: koronavirus, pandemija, onkološki bolesnici, pregled, klinički postupci

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Professional paper

Informing and Preparing Patients for Echocardiography

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Abstract

Aim. To examine the awareness and preparedness of patients for echocardiography regarding age, gender, education level, and the type of examination.

Methods. A cross-sectional study included patients who came for echocardiography through the outpatient clinic and Clinical Departments of the Clinical Hospital Center Osijek during March and April 2023. A survey questionnaire developed for this research was used as the research instrument on patients' awareness and preparedness for echocardiography.

Results. The study included 106 participants, of which 52 (49%) were males and 54 (51%) were females, with 51% of them having undergone 1 - 3 echocardiographic examinations before. Most participants, 83 (78%), received information verbally. There was no significant difference in the awareness and preparation of participants for echocardiography regarding gender and age. Participants with higher education levels agreed that they knew how the examination was conducted before coming, unlike participants with lower levels of education, and there was a significant statistical difference between the groups (p=0.02). Participants who underwent transesophageal echocardiography stated that they were better informed and prepared compared to those who underwent transthoracic echocardiography (p=0.01).

Conclusion. The results of the conducted research indicate that participants are well informed and prepared for echocardiographic examinations, with no significant differences based on gender and age. Participants who underwent transesophageal ultrasound of the heart considered themselves better informed and prepared compared to those who underwent transthoracic echocardiography.

Introduction

Echocardiography, or cardiac ultrasound, is a diagnostic examination that provides insight into the comprehensive anatomy and physiology of the heart, as well as guiding further diagnostic and therapeutic procedures (1). Echocardiography is used for diagnosing congenital and acquired heart defects, cardiomyopathies, inflammatory heart diseases, acute myocardial infarction, cardiac tumors, and diseases of the major blood vessels entering and leaving the heart. It assesses the dimensions of cardiac structures, the elasticity of cardiac walls, and overall heart muscle strength, and displays heart valves along with the heart's pump function (2). Ultrasound has multiple working methods, including two-dimensional, three-dimensional ultrasound, Doppler and color Doppler, and strain imaging as diagnostic tests for echocardiography (1). In addition to these techniques, there is also stress echocardiography and transthoracic echocardiography (TTE) as the most commonly used method, which is painless and non-invasive. There are also invasive diagnostics, transesophageal echocardiography (TEE), which is often performed under anesthesia, and intracardiac echocardiography, which is very rare and performed under anesthesia (1). Transesophageal ultrasound provides a better view of certain heart structures, making various abnormalities of heart valves or clots inside the heart visible with this method (3). There are no contraindications for TTE. Contraindications for TEE include swallowing disorders, bleeding from the esophagus, tumors, radiotherapy of the mediastinum, thoracic aorta aneurysms, and various esophageal changes such as strictures, diverticula, varicosities, and tumors (4). Aside from an allergic reaction to the gel, TEE has no significant complications. Possible complications of TEE are rare but can be associated with trauma to the teeth, oral mucosa, and esophagus, and they can rarely include breathing problems, aspirational pneumonia, difficulty swallowing, arrhythmias, bleeding, esophageal perforation, infections, and more (5).

Ultrasound Physiology

The ultrasound machine used for cardiac examinations employs ultrasound waves that are emitted toward the heart using a probe. These waves reflect off cardiac structures and are then transmitted to the machine and processed using special computer programs to create an image of cardiac structures on the monitor (6). Unlike standard TTE, the probe that generates sound waves for TEE is attached to a thin tube that passes through the mouth, down the throat, and into the esophagus. Since the esophagus is directly behind the heart, images of cardiac structures and valves are much more detailed (6). The actual images and sound recordings can be stored on a portable disk or other media such as a compact disc (CD) for later review or to provide to the patient for further assessment or second opinions, and they can also be exchanged via telemedicine for consultations or research purposes (7).

Patient Information and the Role of the Nurse

In recent years, the importance of patient information has been emphasized. Not only does the patient have the right to be informed and have the right to know everything about their health condition, but by being informed, the patient also facilitates cooperation with the medical staff during diagnostic procedures and treatment. To help the patient understand the manner and reason for conducting certain tests, it is necessary to explain the type of examination clearly and concisely and describe how the examination is conducted and what the patient should do and expect during the diagnostic procedure (8). After the patient receives the necessary information about the diagnostic procedure, the patient is given informed consent, which needs to be signed by the patient to confirm their agreement to undergo the examination and to confirm their understanding of the provided information (9). Informed consent is a statement from the patient that authorizes the doctor to conduct the diagnostic examination in this case, and it is stored in the patient's documentation, among other things, for legal protection. In addition to the written information form, there is also a need for oral communication between the medical staff and the patient, as this allows the patient to ask questions and receive direct and clear answers (10). During communication with the patient, the nurse provides as much information as they are authorized to give. The most important thing is to understand the patient, be ready to answer their questions and provide emotional support to both the patient and the family members involved in the patient care. When arriving for a diagnostic examination, the patient may have a certain level of

fear, both about the outcome of the examination and not knowing what will be done and how the examination will be conducted. To help the patient relax before and during the examination, the nurse plays an important role in this aspect. Above all, the patient should be informed that echocardiography is a diagnostic procedure that does not cause pain. Patients may be afraid of pain during the examination.

Examination and the Role of the Nurse

Before performing the diagnostic examination, it is necessary to identify the patient. The physician reviews the medical documentation brought by the patient and then explains the procedure. During the examination, it is essential to follow the protocol for conducting the examination, including positioning the patient, in which the nurse plays a significant role, in ensuring the accuracy and objectivity of the obtained ultrasound images (11). Sometimes, psychological preparation is more challenging and more important than the physical preparation of the patient (12). Problems related to performing diagnostic examinations can arise when some of the basic human needs in Maslow's hierarchy are not met for the patient. Every person needs security, respect, and self-esteem (12). The nurse receives the patient and prepares and positions them. During the echocardiogram, the patient lies on their left side or their back, undressed from the waist up. The patient's position on the left side allows for a higher-quality display on the ultrasound machine screen (11). The heart rests against the left chest wall, allowing for a much more accurate diagnostic examination (13). The nurse also places electrodes on the patient's back to record an electrocardiogram and informs the patient about the course of the examination (14). The nurse not only instructs the patient on which position to take but, as needed, depending on the patient's condition, assists in assuming the position and often holds the patient. Occasionally, the examination may be uncomfortable because the physician needs to apply more pressure with the probe to the chest. In case the patient cannot endure the discomfort, they are asked to signal. The diagnostic examination itself lasts from 20 to 45 minutes, depending on the course of the examination and the findings.

Transesophageal Ultrasound and the Role of the Nurse

The performance of transesophageal ultrasound differs from preparation to execution. If there is a need for transesophageal ultrasound, the nurse must establish venous access, and administer premedication, and analgesic spray in the form of a spray injected into the esophagus to ease and reduce the pain and discomfort during the insertion of the ultrasound probe. Before the examination, if it is found that the patient has artificial teeth or a part of a dental prosthesis, it needs to be removed for the patient's safety during the examination (15). The examination is performed in the same position as a regular heart ultrasound. The patient is fitted with a shield for the probe, which is covered with their lips and held during the examination. Once the patient is positioned and anesthetized, the physician introduces the transesophageal probe, which passes through the esophagus, with a swallowing motion made for the probe to pass into the esophagus. During the examination, the patient is calmed, and they are reminded of the need to breathe through their nose. The length of the examination depends on the indications for the examination. The patient should not eat or drink anything 4-6 hours before the examination, and after the examination, they may experience a feeling of throat swelling and numbness due to sedation, they are also informed that they should not eat for 2 hours after the examination until the mentioned feeling disappears (5). A patient coming for TEE, if not informed and prepared, can lead to the postponement of the examination (and therefore the diagnosis) and possible complications. Similarly, although in TTE, preparedness does not affect the examination findings, patients experience fear because they do not know what to expect, so it should not be assumed that there is no need for preparation for the examination. No research was found in the available literature examining the awareness and preparation of patients for echocardiography, and we decided to fill this gap. This research aims to examine the awareness and preparation of patients for echocardiography regarding age, gender, education level, and the type of examination.

Methods

Participants

A cross-sectional study was conducted at the Clinic for Internal Medicine of the Clinical Hospital Center Osijek (KBC) for two months (March and April 2023). The participants were patients who underwent echocardiography through the clinic and clinical departments of KBC Osijek, who voluntarily agreed to participate in the study and completed a survey questionnaire. The questionnaire was filled out after the echocardiography was performed. A total of 106 participants were included. Inclusion criteria were participants who signed informed consent to participate in the study, underwent the examination at the Department of Heart and Blood Vessel Diseases, KBC Osijek, were older than 18 years, cognitively intact without severe mental changes, understood, and spoke the Croatian language. Exclusion criteria were participants who did not sign informed consent to participate in the study, participants who did not have the examination at the Department of Heart and Blood Vessel Diseases, KBC Osijek, participants younger than 18 years, dementia, and psychiatric diagnoses obtained from a review of medical documentation. Participants were informed about the way to prepare for an echocardiographic examination when scheduling an appointment. Participants were included in the study, whether they had previously undergone echocardiography and had been informed in the same way or whether they were coming for the first time for these examinations.

Personal data protection

Personal data provided are processed in accordance with the General Data Protection Regulation (Regulation (EU) 2016/679) using adequate physical, technical, and security protection measures. At any time, the participant has the right to request access, review, supplement, or delete their private information and the right to limit processing, data modularity, and the right to revoke consent.

Ethics

The study was conducted by the principles of the Declaration of Helsinki. Ethical approvals were obtained from the Ethics Committee of Nurses-Technicians of the Clinical Hospital Centre Osijek (R1-1946-4/2023) and the Ethics Committee of the Faculty of Dental Medicine and Health (2158/97-97-10-23-16).

Instrument

After the echocardiography was performed, the participants were thoroughly explained the research and, if they agreed to participate in the study, they received informed consent for signing. After they signed the informed consent, the participants completed a survey questionnaire independently. The questionnaire was based on a review of the literature (16,17). The questionnaire consisted of six general questions and 15 statements about awareness of echocardiography. In the statements, participants were asked to agree with each statement on a five-point Likert scale, from "strongly disagree" - 1 to "strongly agree" - 5.

Statistics

Categorical data are presented with absolute and relative frequencies. Numerical data are described by the median and interquartile range boundaries and arithmetic mean and standard deviation. The normality of the distribution of numerical variables was tested with the Kolmogorov-Smirnov test. The Kolmogorov-Smirnov test showed in all questionnaire items that the distribution deviates from normal regarding gender, age, and type of examination, with $p<0.001$, and in statements 1, 2, 4, and 12 regarding education level, with $p>0.05$. Due to the deviation from a normal distribution, numerical variables between two independent groups were tested with the Mann-Whitney U test, while differences between three or more independent variables were tested with the Kruskal-Wallis test. All p-values are two-sided. The level of significance was set at $\alpha = 0.05$. Statistical analysis was performed using the SPSS software (version 22.0, SPSS Inc., Chicago, IL, USA).

Results

Participants' Demographics

A total of 106 participants took part in the study, of which 52 (49%) were males, and 54 (51%) were females. The average age was 55 years (SD 17.42) ranging from 20 to 89 years. Most participants, 60 of them (57%) had a secondary education level. Out of the 106 participants, 52 (49%) underwent a transthoracic, and 54 (51%) underwent a transesophageal echocardiography, with 54 (51%) of them already having undergone 1-3 echocardiographic examinations. Most participants, 83 of them (78%), were informed verbally.

Participants' Views on Awareness and Preparation for Echocardiography

The results indicate that participants are well-informed and prepared for echocardiographic examinations.

Comparison of Participants' Awareness and Preparation by Gender

There is no significant difference in participants' awareness and preparation for echocardiography by gender. However, a larger number of males disagree with the statement that they knew the conditions for which the examination was performed before their scheduled appointment, compared to females who are uncertain about knowing the purpose of the examination.

Table 1. **General Information About Participants**

		Number and (%) of participants
Gender	Male	52 (49)
	Female	54 (51)
Age	20 - 35	20 (19)
	36 - 50	21 (20)
	51 - 65	28 (26)
	66 and older	37 (35)
Education Level	Elementary School	7 (6)
	Secondary School	60 (57)
	Bachelor's Degree	25 (24)
	Master's Degree	10 (9)
	Doctorate	4 (4)
Number of Previous Echocardiographic Examinations	0	43 (41)
	1 - 3	54 (51)
	4 - 7	7 (6)
	8 - 10	0 (0)
	More than 10	2 (2)
Type of Echocardiographic Examination	Transthoracic Echocardiography -TTE	52 (49)
	Transesophageal Echocardiography - TEE	54 (51)
Awareness about Echocardiography	Not informed	20 (19)
	Informed in writing	3 (3)
	Informed orally	83 (78)
Total Number of Participants		106 (100)

Table 2. **Awareness and Preparation of Participants for Echocardiography**

Statement	Number and % of Participants					Total	M (SD)
	1	2	3	4	5		
1. I knew where the examination was performed.	54 (51)	6 (6)	0 (0)	19 (18)	27 (25)	106 (100)	2,61 (1,781)
2. I knew how the examination was performed.	38 (36)	7 (7)	1 (1)	30 (28)	30 (28)	106 (100)	3,07 (1,714)
3. I was informed about the procedure and scope of echocardiography.	9 (8)	5 (5)	5 (5)	46 (43)	41 (39)	106 (100)	3,99 (1,183)
4. I was informed about the steps before echocardiography.	8 (7)	4 (4)	9 (8)	40 (38)	45 (43)	106 (100)	4,04 (1,162)
5. I received information about the examination that was clear and understandable.	1 (1)	2 (2)	5 (5)	44 (41)	54 (51)	106 (100)	4,40 (0,752)
6. I was informed about the positive and negative factors of echocardiography.	0 (0)	0 (0)	6 (6)	42 (40)	58 (54)	106 (100)	4,49 (0,605)
7. I was informed about the examination and its preparation.	0 (0)	0 (0)	1 (1)	42 (40)	63 (59)	106 (100)	4,58 (0,551)
8. I was informed about possible side effects and the course of the examination.	0 (0)	1 (1)	1 (1)	41 (39)	63 (59)	106 (100)	4,57 (0,569)
9. Information about the procedure and results were clearly communicated.	2 (2)	3 (3)	4 (4)	38 (36)	59 (55)	106 (100)	4,41 (0,848)
10. I was provided with information that reduced my discomfort.	1 (1)	1 (1)	0 (0)	40 (38)	64 (60)	106 (100)	4,56 (0,649)
11. I was informed of the need to bring medical documentation.	0 (0)	1 (1)	1 (1)	34 (32)	70 (66)	106 (100)	4,63 (0,558)
12. I was informed about whether I needed to be fasting before the scheduled appointment.	1 (1)	2 (2)	21 (20)	17 (16)	65 (61)	106 (100)	4,35 (0,926)
13. I was informed about whether I could consume food and water immediately after the examination.	0 (0)	1 (1)	0 (0)	26 (24)	79 (75)	106 (100)	4,73 (0,508)
14. I am satisfied with communication before, during, and after the examination.	0 (0)	0 (0)	0 (0)	30 (28)	76 (72)	106 (100)	4,72 (0,453)
15. I am satisfied with the engagement and education during and after the examination.	0 (0)	0 (0)	0 (0)	29 (27)	77 (73)	106 (100)	4,73 (0,448)

1-I don't agree; 2-mostly disagree; 3-neither agree nor disagree; 4- mostly agree; 5-I agree

Table 3. **Information and preparation of respondents for echocardiography concerning gender**

Statement	Median (interquartile range)		*p**
	Male	Female	
1. I knew where the examination was performed.	1 (1 - 4)	3 (1 - 5)	0.12
2. I knew how the examination was performed.	4 (1 - 4)	4 (1 - 5)	0.16
3. I was informed about the procedure and scope of echocardiography.	4 (4 - 5)	4 (4 - 5)	0.39
4. I was informed about the steps before echocardiography.	4 (4 - 5)	4 (4 - 5)	0.61
5. I received information about the examination that was clear and understandable.	4 (4 - 5)	5 (4 - 5)	0.60
6. I was informed about the positive and negative factors of echocardiography.	5 (4 - 5)	5 (4 - 5)	0.61
7. I was informed about the examination and its preparation.	5 (4 - 5)	5 (4 - 5)	0.66
8. I was informed about possible side effects and the course of the examination.	5 (4 - 5)	5 (4 - 5)	0.72
9. Information about the procedure and results were clearly communicated.	5 (4 - 5)	5 (4 - 5)	0.34
10. I was provided with information that reduced my discomfort.	5 (4 - 5)	5 (4 - 5)	0.59
11. I was informed of the need to bring medical documentation.	5 (4 - 5)	5 (4 - 5)	0.50
12. I was informed about whether I needed to be fasting before the scheduled appointment.	5 (4 - 5)	5 (3,75 - 5)	0.84
13. I was informed about whether I could consume food and water immediately after the examination.	5 (5 - 5)	5 (4 - 5)	0.17
14. I am satisfied with communication before, during, and after the examination.	5 (4 - 5)	5 (4 - 5)	0.76
15. I am satisfied with the engagement and education during and after the examination.	5 (4 - 5)	5 (4 - 5)	0.92

* Mann-Whitney U test; 1-I don't agree; 2-mostly disagree; 3-neither agree nor disagree; 4- mostly agree; 5-I agree

Comparison of Participants' Awareness and Preparation by Age

There is no significant difference in participants' awareness and preparation for echocardiography by age. Participants in the 20-35 age group mostly agreed with the statement that they knew the conditions for which the examination was performed before their scheduled appointment, while participants in older age groups disagreed with this statement, but it is not statistically significant.

Comparison of Participants' Awareness and Preparation by Education Level

There is a significant difference between groups regarding the education level in the statement that they knew the conditions for which the examination was performed before their scheduled appointment. Participants with a completed higher education degree agree with this statement compared to other groups who mostly agree, and there is a significant difference between groups. Additionally, participants with a higher professional qualification agree with the statement about knowing how the examination is performed before the appointment, compared to participants with primary education, secondary education, and higher education level, who mostly agree, and there is a significant difference between the groups.

Table 4. **Information and preparation of subjects for echocardiography concerning age**

Statement	Median (interquartile range)				*p**
	20 - 35	36 - 50	51 - 65	66 <	
1. I knew where the examination was performed.	4 (1 - 5)	1 (1 - 4,5)	1 (1 - 5)	1 (1 - 4)	0.64
2. I knew how the examination was performed.	4 (1,25 - 5)	2 (1 - 4,5)	4 (1 - 5)	4 (1 - 5)	0.76
3. I was informed about the procedure and scope of echocardiography.	4 (4 - 5)	4 (3 - 5)	4 (4 - 5)	4 (4 - 5)	0.45
4. I was informed about the steps before echocardiography.	4,5 (4 - 5)	4 (3,5 - 5)	4 (4 - 5)	4 (3 - 5)	0.40
5. I received information about the examination that was clear and understandable.	5 (4 - 5)	4 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.41
6. I was informed about the positive and negative factors of echocardiography.	5 (4 - 5)	4 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.80
7. I was informed about the examination and its preparation.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.66
8. I was informed about possible side effects and the course of the examination.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.46
9. Information about the procedure and results were clearly communicated	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	4 (4 - 5)	0.18
10. I was provided with information that reduced my discomfort.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.48
11. I was informed of the need to bring medical documentation.	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)	5 (4 - 5)	0.22
12. I was informed about whether I needed to be fasting before the scheduled appointment.	5 (3,25 - 5)	5 (4 - 5)	5 (4,25 - 5)	5 (3 - 5)	0.42
13. I was informed about whether I could consume food and water immediately after the examination.	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)	5 (4,5 - 5)	0.25
14. I am satisfied with communication before, during, and after the examination.	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)	5 (4 - 5)	0.47
15. I am satisfied with the engagement and education during and after the examination.	5 (4 - 5)	5 (4 - 5)	5 (5 - 5)	5 (4 - 5)	0.35

*Kruskal-Wallis test; 1-I don't agree; 2-mostly disagree; 3-neither agree nor disagree; 4- mostly agree; 5-I agree

Table 5. **Information and preparation of respondents for echocardiography concerning the level of education**

Statement	Median (interquartile range)				*p**
	ES	HS	BD	MD	
1. I knew where the examination was performed.	2 (1 - 4)	1 (1 - 4)	4,5 (3,25 - 5)	1 (1 - 4,5)	**0.005**
2. I knew how the examination was performed.	4 (1 - 5)	4 (1 - 4)	5 (3,25 - 5)	4 (1 - 4,5)	**0.02**
3. I was informed about the procedure and scope of echocardiography.	4 (4 - 5)	4 (3 - 5)	4,5 (4 - 5)	4 (4 - 5)	0.07
4. I was informed about the steps before echocardiography.	4 (3 - 5)	4 (4 - 5)	4,5 (3 - 5)	5 (4 - 5)	0.17
5. I received information about the examination that was clear and understandable.	5 (4 - 5)	4 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.13
6. I was informed about the positive and negative factors of echocardiography.	5 (4 - 5)	4 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.13
7. I was informed about the examination and its preparation.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.40
8. I was informed about possible side effects and the course of the examination.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.39
9. Information about the procedure and results were clearly communicated.	5 (4 - 5)	4 (4 - 5)	5 (4 - 5)	4 (4 - 5)	0.22
10. I was provided with information that reduced my discomfort.	4 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.33
11. I was informed of the need to bring medical documentation.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.49
12. I was informed about whether I needed to be fasting before the scheduled appointment.	4 (3 - 5)	5 (4 - 5)	5 (3 - 5)	5 (4 - 5)	0.62
13. I was informed about whether I could consume food and water immediately after the examination.	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	5 (4 - 5)	0.13
14. I am satisfied with communication before, during, and after the examination.	5 (4 - 5)	5 (4 - 5)	5 (4,75 - 5)	5 (5 - 5)	0.40
15. I am satisfied with the engagement and education during and after the examination.	5 (4 - 5)	5 (4 - 5)	5 (4,75 - 5)	5 (5 - 5)	0.27

* Kruskal-Wallis test; 1-I don't agree; 2-mostly disagree; 3-neither agree nor disagree; 4- mostly agree; 5-I agree

Table 6. **Information and preparation of respondents for echocardiography regarding the type of echocardiographic examination**

Statement	Median (interquartile range)		*p**
	TEE	TTE	
1. I knew where the examination was performed.	2 (1 – 4)	1 (1 – 5)	0.66
2. I knew how the examination was performed.	4 (1 – 4,75)	3,5 (1 – 5)	0.42
3. I was informed about the procedure and scope of echocardiography.	4 (4 – 5)	4 (3 – 5)	0.25
4. I was informed about the steps before echocardiography.	4 (4 – 5)	4 (3 – 5)	0.39
5. I received information about the examination that was clear and understandable.	5 (4 – 5)	4 (4 – 5)	0.49
6. I was informed about the positive and negative factors of echocardiography.	5 (4 – 5)	4,5 (4 – 5)	0.46
7. I was informed about the examination and its preparation.	5 (4 – 5)	5 (4 – 5)	0.46
8. I was informed about possible side effects and the course of the examination.	5 (4 – 5)	5 (4 – 5)	0.68
9. Information about the procedure and results were clearly communicated.	5 (4 – 5)	5 (4 – 5)	0.56
10. I was provided with information that reduced my discomfort.	5 (4 – 5)	5 (4 – 5)	0.40
11. I was informed of the need to bring medical documentation.	5 (4 – 5)	5 (4 – 5)	0.19
12. I was informed about whether I needed to be fasting before the scheduled appointment.	5 (4 – 5)	4 (4 – 5)	**0.01**
13. I was informed about whether I could consume food and water immediately after the examination.	5 (5 – 5)	5 (4 – 5)	0.63
14. I am satisfied with communication before, during, and after the examination.	5 (5 – 5)	5 (4 – 5)	0.11
15. I am satisfied with the engagement and education during and after the examination.	5 (5 – 5)	5 (4 – 5)	0.06

* Mann-Whitney U test; TEE - transesophageal echocardiography; TTE – transthoracic echocardiography; 1-I don't agree; 2-mostly disagree; 3-neither agree nor disagree; 4- mostly agree; 5-I agree

Comparison of Participants' Awareness and Preparation by Type of Examination (TEE or TTE) Participants who underwent TEE significantly agreed that the nurse/technician informed them not to eat or drink before the scheduled appointment, compared to participants who underwent TTE. Participants who underwent TEE completely agreed that they were satisfied with the professionalism, approach, and knowledge before, during, and after the examination, compared to participants who underwent TTE, but it is not statistically significant.

Discussion

This research investigated the awareness and preparation of patients undergoing echocardiography. The results of the study suggest that patients are well-informed and adequately prepared for echocardiographic examinations. A meta-analysis, including 38 studies with over six thousand patients, revealed that patient-oriented interventions increased patient knowledge (10). The predominance of female patients undergoing echocardiography could be attributed to the growing interest in cardiovascular disease among women in the last decade (18). Additionally, the mortality rate due to cardiovascular diseases is higher in women (48%) than in men (37%) (18). This research found that out of a total of 106 participants, 51% had already undergone echocardiography 1-3 times. The increased frequency of echocardiography is due to advances in medicine and diagnostics. Echocardiography is an indicator of simple and congenital heart defects in adults, and it is used to diagnose such conditions that, due to their low hemodynamic significance and complexity, are often only discovered in adulthood (19). When it comes to age, there were no significant differences in awareness. However, participants between the ages of 20-35 generally agreed that they knew the conditions for which the examination was performed before their appointment, compared to older participants, which could be attributed to the availability of information via the internet and higher internet usage in younger populations (20). Research in 2010 by Medicus found that 80-85% of adults used the internet to search for medical and health-related information, with varying rates across different regions (21). Moreover, research by the European Commission in 2014 indicated that 59% of the participants in 28 European Union Member States used the internet to seek health information in the previous year (22). Participants with higher education levels were more knowledgeable about the examination process, which is consistent with research showing that a higher level of education correlates with greater health literacy (23). Effective communication and preparation are essential for both the patient and the medical team performing the examination. Participants who underwent transesophageal ultrasound of the heart reported in this study that they were better informed and prepared than participants undergoing transthoracic ultrasound. This suggests that communication plays a crucial role in preparing patients for the examination. It also indicates that patients without a medical background need clear explanations, even for simple procedures. Healthcare providers may assume that patients undergoing transesophageal ultrasound require more detailed explanations, and they dedicate more time to providing information. Despite transesophageal ultrasound being an invasive method compared to transthoracic ultrasound, patients were better prepared. This highlights the importance of not making assumptions about whether a procedure is painless or non-invasive and emphasizes the need to inform patients about the preparation process. Nurses should possess the necessary knowledge within the scope of their competencies. Having good communication skills is important for building a successful patient-nurse relationship. Effective communication reduces patients' fears, and fosters trust, and mutual respect, which ultimately gives patients more hope and confidence in their treatment (24). The primary goal of quality communication in diagnostic examinations, whether invasive or non-invasive, is to prepare the patient as thoroughly as possible, physically, psychologically, and spiritually. Echocardiography, both transthoracic and increasingly transesophageal, plays a significant role in monitoring and diagnosing heart conditions. Both methods have been steadily growing over the last decade, with rare complications. Educated medical staff is aware of potential complications related to the gastrointestinal, cardiovascular, and respiratory systems, as well as specific infections (25). Despite patients being continuously monitored, they should receive information about the examination procedure and potential complications. Informed consent, signed after the explanation, serves as both permission for the examination and confirmation that the patient understands its necessity and the potential complications. Patient information and the signed informed consent are primary strategies for preventing complications (26). When informing patients about the examination procedure and possible complications, it is essential to learn about the patient's medical history, fears, and concerns, which ultimately facilitates the examination process (26). However, certain limitations of this study should be noted. It was conducted in a single institution, so the results may not be generalizable. Furthermore, patients were referred to the study by healthcare

professionals who were the subject of the patients' assessment, which could have led to overly positive results. Also, some patients had previous experience with echocardiography, which might have influenced the study's outcomes.

Conclusion

The results of this research indicate that patients are well-informed and prepared for echocardiographic examinations. There is no significant difference in the awareness and preparation of patients for echocardiography based on gender and age. However, participants with a higher level of education agreed that they knew how the examination was performed before their appointment, in contrast to participants with lower education levels, showing a significant statistical difference between the groups (Kruskal-Wallis test, p=0.02). Participants who underwent transesophageal ultrasound of the heart reported being better informed and prepared than participants undergoing transthoracic ultrasound (Mann-Whitney U test, p=0.01). Every diagnostic procedure requires patient preparation and education, along with skill in conducting the procedure. Nurses and medical technicians play a vital role in preparing and educating patients for echocardiography. This highlights the need for continuous education and training for healthcare professionals to ensure patient awareness and safety.

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INFORMIRANOST I PRIPREMLJENOST PACIJENATA ZA EHOKARDIOGRAFIJU

Sažetak

Cilj. Ispitati informiranost i pripremljenost pacijenata za ehokardiografiju s obzirom na dob, spol, razinu obrazovanja i vrstu pretrage.

Ispitanici i metode. U presječnom istraživanju sudjelovali su pacijenti koji su dolazili na ehokardiografiju putem ambulante i kliničkih odjela Kliničkog bolničkog centra Osijek tijekom ožujka i travnja 2023. Kao instrument istraživanja o informiranosti i pripremljenosti pacijenata za ehokardiografiju upotrijebljen je anketni upitnik izrađen za potrebe ovog istraživanja.

Rezultati. U istraživanju je sudjelovalo 106 ispitanika, od kojih su 52 (49 %) muškarci te 54 (51 %) žene te ih je 51 % već bilo na jednoj do tri ehokardiografske pretrage. Ispitanici su u najvećem broju, njih 83 (78 %), informirani usmenim putem. Nema značajne razlike u informiranosti i pripremi ispitanika za ehokardiografiju s obzirom na spol i dob. Ispitanici s visokom stručnom spremom slažu se s tvrdnjom da su prije dolaska znali kako se pretraga izvodi, za razliku od ispitanika sa srednjom i nižom razinom obrazovanja, te postoji značajna statistička razlika između grupa (p = 0,02). Ispitanici koji su podvrgnuti transezofagealnom ultrazvuku srca naveli su da su informiraniji i pripremljeniji od ispitanika koji su podvrgnuti transtorakalnom ultrazvuku srca (p = 0,01).

Zaključak. Rezultati provedenog istraživanja ukazuju da su za ehokardiografske pretrage ispitanici dobro informirani i pripremljeni, nama značajne razlike s obzirom na spol i dob. Ispitanici koji su obavljali transezofagealni ultrazvuk srca procjenjuju da su informiraniji i pripremljeniji u odnosu na one koji su obavljali transtorakalni.

Ključne riječi: ehokardiografija, informiranost, medicinska sestra, pacijent, pripremljenost

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Review

The Benefits of Virtual Reality in Preventing Falls in Older Adults: Literature Review

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Keywords: virtual reality, exergames, falls, fall prevention, older adults, elderly

Abstract

Introduction. The aging of the human organism brings with it a decrease in bodily functions, both motor and cognitive, and the probability of developing numerous diseases and conditions increases. The most common difficulties faced by the elderly are reduced ability to control balance and control gait due to muscle weakness and reduced coordination. The consequences of falls in elderly population are increase in mortality and morbidity and effects on quality of life, and work is needed to prevent falls in this population. Over the past few decades, the integration of information and communication technology (ICT) into healthcare has given rise to a novel research field. One prominent aspect within this field is the widespread adoption of virtual reality (VR) and/or exergaming in various medical areas. This study aims to explore the potential usability of virtual reality and exergames as a preventive measure against falls in older adults.

Methods. A search of literature was conducted through PubMed and Scopus databases, using search strings and inclusion and exclusion criteria.

Results. A total of 330 papers were identified through databases search, and after study selection process, 8 studies were included in this review.

Conclusion. The use of these interventions has a promising effect on improving the balance, gait, motor, and cognitive functions of the older adults, which are all factors that are correlated with a reduction in the risk of falls in the studied population.

Introduction

In recent decades, there has been a notable shift in the demographic makeup of the global population, primarily driven by advancements in healthcare and medical services, as well as broader societal factors. This transformation is characterized by an increasing proportion of older individuals worldwide, accompanied by a simultaneous decline in the younger population. The World Health Organization (WHO) reported in 2020 that the number of individuals aged 60 years and above outnumbered children under the age of 5. Furthermore, projections indicate that between 2020 and 2050, the global population aged 60 years or older is expected to double from 1 billion to 2.1 billion (1).

The stated development of today's society brings more than just advantages. The aging of the human organism inevitably leads to a decrease in bodily functions, both motor and cognitive, and the probability of developing numerous diseases and conditions increases (2). According to Owino, the most common difficulties faced by the elderly are reduced ability to control balance and control gait due to muscle weakness and reduced coordination (3). Due to this decline, elderly individuals often experience various complex health conditions, with falls being one of the most prevalent (4). The combination of reduced cognitive functions and the factors mentioned earlier contributes to the heightened susceptibility of the elderly population to falls. Additionally, falls in this population often result in more significant consequences and impacts on overall well-being. According to previous research, every third person aged 65 or more experiences at least one fall every year (5, 6). According to the World Health Organization (WHO), individuals aged 60 years and above experience the highest number of fatal falls (1). Additionally, Marschollek's research emphasizes that falls are the primary cause of non-fatal injuries among older adults (7).

The consequences of falls in elderly population are various, including increase in mortality and morbidity, but also psychological, such as reduction of quality of life due to loss of independence and fear of falling which can lead to depression and social isolation (8). In addition, falls represent a great socio-economic burden on health care systems all around the globe.

Due to all the above, work is needed to prevent falls in this population. Among the many ways to conduct measures of prevention, one of the most effective would be promoting individuals physical activity in order to slow down the decline of motor functions.

As time progresses, the activity levels of most individuals tend to decline. However, extensive research has consistently demonstrated that participating in physical activity positively impacts coordination, balance, and the likelihood of falls in this population (9-12). In fact, increased physical activity can potentially decrease the risk of falls by up to 50% (13). Taylor cites that the WHO recommends daily physical activity and combining balance and muscle-strengthening exercise to reduce the impairment of physical functions in people aged over 65 (14). However, here we encounter the problem of cooperation. Namely, older adults may have difficulty in mobility and are unable to regularly attend, for example, organized classical exercise programs. Furthermore, a major aggravating circumstance is the lack of motivation in this population, and according to de Groot and Fagerström, older people must see a certain potential in carrying out physical activity, such as a potential increase in independence or a potential better balance, which is difficult to achieve through classic exercise programs (15).

In recent decades, a novel research field has emerged that integrates information and ICT into healthcare, specifically through the widespread utilization of VR and/or exergaming across various medical areas.

VR technology can simulate a real exercise environment, and its popularity has been growing because it is entertaining, enables the use of all senses and can provide feedback and results (16). Virtual reality is defined in the Encyclopaedia of multimedia as technology that uses different multimedia technologies such as image, sound, video, text, as well as newer ones like touch, smell, taste, all to provide almost real experiences in a virtual way (17). Exergaming is actively playing videogames that includes physical movement (18).

The aim of this literature review was to investigate the benefits of virtual reality in preventing falls in older adults.

Methods

This study reviewed the scientific literature on the effect of virtual reality on fall prevention in the elderly population published from 2018 to 2022. The search was conducted in two scientific databases, PubMed, and Scopus, on February 17, 2023. The following keywords were used in various combinations when searching for titles, abstracts, and keywords of articles: virtual reality, exergame*, serious game*, fall*, fall prevention, preventing fall* older adult*, elder*. Boolean operators were used to create search strings, as shown in Table 1. Regarding the inclusion and exclusion criteria, shown in Table 2, the search was limited to English-language articles, and the target population were participants older than 65 years. Regarding the type of article, clinical trials and randomized clinical trials were included.

Results

By searching both databases, we obtained a total of 330 articles, of which 119 by searching the PubMed database and 211 by searching the Scopus database. After removing duplicates using Zotero, there were 221 articles left. After reading the title and abstract and following the inclusion and exclusion criteria listed in Table 2, another 209 articles were excluded (not randomized controlled trials - 195, articles not written in English - 5, population under 65 - 9). Additionally, 4 more articles were excluded due to content irrelevance. There were 8 articles left that were included into the final review. The procedure for extracting the final literature used for this literature review is shown in Figure 1 using the PRISMA flow diagram (19).

Table 1. **Databases with search string and number of hits**

Core collection	PubMed	Scopus
Search string	("virtual reality"[Title/Abstract] OR "exergame*"[Title/Abstract] OR "serious game*"[Title/Abstract]) AND ("fall*"[Title/Abstract] OR "fall prevention"[Title/Abstract] OR "preventing fall*"[Title/Abstract]) AND ("older adult*"[Title/Abstract] OR "elder*"[Title/Abstract])	(TITLE-ABS-KEY ("virtual reality") OR TITLE-ABS-KEY (exergame*) OR TITLE-ABS-KEY ("serious game*") AND TITLE-ABS-KEY (fall*) OR TITLE-ABS-KEY ("fall prevention") OR TITLE-ABS-KEY ("preventing fall*") AND TITLE-ABS-KEY ("older adult*") OR TITLE-ABS-KEY (elder*))
Number of hits	119	211

Table 2. **Criteria for including and excluding results**

Criteria	Inclusion	Exclusion
Population	> 65 years	Other
Language	English	Other languages
Article type	Clinical trial, Clinical randomized trial	Other

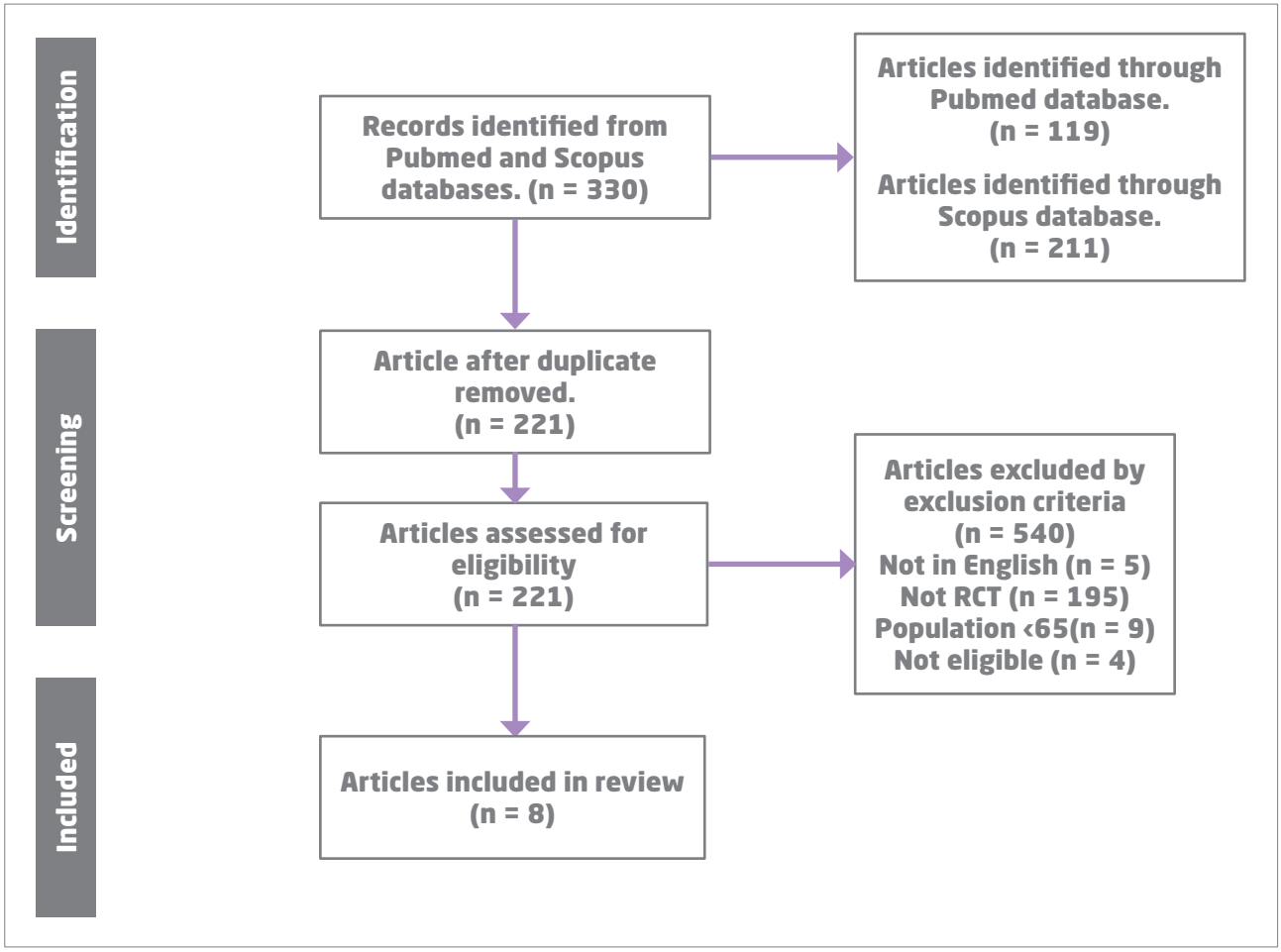

Figure 1. **PRISMA flow diagram for the literature research**

Discussion

This literature review has identified a collection of randomized controlled studies that provide substantial evidence supporting the advantageous impact of incorporating virtual reality and exergames-conducted exercise programs on the balance, gait, motor skills, and cognitive functions of older adults.

Authors Zak et al. wanted to investigate if there were advantages in using a VR application enhanced physiotherapy compared to classic programme. They conducted a double-blind study on a total of 60 participants randomly allocated into 4 groups (three VR enhanced groups and one classic programme group), where the sessions took place in the participants homes for 3 weeks. They concluded that the use of VR environments in the physiotherapy programme particularly improved static balance. Also, they claim that VR enhanced physiotherapy is good alternative to classic physiotherapeutic regimens (20). The above-mentioned results have been supported by similar studies, which further demonstrated superior improvements in gait among the VR group (21,22). Hauer et al. conducted research that also revealed notable enhancements in the performance of complex motor-cognitive stepping using exergames, which has potential relevance in fall prevention. The study involved fifty-eight older adults who participated in a 10-week intervention, engaging in strength and balance exercises once a week, along with supplementary stepping exergame training. The control group, on the other hand, solely performed the strength and balance exercises without the additional exergame component (23). Hassett et al. conducted research wherein they also demonstrated improvements in mobility among individuals with various health conditions through the utilization of digitally enabled rehabilitation (24).

Table 3. **An overview of articles identified in the literature review**

Authors	Purpose	General outcomes	Limitations
Zak et al. 2022 (20).	To investigate the effect of physiotherapeutic intervention aided by an innovative application of VR software package (VR OCULUS device) on a total of 60 participants randomly allocated into 4 groups	Use of VR in the physiotherapeutic management of older adults improved functional performance, especially static balance. Authors conclude that physiotherapy aided by VR technology offers a great alternative to conventional physiotherapy.	Small number of participants, tests conducted in a non-random order
Taylor et al. 2018 (26).	To examine whether an exergame program conducted in groups could improve mobility compared to a control group, in a total of 65 long-term care residents.	Exergames did not significantly improve the mobility of the participants in the intervention group, but a higher attendance rate was measured, indicating the motivational potential of exergaming.	Small number of participants, not being able to monitor the out-of-the study activities of participants
Moreira et al. 2021 (27).	To compare the effects of exergaming vs. traditional multicomponent training program on cognitive and motor functions of a total of 66 participants randomly allocated into two groups.	Both intervention programs demonstrated effectiveness in reducing the fear of falling, increasing fall risk awareness, and improving cognitive status, muscle function, and physical function. The exergame training showed potential for enhancing cognition, while the traditional program appeared to be more effective in improving physical function.	Large drop-out rate, lack of control group
Liao et al. 2019 (21).	The aim of this study was to compare the effects of VR-based training to traditional physical and cognitive training and to assess the impact of VR-based training on executive function and dual-task gait performance in older adults with mild cognitive impairment.	Significant improvements in dual-task gait performance were observed in the VR group, suggesting that the enhancements may be linked to improvements in executive function.	No actual control (placebo) group, simple motor skills tasks chosen.
Lee K. 2021 (22).	The aim of this study was to examine the impact of virtual reality gait training on balance and gait among older adults.	Virtual reality gait training is useful for preventing falls and improving balance and gait in the elderly.	No follow-up.
Kim and Cho 2022 (25).	The objective of this study was to assess the effects of VR and motor imagery training as a preventive measure against falls in older adults who are socially isolated.	VR and motor imagery training have been shown to be effective in preventing falls among older adults.	Small number of participants.
Hauer et al. 2020 (23).	The aim of this study was to examine the impact of a stepping exergame training on the stepping performance of older adults.	The authors have demonstrated the positive effects of a complex motor-cognitive stepping exergame on performance, indicating its potential relevance in fall prevention.	The completion rates decreased with progression to more complex levels, the participants were mostly female.
Hasset et al. 2020 (24).	To test the effectiveness of affordable devices to improve mobility and physical activity in people with mobility limitations.	The study revealed improvements in mobility among individuals with various health conditions using digitally enabled rehabilitation.	15%–19% loss to follow-up at 6 months.

Kim and Cho's research findings indicated that VR and motor imagery training (MIT) can effectively contribute to fall prevention among older adults. Furthermore, they recommended VR and MIT as viable alternatives to physical activity for older individuals who may be socially isolated (25).

However, it is important to note that not all studies included in this review demonstrated advantages of VR-enhanced exercise in comparison to traditional training. For instance, one study investigated the effects of exergames played on Xbox Kinect platforms in the intervention group, while the control group engaged in their usual activities. The study, however, yielded no statistically significant improvements in the intervention group. But the authors emphasize that the attendance rate was high, which can be indicative of the motivational potential of exergames on older adults (26). Another study conducted by Moreira et al. did not demonstrate a significant advantage of VR-aided training. In their study, they compared the impacts of exergaming and a traditional training program on cognitive and motor functions. The study enrolled a total of 66 participants who were randomly assigned to two groups. Surprisingly, both programs demonstrated equal effectiveness in reducing the fear of falling, enhancing fall risk awareness, and improving cognitive status, muscle function, and physical function (27).

Identified gaps

Most of the studies mentioned above have been conducted on a relatively small number of participants, so it is questionable if their results can be applied to the total population. However, this field of interest has been present for some time now. Many studies were conducted investigating the use of VR and exergaming in rehabilitating patients suffering from different diseases and conditions. A great majority of those studies concluded that using VR and exergaming can be a significant benefit, not only because they give better results but also because of the long-term cost-benefit. So, the question is not whether they are helpful but how can we make them more useful in a specific design and tailoring for certain groups of patients.

Furthermore, some of the research lack long-term follow-up, and we do not know if the immediate good results of VR-based training had a long-term impact and how long. This is therefore considered vital because this data would greatly help to tailor and design the VR mentioned above and exergames targeting a specific population or group of patients.

Conclusion

Through a comprehensive review of the literature on this subject, the research findings consistently indicate that the implementation of VR and/or exergaming can have a positive impact on enhancing the balance, gait, motor skills, and cognitive functions of older adults. These improvements directly contribute to reducing the risk of falls within this population. The results obtained from this study align with the majority of previously conducted research in this specific area of interest, reinforcing the coherence and validity of the findings. The common conclusion derived from all the studies conducted is that, considering the fact that the ageing population, which is at the greatest risk of falls, and will be a great burden on health and socioeconomic systems globally, there is a need to develop instruments and methods for fall prevention, and exergaming or VR has shown great potential to do so. Further studies should be conducted on larger number of participants to better examine the mechanisms by which such technologies can help in preventing falls. Also, further work is needed to identify the best ways to implement these technologies to be used by the said population, considering aggravating factors such as lack of motivation, inactivity, digital literacy, and aversion to the use of technology.

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PREDNOSTI VIRTUALNE STVARNOSTI U PREVENCIJI PADOVA KOD STARIJIH ODRASLIH: PREGLED LITERATURE

Sažetak

Uvod. Starenje ljudskog organizma sa sobom nosi smanjenje tjelesnih funkcija, kako motoričkih tako i kognitivnih, te se povećava vjerojatnost razvoja brojnih bolesti i stanja. Najčešće su poteškoće s kojima se susreću starije osobe smanjena sposobnost kontrole ravnoteže i kontrole hoda zbog slabosti mišića i smanjene koordinacije. Posljedice su pada u starijoj populaciji povećanje mortaliteta i morbiditeta te utjecaj na kvalitetu života te je potrebno raditi na prevenciji padova u ovoj populaciji. Tijekom posljednjih nekoliko desetljeća integracija informacijske i komunikacijske tehnologije (IKT) sa zdravstvenom skrbi dovela je do novoga istraživačkog polja. Jedan od aspekata u ovom području je široko prihvaćanje virtualne stvarnosti (VR) i/ili *exergaminga* u različitim područjima medicine. Ova studija ima za cilj istražiti potencijalnu upotrebljivost virtualne stvarnosti i *exergaminga* kao preventivne mjere protiv padova kod starijih osoba.

Metode. Pretraživanje literature provedeno je kroz baze podataka PubMed i Scopus, primjenom nizova za pretraživanje te kriterija uključivanja i isključivanja.

Rezultati. Pretraživanjem baza podataka identificirano je ukupno 330 radova, a nakon postupka odabira studija, u ovaj pregled literature uključeno je osam studija.

Zaključak. Primjena ovih intervencija ima obećavajući učinak na poboljšanje ravnoteže, hoda, motoričkih i kognitivnih funkcija starijih odraslih osoba, što su sve čimbenici koji su u korelaciji sa smanjenjem rizika od padova u proučavanoj populaciji.

Ključne riječi: virtualna stvarnost, *exergaming*, padovi, prevencija pada, starije osobe

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Review

Addressing the Need to Set a Framework for the Education of Nurses in Psychooncology in Developing Countries: A Systematic Review

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Abstract

There is a need to study the impact of nursing care in psychosocial treatment in developing countries. The aim is to emphasize the importance of psychooncological education for oncology nurses in order to identify and create a framework for implementation. A systematic review was conducted. The literature was searched for in the Medline database. The inclusion criteria were articles in English published in the last five years within the Web of Science Category: Nursing. After filtering articles by the inclusion criteria, 107 results were found, and this review includes 14 articles. Psychosocial interventions positively affect the progression of illness, psychosocial condition, symptoms, treatment and side effects. However, nurses have little opportunity to receive education on the psychological care. Therefore, in the field of psychooncological nursing care, it is necessary to improve the education and training systems for psychological assessment and stress management.

Introduction

Nursing is a profession that is constantly evolving and changing, focusing on providing care to individuals, especially in the field of oncology. While nurses primarily provide nursing care that addresses the physical needs of patients, they meet their spiritual, emotional, and psychosocial demands as well. The nurse needs to precisely define the health condition, assess coping mechanisms and their effects, and plan and implement nursing interventions according to the data collected (1). Oncology nurses have an important role to play in providing quality oncological psychosocial care and in recognizing psychosocial problems because they are in constant contact with patients and their families (2). It is important to emphasize that all oncology patients are necessarily in contact with nurses, as opposed to psychologists or social workers (3).

Psychosocial care is defined as the provision of psychological, social, spiritual, counseling, and informational support (4). It includes communication between nurses and patients and their family members, as well as teamwork among health professionals to ensure a multidisciplinary treatment (5). Understanding and experience in delivering psychological treatment are essential for its efficacy (6). The goal of psychosocial oncology (or psychooncology) is to manage depression, feelings of hopelessness, and stress associated with cancer diagnosis (7), whereby the integration of the psychological part of treatment is emphasized (8).

Today, the field of psychooncology is growing into a foundation in many regions of the world, helping to reduce the burden of the disease itself, improving the quality of life from the moment of diagnosis throughout the treatment and survival or palliative care. Nevertheless, the inclusion of psychosocial oncology in conventional cancer care remains diversely implemented and limited in many countries, with continued adherence to a predominantly biomedical approach (9). In addition, the COVID-19 pandemic has also contributed to widening the gap in health system inequality and in the availability of psychosocial interventions (10). Despite the fact that the majority of psychosocial oncology research originates from developed countries, there is a need to study the impact of psychosocial treatment in developing countries, as it not only improves quality of life but also lowers overall health-care costs. In both developed and developing countries, this is a critical goal in health care management (11).

However, in nursing documentation, most psychosocial problems are not addressed adequately or at all, so nurses may have difficulty formulating or implementing interventions focused on psychosocial problems. Nurses` attitudes toward patients can be therapeutic, with appropriate communication skills (12), yet even nurses with experience are insecure and therefore do not fully document the presence of psychosocial problems (13). Due to the existing hierarchy, a lack of interest in providing psychological care, challenges in sharing tasks, and communication issues, psychosocial care is usually not an obvious aspect of nursing care (14). Challenges faced by oncology nurses in recognizing psychosocial problems in patients include lack of time and resources (15), lack of knowledge (16), and lack of privacy for talking to patients about their problems (15). Nurses feel uneasy when it comes to psychosocial problems and psychooncological care because they do not know how to approach the issue (12). There is a lack of guidelines and frameworks on how to provide psychosocial care that meets the needs of patients (17). However, if psychosocial problems are not integrated into the nursing care, they will not be continuously and adequately addressed, and interventions conducted by nurses will not be visible (18).

Research shows that nurses need to invest more effort because screening and assessment of psychosocial problems is not carried out routinely or systematically, and many interventions are patient-centered, without the involvement of family members (19). Healthcare providers often do not recognize mental health disorders in cancer patients (20). The majority of published research suggest that health professionals` ability to recognize the cancer patients` emotional stress is insufficient (21). Nakaguchi (22) reported that nurses are unable to identify the needs and symptoms of patients on chemotherapy and feel incapable of recognizing psychological symptoms as well as the need for support. Several studies have found that nurses tend to focus more on physical problems rather than on psychosocial needs (23) and look at assessing, managing, and reporting on psychosocial needs as part of a practice that is not considered routine (24). Another study based on Gor-

don's health patterns indicated that nurses disregard the psychological requirements of patients while identifying their physical demands (25). Unmet psychological requirements are reported to be present in 22 to 58% of cancer patients (26)..

Oncology patients may benefit from psychooncological interventions in order to reduce discomfort. Zhang (27) found that guided safe and brief self-discovery interventions can facilitate positive psychological outcomes. Therefore, nurses should encourage patients to verbalize their emotions, problems, and challenges they face, as well as to reflect on positive changes (28). Psychoeducation increases knowledge and satisfaction with nursing care (29) and reduces anxiety and stress (30–33). Interventions can help patients and families in prioritizing needs and can promote joint decision-making (34). It is therefore imperative that the psychosocial problems of patients are recognized and addressed through appropriate nursing interventions (35). The current article aims to fill this education gap by exploring the interventions associated with psychooncology education for nurses. The objective of this systematic review is to emphasize the importance of psychooncological education for oncology nurses in order to identify and create a framework for implementation in developing countries.

Methods

The systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (36) (Figure 1).

The literature was for in the Medline database (Web of Science) in English ending with 22 October, 2021. Searched key words included: psychooncology (TOPIC) or psychosocial oncology (TOPIC). These terms were selected following an investigatory search of available literature and based on their occurrence as well as their relevance to the research question. The inclusion criteria were articles in English published in the last five years within the Web of Science Category: Nursing and studies of any design type.

Exclusion criteria were published articles older than five years, articles that were not in English, articles outside the Web of Science Category: Nursing, and non-full text-articles or abstracts.

A detailed extraction was done for all articles included in the review paper. A standardized table was used to extract the data, which included: general information (first author, year of publication, country), type of study, study objective, sample (in case of a research), and key result of the review / research.

Results

While searching the Medline (Web of Science) database, a total of 4,806 results were found using the keywords psychooncology (TOPIC) or psychosocial oncology (TOPIC). After filtering articles by using the inclusion criteria, 107 results were found. All 107 articles were read and reviewed in detail, and this review paper includes 14 articles that focused on education in the field of psychooncology in nursing. Most of the articles examined nurses (1, 4, 5, 16, 34, 36, 37), two were patient-oriented (39, 40), and two were oriented on nurses and patients (41, 42). Same number of studies are conducted in Europe (13, 42), predominately in Turkey (1, 16, 41), and in North America (9, 34, 38, 39, 43) (Table 1).

When speaking of formal education, most authors do not mention such education for nurses in the field of psycho-oncology (1, 4, 5, 9, 12, 16, 34, 38, 41, 43). Authors such as Cantrell (39) and Jabaley (34) discuss psychosocial standards of nursing care that have been developed as well as guidelines from different societies. Only three authors describe formal education for nurses; Kubota (37) who talks about the effectiveness of a short training for general nurses that touches upon normal psychological responses to cancer and supporting communication; Daem (42) who states that nurse consultants are supported in participating in the oncological care programs of hospitals; and Kim (40) who developed a seven-week program about a nurse-led psychological intervention program.

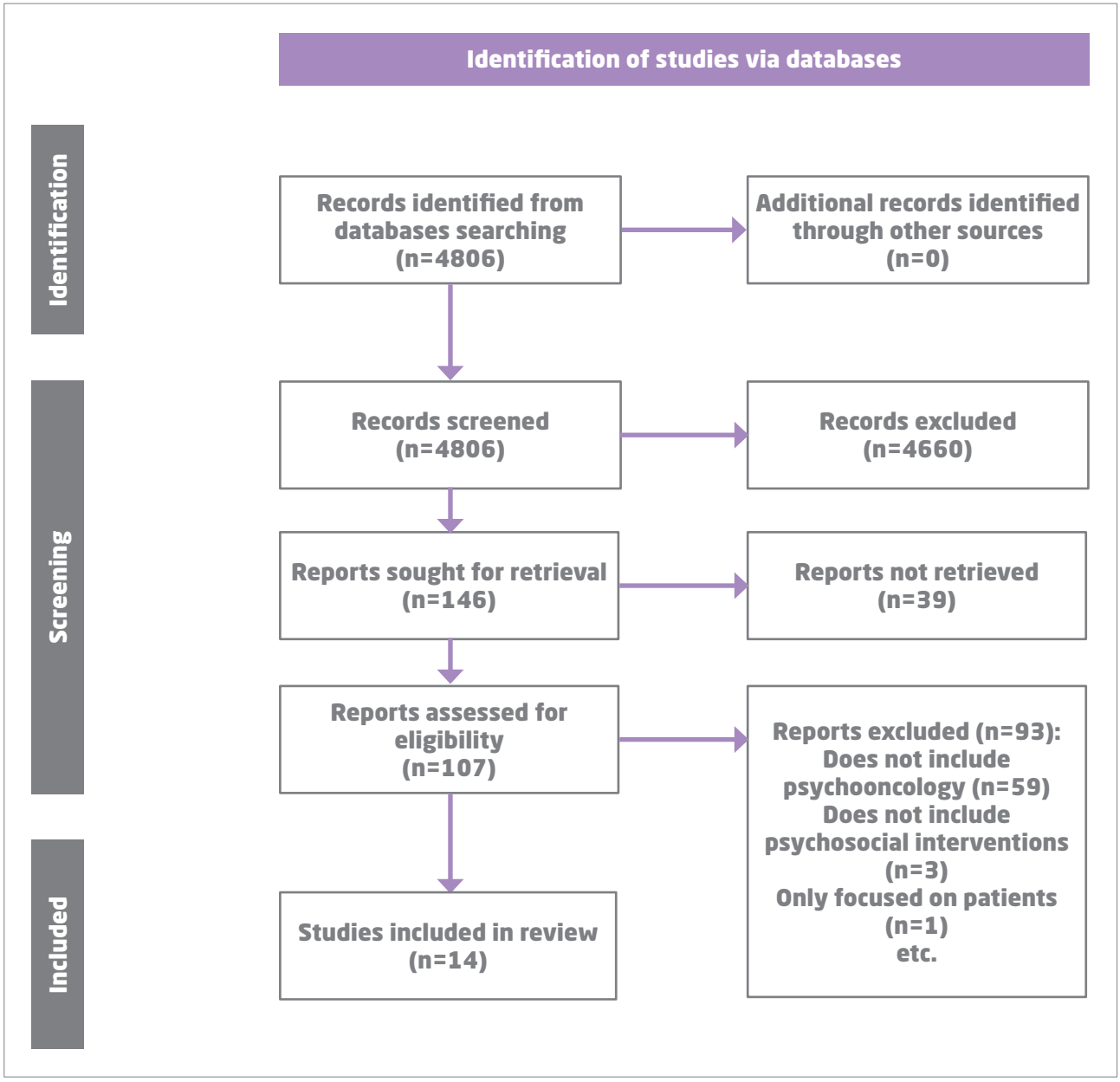

Figure 1. **PRISMA flow diagram showing phases of the systematic review**

Except for Kubota (37) who talks about onsite education and e-learning lectures on assessment and management of normal psychological stress with role-play; Daem (42) who relies on a multidisciplinary approach; and Kim (40) who provides data on seven weekly sessions, authors Bultz (9), Ercolano (43) and Jabaley (34) state that there is no formal form of education, but they point out the availability of multidisciplinary clinical practice guidelines. The adoption of guidelines largely depends on the motivation of nurses and is not conditional. Since there is no mention of formal education in other articles, delivery of education could not be done, but everyone recommends training for nurses, with the expectation of more professional interventions that would make noticeable changes.

Overall, authors agree that it is important for nurses to acquire knowledge and skills before providing psychosocial care (41) and that standards for nursing psychosocial care needs to be established (5, 34,

Table 1. **Summary table of the included studies**

General information	Type of Study	Aim	Sample	The Key Result
Pehlivan, T., et al. (2016). Turkey.	Descriptive study	Assessing the skills of nurses for detection of psychosocial needs and discovering the level of skills in psychosocial diagnostics and defining factors for the treatment of psychosocial problems.	157 nurses	Nurses who were educated about the approach to the patient / family with cancer, the psychological components of cancer and the approach to the terminal patient / family had a better assessment of aspects of health, nutrition, activity, cardiovascular system and stress tolerance.
Götz, A., et al. (2020). Switzerland.	A retrospective descriptive study	Explore how nurses perform screening by using a distress thermometer and how they integrate screening results into nursing care planning.	1,711 cases	The referral rate to the psycho-oncology service was lower compared to the literature.
Bultz, B. (2016). Canada.	Editorial page	Discuss oncology nursing care and the role of psychosocial oncology.	-	Nurses who practice the full potential of their discipline will play a critical role in initiating psychosocial oncology as a part of the comprehensive nursing care.
Cantrell, M.A., et al. (2017). USA.	Non-experimental longitudinal study	Examine the quality of life associated with health and the relationship between quality of life, self-confidence and hope among women who survived childhood cancer.	95 patients	The practice of nursing care for pediatric oncology nurses who support psychosocial adjustment through the promotion of self-confidence and hope may have the potential for improving the quality of life among women who have survived childhood cancer.
Kubota, Y., et al. (2018). Japan.	Open, uncontrolled study	Examine the advantages of enrolling in a nursing education program to develop the necessary self-confidence, knowledge, and attitude to assess and manage oncology patients with psychosocial issues.	72 nurses	Nurses' self-confidence, knowledge, and attitude toward assessing and managing cancer patients with psychosocial difficulties improve as a result of the psychooncology training program.
Daem, M., et al. (2018). Belgium.	Qualitative study with grounded theory techniques	Explore when oncology patients experience high-quality psychosocial care and identify circumstances that contribute to positive psychosocial care.	13 patients and 31 health workers	The purpose of quality psychosocial care is to help patients dealing with difficult situations and treatment. Quality psychosocial treatment requires health workers who are familiar with patients and who know and understand what they are going through.
Granek, L., et al. (2019). Canada.	Method of grounded theory of data collection and analysis	Interview oncology nurses about what they are looking for and how they identify psychological difficulties in oncology patients, with an emphasis on strategies and barriers to identifying psychosocial problems from their perspective.	20 nurses	Recognition of psychosocial problems was based on experience, not formal training. The main obstacles in recognizing psychosocial problems are lack of time and overwork.
Abu Shosha, G.M., et al. (2021). Jordan.	Qualitative study with a descriptive phenomenological approach	Explore the psychosocial needs of children and their families from the perspective of nurses.	10 nurses	Having at least one psychosocial care course, conducting training and using specific tools to assess the needs for psychosocial care are very important strategies that enable effective nursing care.

General information	Type of Study	Aim	Sample	The Key Result
Hiçdurmaz, D., et al. (2020). Turkey.	Qualitative study	Describe, interpret and understand the phenomenon of the process of psychological empowerment from the perspective of cancer patients and oncology nurses.	13 patients and 16 nurses	The study highlights the elements that direct attention to psychooncological care by providing insight into the perspectives of patients and oncology nurses.
Güner, P., et al. (2018). Turkey.	Qualitative descriptive study.	Identify the attitudes, barriers, and needs of oncology nurses in relation to psychosocial care.	30 nurses	The study findings will aid in the development of the scope and structure needed to handle psychosocial care challenges.
Ercolano, E. (2017). USA.	Systematic review	Describe the psychosocial issues faced by a postoperative oncology patient, as well as current evidence-based psychosocial interventions.	-	Nurses should play a central role in assessing the effectiveness of physical or psychosocial interventions.
Chen, C.S., et al. (2017). Singapore.	Research qualitative study with individual face-to-face interviews.	Examine the nurses` perspectives and experiences in delivering psychosocial care, as well as impediments to providing psychosocial care.	18 nurses	The findings help fill a gap in the nurses' understanding of psychosocial care, which will aid in the development of a strategy to promote psychosocial care and improve nursing care quality.
Kim, Y.H., et al. (2018). South Korea.	Randomly controlled study	Developing a program of psychosocial interventions under the guidance of nurses and assessing their effects on stress and quality of life in breast cancer patients.	60 patients	Psychosocial interventions could help patients feel more secure and encourage their proactivity and self-control, which should be conducted to alleviate psychological stress and increase the quality of life.
Jabaley, T., et al. (2020). USA.	Prospective research based on the SPAWN model.	Develop and evaluate psychoeducational interventions by using multimedia tools.	45 nurses	The study describes an approach to the development and evaluation of psychoeducational interventions. They serve as a model for effective psychoeducational interventions.

39, 40, 43). Also, they agree that psychooncology nursing practice should concentrate on training, education and counseling elements (1, 4, 9, 13, 16, 38) in order for patient to be the center of nursing care (42). Education program would have multiple benefits: enhancing confidence, knowledge and attitude associated with cancer patients (37).

The articles included in the systematic review clearly show that nurses do not have an adequate psychooncological education, nor enough self-confidence to carry out the interventions. Also, educated nurses had a better assessment and initiative to put psychosocial oncology as a part of the comprehensive nursing care. Integration of psychosocial nursing care at all levels could help oncology nurses with coping, assessing, managing, and understanding the complexities of cancer.

Discussion

Cancer patients have different psychological difficulties at each stage of treatment (44). As a result, every member of the health-care team should be able to diagnose the psychosocial difficulties of patients and provide ongoing and consistent health treatment. Since psychosocial therapies and support are ubiquitous across all disciplines, they can also produce collaborative problems. Psychooncological scope of action is not restricted to that of a single team member; the diverse methods of each discipline allow for a complementary care (42).

The aim of this systematic review is to emphasize the importance of psychooncological education of

oncology nurses in order to identify and create a framework for its implementation in developing countries, especially in the Republic of Croatia. Overall, the number of articles found in the systematic review was low, but it suggests that research of psychooncology in nursing is a vital aspect in helping to support nurses. So far, no article was found to have been published in Croatia that would refer to the implementation or education of psychooncology in the field of nursing. Generally speaking, five articles have been published by psychologists (45), physicians (46–48) and rehabilitators (49), only one of which was published in the past five years. That is why it is necessary to introduce the education of nurses in the field of psychooncology in order to improve nursing care that focuses not only on physical but also on psychological needs of patients.

All oncology nurses have a key role in detecting psychological distress (34, 37). Compared to other health professionals, nurses are most exposed to intense emotions given the time spent with patients and their families (50). That is why they must adequately assess the psychosocial problems of patients and try to avoid causing psychological harm (37). In this way, they can reduce potential barriers to psychosocial interventions by emphasizing the normality of the need for them. Patients are also more likely to receive psychological care from nurses than from other health workers, according to Daem study (42).

Despite their critical role in potentially detecting illnesses, a study demonstrates that oncology nurses do not recognize the specific psychosocial problems of patients (20). For example, McDonald et al. (51) included 40 nurses in 25 oncology clinics and discovered that out of 1,109 patients, nurses could reliably identify clinical depression in only 29% of cases of mild depression, and only 14% of cases of major depression. McDonald et al. (51) concluded that nurses tend to underestimate the levels of depression in patients, especially in cases of major depression (22). Oncology nurses expressed concern about their abilities to recognize psychosocial disorders in a research by Pehlivan et al. (1). In a study by Kaneko et al. (52), out of 88 oncology nurses, more than half expressed concern about their ability to assess anxiety and depression. The symptoms they managed to notice were indicators of a major depressive disorder: apathy, withdrawal, sadness, hopelessness, helplessness, indifference, and discouragement. Also, irritability, anger, fear, and anxiety were considered potential signs of psychosocial problems (38). Nakaguchi et al. (22) examined the psychosocial needs of patients and the level of awareness among oncology nurses. The results showed that during the implementation of the nursing care, the nurses` awareness about psychosocial requirements and symptoms was low. It was concluded that nurses cannot adequately detect psychosocial symptoms or respond to psychosocial demands of patients (1). A study conducted in Turkey identified that most nurses (98.7%) believe that patients need psychosocial evaluation. More than half of nurses (51.6%) are able to make a psychosocial assessment of patients, while 48.4% are not able to make such an assessment. Most nurses believe that all patients need psychosocial treatment and support (66.2%) (1).

Lack of specialized education and training for nurses in the field of psychooncology can have a negative impact on nursing care because nurses feel inadequate when it comes to specific needs of patients and their families, especially during active treatment and at the end of life (5). Disease stage and prognosis, treatment uncertainty, inability to keep symptoms under control, and long and arduous treatment procedures are all reasons why nurses experience difficulty in delivering psychosocial care (4). They believe that physicians are more focused on the illness itself, that psychological treatment is not considered a priority, and that nurses should not spend time on it since they are under pressure to address the physical needs of patients (16).

Skills needed to provide adequate psychosocial care include empathy, holistic care, and communication with patients as authentic human beings and active participants in the nursing care (41). Hinds et al. (5) identified seven specific nurses` behaviors that affect patient well-being and psyche: clear explanations, sympathy, patient involvement, conversations about topics that do not focus only on the patients` disease, clinical competence, focusing on the future and sharing the experiences of cancer survivors. There are six dimensions for improving the quality of cancer care (50): a holistic approach to caring for patient needs; alleviating physical discomfort; providing emotional support and recognizing psychosocial problems; family involvement; providing information and education; integration and coordination (5).

The psycho-oncology training program began at the Memorial Sloan-Kettering Cancer Center in New York City in 1977, where the formal training lasted a year, adding information to the primary discipline and tailor-

ing the program to acquire appropriate skills. Kubota et al. developed a psychooncological education for nurses. A normal psychological response to illness, clinically significant stress, suicidal thoughts, and delirium were among the four frequent psychosocial disorders in cancer patients addressed by the program. A short program of psychooncology education helped to improve the nurses` self-confidence, their knowledge, and attitudes regarding psychological care (37). The goal of psychosocial education is to include education, coping strategies, and emotional support that will enable the provision of effective and sustainable interventions (40).

The approach to psychosocial nursing care includes building trust, understanding, presence, setting common goals, and providing social support (13, 39). Interventions to detect psychosocial problems include assessing stress levels and identifying problem areas: physical, emotional, practical, social, and spiritual (6). Nonpharmacological therapies, such as stress reduction techniques, support groups, or individual therapy, should be discussed with patients and their families by the nurses (7, 8).

In order to provide integrative care, nurses must be trained to recognize psychosocial problems. Such an education is the basis for addressing psychosocial problems, as well as a tool for solving them (13,38). Education can effectively improve communication skills, empathy, and support during the nursing care of oncology patients (9). Psychooncological education should include the providing of patient-specific information about the disease, diet, chemotherapy side effects, and symptom management (40). Also included in psychological interventions should be the strategies for dealing with negative emotions during treatment, as well as emotional support, which includes coping with stress, expressing fear of cancer recurrence, techniques for overcoming personal difficulties, utilizing social resources, sharing sex life experiences, and self-acceptance (40, 6). Psychoeducational interventions include a therapeutic approach of giving and receiving information, discussion problems, problem solving, coping, expressing emotions, and social support (6). Interventions can be implemented through a variety of modalities, including health education, cognitive behavioral therapy, or social support (2).

The first major psychooncological intervention is the early diagnosis of unmet psychological needs (43). The key psychosocial element is communicating the diagnosis to patients and family. Most often this is done by physician in a presence of a nurse. Since this period causes high levels of stress and uncertainty that might lead to few days even weeks of struggling to cope with diagnosis, nurses might best support the patient by providing a focused therapeutic dialogue that encourages patients to express their feelings and worries in a secure atmosphere (43). As part of psychosocial treatment, cognitive behavioral therapy, awareness-based stress reduction, psychoeducation, and psychopharmacology are recommended (8). Cognitive behavioral therapy is particularly effective in redirecting negative thoughts and behaviors and improving the patients' self-confidence and sense of control (43).

The importance of communication in psychosocial care cannot be overstated (4). According to literature, strong communication between nurses and patients leads to improved nursing care and a higher degree of trust, which is the foundation of the therapeutic relationship (4). Furthermore, multidisciplinarity is an important component of psychosocial care (5, 9). Encouraging patients to express thoughts and feelings, and educating them on symptom management, help alleviate the level of insecurity during chemotherapy (5), which reduces the level of anxiety and depression, encourages proactivity and self-control (6). The most important strategy is to ask direct questions which include questions about their work, potential mood swings, and general physical and emotional state. It is also necessary to find out what they were like before the disease and how they currently feel so that the nurse can assess potential problems (38). Psychosocial interventions should be conducted from the outset of treatment to minimize the level of stress, improve mental health, and ultimately increase survival rates (39).

Crying during treatment or while discussing their situation is an apparent symptom of psychological problems. The patient`s appearance may also indicate psychosocial distress: disheveled look, neglect of daily activities such as personal hygiene and nutrition. Also, patients who isolate themselves or who appear lonely may have psychosocial problems (38). However, patients often explicitly verbalize their psychosocial problems by saying, "I'm sick and tired," "I want to die," "I don't want to live in pain," "My life has no meaning," "I don't want to suffer," or "It's too hard to deal with illness." (38). Therefore, a good way to satisfy the psychosocial needs of patients is to increase their self-confidence, which includes the belief that they are able to undergo treatment with emotional support, increasing disease awareness, and sharing the burden together with the family (13, 34).

Limitations

The advantage of this systematic review is the focus on unifying psychosocial interventions that could be implemented in oncology nursing care regardless of the location of the tumor. Also, this systematic review has a potential of becoming a foundation in the psychooncological education of nurses, which can be supplemented and expanded depending on educational needs. However, one should bear in mind that this educational framework is not suitable for all countries and systems, especially in developed countries, since their curricula include psychooncology training for nurses, and there are numerous trainings available to nurses, but it can serve as an example for developing countries that are only starting to implement psychosocial oncology nursing care. Unfortunately, the lack of scientific articles in Croatian language shows that this area is not covered in any way, especially when it comes to the field of nursing. In general, there is a lack of literature that specifically targets the psychooncological education of nurses in developing countries. Another limitation may be that we only used one database, which may have excluded a number of relevant studies. Nevertheless, this systematic review contributes to highlighting the need for the development of psychooncological education for nurses and research in this field in developing countries.

Conclusion

Psychooncology requires the readiness of nurses to provide support in dealing with oncology patients with psychosocial problems, pointing out the normality of such feelings, and helping to endure physical treatment. This systematic review has shown that psychosocial interventions positively affect the progression of illness, psychosocial condition, symptoms, treatment and side effects, as well as lowering stress levels and improving the quality of life.

Nurses should be able to determine the psychological needs of patients as well as their physical demands by utilizing a holistic approach. However, nurses have little opportunity to learn about the psychological care that needs to be provided. The burden of cancer continues to grow disproportionately in developing and underdeveloped countries and is affected by changes in life choices, current health policies, health system infrastructure, and resource availability (10, 9). Therefore, in the field of psychooncological nursing care, it is necessary to improve the education and training systems for psychological assessment and stress management. Further research is needed in this area, especially in developing and underdeveloped countries, to highlight the need for education. Consequently, the psychosocial problems of patients will become a priority, in addition to providing care and focusing on their physical needs.

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RJEŠAVANJE POTREBE ZA POSTAVLJANJEM OKVIRA ZA OBRAZOVANJE MEDICINSKIH SESTARA U PSIHOONKOLOGIJI U ZEMLJAMA U RAZVOJU: SUSTAVNI PREGLED

Sažetak

Postoji potreba za proučavanjem utjecaja zdravstvene njege na psihosocijalni tretman u zemljama u razvoju. Cilj je naglasiti važnost psihoonkološke edukacije onkoloških medicinskih sestara kako bi se identificirao i stvorio okvir za provedbu. Proveden je pregledni rad. Literatura je pretražena primjenom baze podataka Medline. Kriteriji za uključivanje bili su članci na engleskom jeziku objavljeni u posljednjih pet godina unutar kategorije Web of Science: Sestrinstvo. Nakon filtriranja članaka prema kriterijima uključivanja, pronađeno je 107 rezultata, a ovaj pregledni rad uključuje 14 članaka. Psihosocijalne intervencije pozitivno utječu na progresiju bolesti, psihosocijalno stanje, simptome, liječenje i nuspojave. Međutim, medicinske sestre imaju malo prilika naučiti o psihološkoj skrbi. Stoga je u području psihoonkološke zdravstvene njege potrebno unaprijediti sustave obrazovanja i osposobljavanja za psihološku procjenu i upravljanje stresom.

Ključne riječi: okvir, sestrinstvo, onkološko sestrinstvo, psihoonkološka edukacija, psihoonkologija

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Review

Analysis of Colon Cancer Incidence and Mortality in Croatia

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Abstract

Introduction. Colon cancer is considered one of the most significant health issues in the world where, according to the GLOBOCAN 2020 data, it is diagnosed in 1,931,590 patients annually and is the cause of death in 935,173 patients. Approximately 3,500 new cases of colon cancer are diagnosed each year in Croatia.

Aim. To present and analyze the recent trends in the incidence of colon cancer in Croatia for the period from 2001 to 2018 and trends in mortality for the period from 2001 to 2019.

Methods. The analysis of colon cancer incidence reports for the period from 2001 to 2018 gathered from the Croatian National Cancer Registry and mortality reports obtained from the database of the Croatian Bureau of Statistics and the Croatian Institute of Public Health. The trends in incidence and mortality were processed using the Joinpoint program.

Results. An incidence rate of 626.8 per 100,000, 706.4 per 100,000 for males, and 552.4 per 100,000 for females was recorded. In the year 2018, 13,809 people died from cancer in Croatia, including 8,049 men and 5,760 women. The mortality rates were 337.8 per 100,000, 407.5 per 100,000 for males, and 272.6 per 100,000 for females. In women, colon cancer ranked second in terms of incidence, while in men it was in the third place. The total number of new cases was 2,121 for men and 1,508 for women, totaling 3,629 cases. The share of colon cancer in the number of neoplasms in 2018 was 14.1%.

Conclusion. The trends in the incidence and mortality rates of colorectal cancer in Croatia still show an increasing tendency in standardized rates.

Introduction

Colon cancer is a malignant tumor which most commonly originates from the epithelial cells of the lining of the colon. It has a tendency to spread to other parts of the intestinal wall, surrounding tissues, and lymphatic vessels, and later to distant organs such as the liver or lungs (1).

The highest incidence rates are recorded in highly developed countries, which can be associated with a Western lifestyle. Several risk factors contribute to the development of colon cancer, such as a positive family history, advanced age, male sex, inflammatory bowel diseases, smoking, excessive alcohol consumption, obesity, frequent consumption of red meat and fats, and diabetes. Preventive factors for the development of colon cancer include physical activity, a diet rich in fruits and vegetables, fiber, and grains, endoscopic removal of precancerous lesions, and estrogen hormone replacement therapy in women. Additionally, a protective effect of aspirin has also been documented (2).

The majority of colorectal cancers develop from adenomas (adenoma-carcinoma sequence). In more than 90% of cases of colon cancer, it is an adenocarcinoma. Colon cancer is most commonly localized in the rectum and sigmoid colon (50%), the cecum and ascending colon (20%), the descending colon (15%), and the transverse colon (15%) (2).

The classification of colon cancer is performed using the TNM and Dukes classification systems. In the TNM classification, "T" represents the size of the tumor, "N" indicates the number of involved lymph nodes, and "M" denotes the presence of distant metastases. *In situ* carcinoma refers to cancer which has not penetrated the basal membrane and does not have the ability to metastasize. The Dukes classification includes four stages: stage A involves the involvement of the bowel wall (limited to the mucosa), stage B involves the muscular layer, stage C involves lymph node involvement, and stage D indicates distant metastases. The most important prognostic indicator is the extent of tumor spread at the time of diagnosis (3).

Various treatment modalities are possible for colorectal cancer, including surgical treatment, which involves the removal of the affected part of the colon along with neighboring lymph nodes and associated blood vessels. Other forms of treatment include chemotherapy and radiation therapy, which can be administered before, after, or concurrently with surgical treatment. There is also the possibility of biological therapy, which aims to destroy cancer cells without negatively affecting the remaining healthy cells (4).

In 2007, the National Colorectal Cancer Screening Program was launched in Croatia. The population between 50 and 74 years of age receives a fecal occult blood test every other year by mail, which, after providing a stool sample, is sent back to the address of the local Institute of Public Health. In case blood is found in the stool, and the test is positive, patients are called in for a colonoscopy to establish a final diagnosis and remove any polyps if they are found. During the first cycle of early screening, only 19.9% of the target population participated (5). European guidelines for quality assurance in cancer screening and diagnosis state that in order to implement a well-designed screening program, it is necessary to conduct it in an organized manner, use the most up-to-date data, establish accurate exclusion criteria, and ensure that the program is free of charge and applicable to the entire population. In addition to analyzing occult fecal blood, it is necessary to provide accessible instructions for the population. It is advisable to use a testing procedure which does not require dietary restrictions. According to European guidelines, during organized screening using the guaiac test, there is no need to follow a dietary regimen, but the consumption of vitamin C is not allowed (6). During the second cycle, patients do not receive the test by mail, but a call for testing. If the patient responds, they receive three test kits at their home address.

The frequency and mortality rates of colorectal cancer vary significantly across the world. Globally, it is the third most commonly diagnosed cancer in men and the second most common in women, according to the GLOBOCAN database of the World Health Organization. Incidence and mortality rates are significantly higher in men than in women.

The highest incidence rates are in Australia and New Zealand, Europe, and North America, while the lowest rates are in Africa and South Central Asia. These geographic differences appear to be attributed to variations in diet and environmental exposure, low socioeconomic status, and lower rates of cancer

screening. In the United States, the lifetime incidence of colorectal cancer in patients with an average risk level is approximately 4%. The incidence of colorectal cancer is approximately 25% higher in the male population than in the female population, and about 20% higher in African Americans than in Caucasians. The frequency is higher in patients with specific inherited conditions which predispose them to the development of cancer. A gradual shift towards right-sided colon cancer has been observed in the USA and other countries, with the most significant relative increase in incidence noted for primary cecal cancers. This change in the anatomical distribution of colorectal cancer may be partly associated with the improvements in diagnosis and treatment, as well as increased screening with the removal of adenomatous polyps in the distal colon. Colonoscopy is more effective in preventing left-sided than right-sided colorectal cancer, which could also contribute to the shift in the distribution of colon cancer. Part of the difference is likely due to quality aspects related to colonoscopy (poorer preparation on the right side, incomplete colonoscopy, anatomical configurations which compromise visibility), but biology may also vary between right and left colorectal cancer. For example, serrated adenomas, which are flatter and more challenging to visualize endoscopically, and typically carry BRAF V600E mutations and lead to microsatellite-unstable colorectal cancer, are more common in the right colon. In the USA, colorectal cancer incidence rates had been declining at approximately 2% annually, but that rate of decline slowed to about 1% per year during the period from 2013 to 2017. Incidence rates in most other Western countries remained stable or slightly increased during that period. In contrast, colorectal cancer incidence rates have rapidly increased in several historically low-risk regions, including Spain and several countries within Eastern Asia and Eastern Europe (7).

In Croatia, colon cancer ranks second in terms of incidence for both sexes. Despite advanced treatment methods, there continues to be an increase in both incidence and mortality on a global scale (7).

Age is the primary risk factor for sporadic colorectal cancer. It is rare before the age of 40, with the incidence starting to significantly increase between 40 and 50 years of age, and age-specific incidence rates continue to rise in each subsequent decade. Recent data from the Surveillance, Epidemiology, and End Results (SEER) database of the United States and other cancer registries in Western countries indicate that colorectal cancer incidence is increasing in the under-50 age group while decreasing in older age groups. In the USA, the incidence of colorectal cancer in men and women under the age of 50 has consistently increased at a rate of 2% per year from 1995 to 2016. Some registries report an increase in the incidence of colorectal cancer even among young adults up to the age of 39, although the absolute number of cases in this age group is still much lower than in adults aged 50 and older. These increases in incidence can mainly be attributed to left-sided colon cancer, particularly rectal cancer.

More than 86% of individuals under the age of 50 diagnosed with colorectal cancer are symptomatic, and the disease is diagnosed in later stages, suggesting that the increased incidence is real and not attributable to earlier detection. The reasons for this trend can be multifactorial, involving genetic influences and changes in environmental exposure and lifestyle. It is estimated that up to 35% of these cancers in young adults in the USA are linked to known hereditary syndromes, and the reasons for these increases remain unknown. Interestingly, these trends have also been observed in developing countries, which are traditionally considered to have lower rates of colorectal cancer compared to Western countries. The literature suggests that the ratios of early and late-onset cases in several low-resource countries are significantly higher than the international average in general, and particularly in Western countries. A meta-analysis of 20 studies concluded that significant risk factors for early-onset colorectal cancer (EOCRC) include a family history of colorectal cancer in first-degree relatives (relative risk [RR] 4.21, 95% CI 2.61-6.79), hyperlipidemia (RR 1.62, 95% CI 1.22-2.13), obesity (RR 1.54, 95% CI 1.01-2.35), and alcohol consumption (RR 1.71, 95% CI 1.62-1.80). Several other potential risk factors (e.g., hypertension, metabolic syndrome, ulcerative colitis, chronic kidney disease, unhealthy dietary patterns, insufficient vitamin D intake, sedentary behavior, and occupational exposure to organic dust) have been examined in only one or two studies. A pooled analysis of 13 population studies concluded that EOCRC is associated with irregular use of non-steroidal anti-inflammatory drugs, higher red meat consumption, lower education, alcohol abstinence, and increased alcohol use (7).

Colorectal cancer mortality rates have been progressively declining since the mid-1980s in the United

States and many other Western countries. This improvement in outcomes can be attributed, at least in part, to the detection and removal of colon polyps, the early detection of colorectal cancer, and more effective primary and adjuvant treatments. However, at least in the USA, the decline in colorectal cancer mortality began long before widespread screening and before effective adjuvant therapy became widely used. Nevertheless, especially in the USA, the overall decline in mortality masks trends in young adults. In data derived from the Surveillance, Epidemiology, and End Results (SEER) database of the National Cancer Institute, colorectal cancer mortality rates per 100,000 individuals under the age of 50 decreased by approximately 2% annually from 2000 to 2004, and then increased by 1% annually until 2018. The increase applied to Caucasians and Latino Americans, unlike African Americans and Asian/Pacific Islanders, whose mortality rates either remained stable or decreased during the same time period. Similar trends have been reported by the American Cancer Society and the National Center for Health Statistics. Globally, the USA has one of the highest survival rates for colorectal cancer. Data collected by the Surveillance, Epidemiology, and End Results (SEER) program of the US National Cancer Institute show that nearly 65% of all patients treated for colorectal cancer (all stages and locations combined) between 2011 and 2017 survive for five years. Unlike these data, mortality rates continue to rise in many countries with limited resources and healthcare infrastructure, especially in Central and South America and Eastern Europe, as evidenced by the data from the WHO GLOBOCAN international database (7).

Since colon cancers develop slowly, in the early stages, there are often no noticeable symptoms or they are attributed to other, less serious conditions. Signs which may indicate colon cancer include anemia, low hemoglobin levels, fatigue, the presence of blood in the stool, changes related to stool consistency (diarrhea, constipation, or a feeling of incomplete bowel emptying), bloating and gas, nausea, abdominal pain, and weight loss (8). Today, numerous diagnostic methods are used for the purpose of detecting cancer. The test for detecting occult (hidden) blood in the stool is one of the cheapest and simplest methods for detecting colon cancer. Due to its simplicity and cost-effectiveness, it is used as a method for timely colorectal cancer detection. Digital rectal examination is a procedure in which a physician, usually a general practitioner, manually examines the end of the colon using a finger, especially when there is suspicion of colon cancer. That examination can help detect cancers located at the end of the colon. Colonoscopy is the most reliable method for detecting colorectal cancer because it provides the best view of changes in the colon, allows for the removal of pathological changes and the collection of samples for histological analysis. Irigography is a radiological method for detecting pathological changes in the colon (9).

When a diagnosis of colon cancer is made, it is necessary to assess the extent of the disease and decide on the method of treatment. The treatment of colorectal cancer often requires surgery to remove the portion of the colon affected by the tumor, along with the associated blood vessels and lymph nodes. In some patients, in addition to surgery, chemotherapy may be necessary. Chemotherapy involves the use of specific drugs to destroy cancer cells and prevent their further growth and proliferation. Radiotherapy is a treatment method that involves the use of ionizing radiation. High doses of radiation are used to destroy genetic material, and thus cancer cells. Targeted biological therapy is a very modern method of treating colon cancer today. This form of treatment involves the use of specific antibodies which selectively destroy cancer cells without negatively affecting the body (10).

Colon cancer prevention

The aim of primary and secondary prevention measures is to reduce the number of individuals suffering from colorectal cancer, decrease mortality, and improve the quality of life for the affected individuals. Primary prevention refers to reducing the risk of developing colorectal cancer. To prevent or at least reduce the risk of developing cancer, it is recommended to consume a diet rich in fiber, such as starch, fruits, and vegetables. Fiber does not excrete bile acids, but promotes faster bowel movement, reducing the contact time of potential carcinogenic substances with the intestinal mucosa, thereby lowering the chances of their absorption. In addition to a proper diet, it is necessary to engage in physical activity, regulate bowel movements, avoid alcohol and cigarettes, and lead a healthier lifestyle. The aim of secondary prevention is the early detection of any changes in the lining of the colon, which includes a systematic program for the timely detection of cancer while the disease is still in its early stages and more easily treatable.

The National Colorectal Cancer Screening Program was adopted during the session of the Government of the Republic of Croatia on 4 October 2007, following the Recommendation of the Council of Europe (2003) and the European guidelines for quality assurance in colorectal cancer screening and diagnosis. The program aims to detect cancer in its early stages, improve the chances of curing patients, enhance the quality of life and survival, and reduce mortality.

The target group consists of men and women aged 50 to 74 years (approximately 1,300,000 individuals). The screening test is conducted using a fecal occult blood test (FOBT) card to detect hidden blood in the stool. All individuals who receive a positive stool blood test result within the screening program are scheduled for a colonoscopy, which includes the removal of polyps and a histopathological diagnosis (11).

Aim

The aim of the research was to present and analyze the trends in colon cancer incidence in Croatia from 2001 to 2018, as well as the mortality rates from 2001 to 2019.

Methods

The research includes an analysis of the incidence data for colon cancer during the period from 2001 to 2018, obtained from the Croatian National Cancer Registry, as well as the mortality data from 2001 to 2019, obtained from the Croatian Bureau of Statistics and the Croatian Institute of Public Health using the most recent data available. Age-standardized incidence and mortality rates were calculated using the direct standardization method, utilizing Croatia's population census from the year 2011. The trends in incidence and mortality were analyzed using the Joinpoint program, version 4.4.0.0, from January 2017.

The population data used in the research was obtained from the 2011 population census conducted by the Croatian Bureau of Statistics.

Results

Incidence

During the period from 2001 to 2018, there were 57,552 cases of colon cancer recorded in Croatia. The percentage of men was 57.68% (33,196), while women made up 42.31% (24,356). The highest incidence rate is observed in older age, particularly in the range between 80 and 84 years. The average age of those affected in 2018 was 69.6 years. The data shows that incidence and mortality are higher in men compared to women.

Figure 2. depicts the incidence of colon cancer in men and women in the age group of 50 to 74 years in Croatia from 2001 to 2018. It shows an increase of 1.0% per year in men, 1.0% per year in women, and a total annual increase of 1.1%.

Figure 3. illustrates the trend in the incidence of colon cancer in men and women from 2001 to 2018. It is evident that the incidence of colon cancer has been on the rise on average for both sexes.

The overall age-standardized colon cancer incidence rate for both sexes (standardized to the 2011 population census) in the mentioned period is statistically significantly increasing for both sexes (1.1% per year in men, 1.0% per year in women), with an overall annual increase of 1.2% when considering both sexes together.

0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
0.0	0.0	0.5	0.0	0.4	2.1	4.5	9.5	17.5	34.4	60.6	91.1	174.2	248.5	255.8	340.4	359.7	359.5

Figure 1. **Age-specific incidence rate (data for the year 2018), (13)**

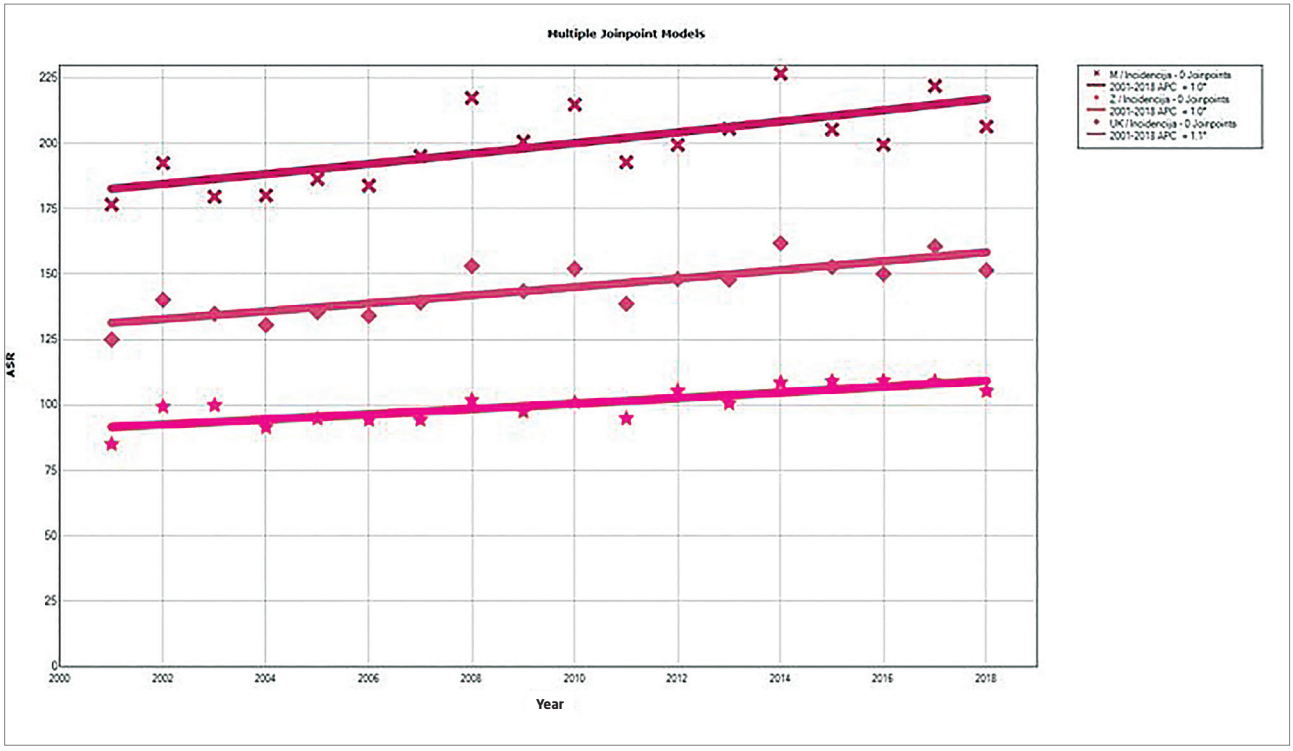

Figure 2. **Joint point analysis of colon cancer incidence in men and women in the age group of 50 to 74 years in Croatia in the period from 2001 to 2018.**

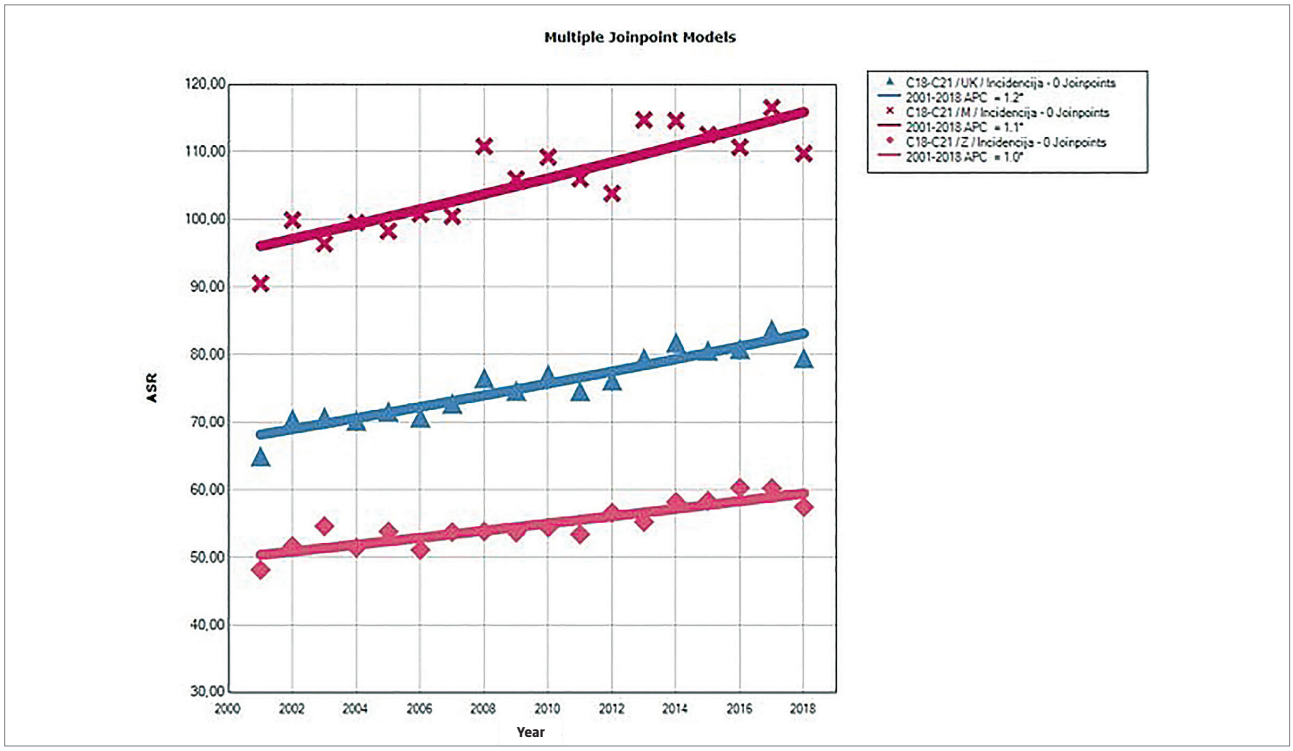

Figure 3. **Joint point analysis of colon cancer incidence in men and women in Croatia in the period from 2001 to 2018.**

Mortality

From 2001 to 2019, there were 35,830 deaths due to colon cancer in Croatia. The percentage of men was 57.82% (20,718), while women accounted for 42.18% (15,112). The highest mortality rate is observed in the elderly population, between 75 and 79 years of age, both in men and women.

Figure 4. shows that the overall age-standardized mortality rate (standardized to the 2011 population census) for colon cancer significantly increased in men by 0.7% per year throughout the mentioned period. For women, there was an annual increase of 1.0% until 2012, and from 2012 to 2019, there was a non-statistically significant decrease of -0.8% per year. We conclude that the mortality trend is stable because a decrease is not yet evident.

Figure 5. displays the analysis of colon cancer mortality in men and women in the age group of 50 to 74 years in Croatia from 2001 to 2019. In men, an increase of 0.2% per year was observed, while in women, it was 0.3% per year, and we conclude that neither trend is statistically significant.

When considering both genders together, we observe a statistically significant increase from 2001 to 2015 (1.5% per year). However, from 2015 to 2019, there is a non-statistically significant decrease of -0.3% per year. It is interpreted as a stable mortality trend because a decrease is not yet evident.

Discussion

Wong and colleagues published an epidemiological study for the periods from 2007 to 2016, from 2006 to 2015, or from 2005 to 2014, depending on data availability, on the incidence and mortality of colon cancer in 36 countries (13).

The incidence of colon cancer increased in 10 out of the 36 analyzed countries (all in Asia or Europe), with the highest increase observed in India, followed by Poland. All of these 10 countries showed moderate to high scores on the Human Development Index (HDI). Six countries showed a decrease in the incidence of colon cancer. Those countries had the highest HDI scores, with the United States experiencing the largest decrease, followed by Israel. Seven countries (including all North American countries) showed a decrease in incidence among individuals aged 50 and older. Eight countries showed an increase in the incidence of colon cancer among individuals under 50 years of age, including the United Kingdom and India. Germany, Australia, the United States, Sweden, Canada, and the United Kingdom showed a decrease or stable incidence among individuals aged 50 and older, but a significant increase among individuals under 50 years of age. Only Italy showed a decrease in the incidence of colorectal cancer among individuals under 50 years of age. Among women, 12 out of 36 countries (all from Asia and Europe) showed an increase in the incidence of colon cancer, while 7 countries showed a decrease. India showed the highest increase in colon cancer incidence among women, followed by Slovenia. Out of the 36 countries, 5 showed an increase in rectal cancer incidence, and 8 showed a decrease. Ecuador and Thailand experienced the most significant increase in rectal cancer incidence. The frequency of rectal cancer among individuals under 50 years of age significantly increased in Finland, Australia, Canada, the United States, and the Netherlands. Four countries showed an increase in the incidence of rectal cancer among women, with Ecuador experiencing the highest increase, followed by Thailand. The frequency of rectal cancer in women decreased in 8 countries. Among women under 50 years of age, the incidence of rectal cancer increased despite a decrease in women aged 50 and older in Costa Rica, Slovenia, Japan, Slovakia, Canada, and the United States. A total of 24 countries reported a decrease in mortality, including North America, Oceania, and most European countries. Furthermore, some countries in Asia, Latin America, and Southern Europe showed a significant increase in colorectal cancer mortality (14).

Conclusion

Colorectal cancer is a malignant neoplasm which annually affects more than 1,900,000 people worldwide, making it the third most common cancer among men and the second most common among women. In developing countries, the incidence and mortality rates of colorectal cancer are increasing, which

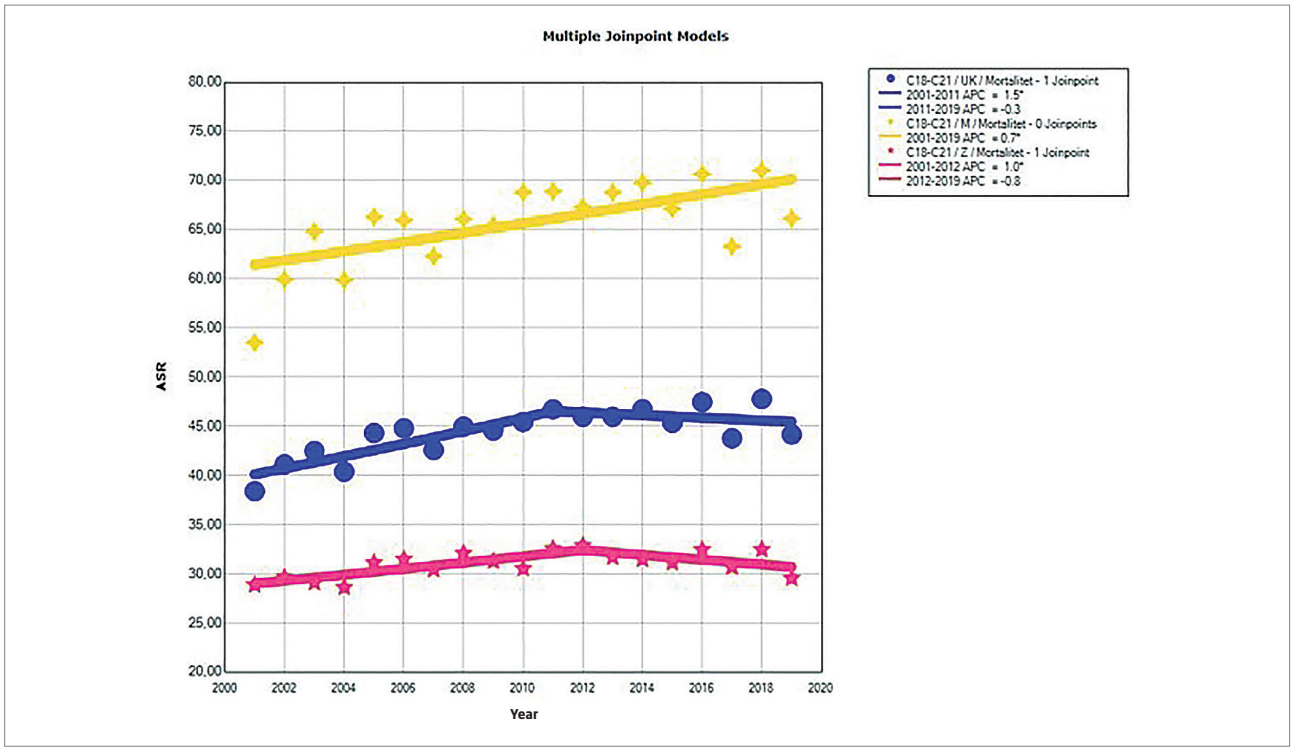

Figure 4. **Joint point analysis of colon cancer mortality in men and women in Croatia from 2001 to 2019.**

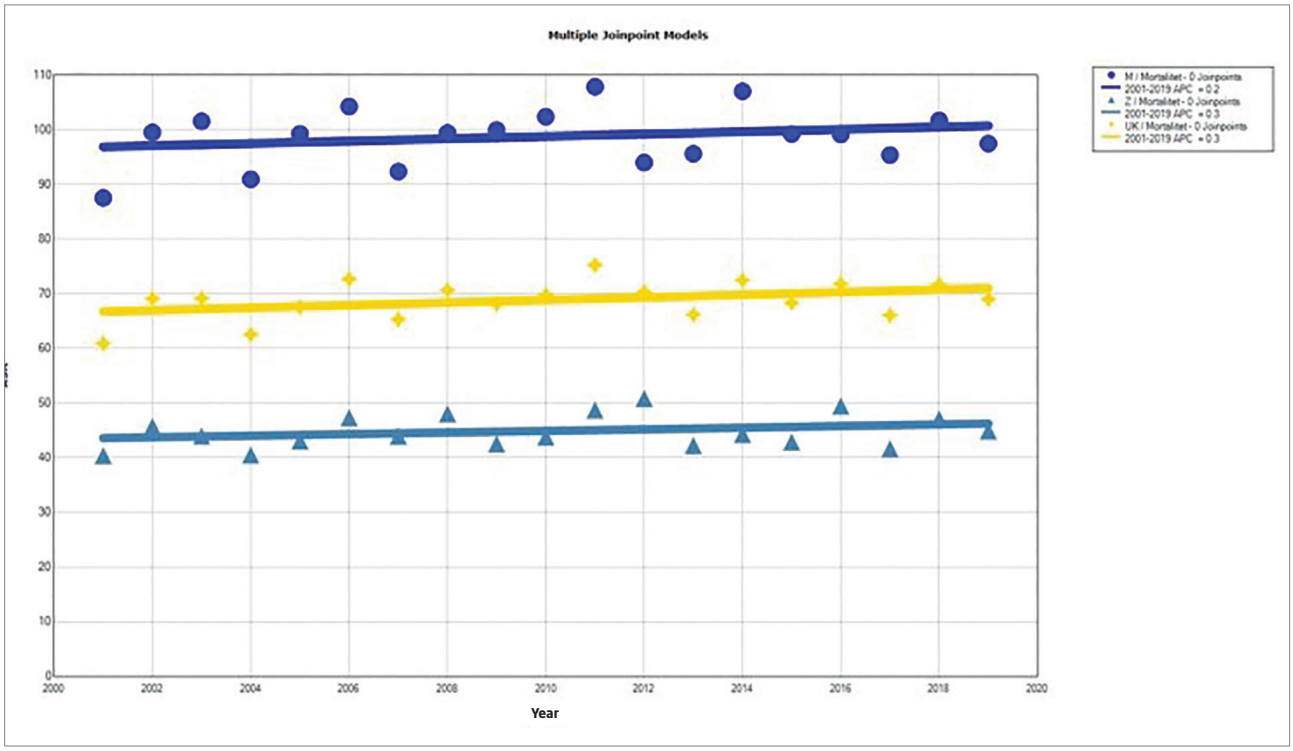

Figure 5. **Joint point analysis of colon cancer mortality in men and women in the age group of 50 to 74 years in Croatia from 2001 to 2019.**

subsequently leads to a gradual reduction in the disparity compared to industrialized Western countries. In Croatia, colon cancer is the second most common cause of death from malignant diseases in both men and women. In women, it ranks second in terms of incidence, while in men, it ranks third. The trends in the incidence and mortality rates of colorectal cancer in Croatia still show an increasing tendency in standardized rates. According to epidemiological data, it is clear that the prevention of colorectal cancer is one of the main public health activities in Croatia. The increased incidence and mortality of colorectal cancer highlight the crucial role of a multidisciplinary approach, ensuring the availability of new treatment models, and emphasizing secondary prevention (population-based screening) and primary prevention (changing dietary habits and levels of physical activity). Education of the general population about the importance of colorectal cancer is necessary.

It is important to focus on the prevention and early detection of the disease, which can be achieved through the National Colorectal Cancer Screening Program.

During the period from 2001 to 2018, there were 57,552 cases of colon cancer recorded in Croatia. The percentage of men was 57.68%, while women made up 42.31%. The highest incidence is observed in older age groups, with the peak incidence occurring between 80 and 84 years of age.

In 2019, 1,258 men and 837 women in Croatia died from colorectal cancer (including the anus).

According to the World Health Organization's estimation, by the year 2030, approximately 2.5 million people worldwide will be diagnosed with colorectal cancer, and around 1.2 million will die from it.

With the help of the obtained results, we believe that the importance of addressing the concern related to colon cancer will be further highlighted, encouraging all healthcare system stakeholders to systematically implement measures for primary, secondary, and tertiary prevention.

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PRIKAZ INCIDENCIJE I MORTALITETA RAKA DEBELOG CRIJEVA U REPUBLICI HRVATSKOJ

Sažetak

Uvod. Karcinom debelog crijeva smatra se jednim od najvećih zdravstvenih problema u svijetu, gdje, prema podacima Globocana 2020, godišnje bude dijagnosticiran kod 1 931 590 bolesnika te je uzrok smrti kod 935 173 bolesnika. U Republici Hrvatskoj godišnje se dijagnosticira oko 3500 novih slučajeva karcinoma debelog crijeva.

Cilj. Prikazati i analizirati zadnje trendove incidencije karcinoma debelog crijeva u RH za razdoblje od 2001. do 2018. i trendove mortaliteta za razdoblje od 2001. do 2019.

Metode. Analiza izvještaja o incidenciji karcinoma debelog crijeva za razdoblje od 2001. do 2018. objedinjena je iz Registra za rak RH, dok su izvještaji o mortalitetu preuzeti iz baze podataka Državnog zavoda za statistiku i Hrvatskog zavoda za javno zdravstvo. Trendovi incidencije i mortaliteta obrađeni su uz pomoć programa Joinpoint.

Rezultati. Zabilježena je stopa incidencije 626,8 / 100 000, 706,4 / 100 000 za muškarce i 552,4 / 100 000 za žene. U RH je 2018. od karcinoma umrlo 13 809 osoba, od čega 8049 muškaraca i 5760 žena. Stope mortaliteta iznosile su 337,8 / 100 000, odnosno 407,5 / 100 000 (M) i 272,6 / 100 000 (Ž). Kod žena se karcinom debelog crijeva po incidenciji nalazio na drugom mjestu, dok se kod muškaraca nalazio na trećem mjestu. Ukupan broj novooboljelih iznosio je 2121 za muškarce te 1508 za žene, sveukupno 3629 slučajeva. Udio karcinoma debelog crijeva u broju novotvorina 2018. iznosio je 14,1 %.

Zaključak. Trendovi pojavnosti karcinoma debelog i završnog crijeva u RH još uvijek imaju tendenciju porasta u standardiziranim stopama incidencije i mortaliteta.

Ključne riječi: karcinom debelog crijeva, incidencija, mortalitet

Author Guidelines

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Croatian Nursing Journal is a peer-reviewed nursing journal that publishes original articles that advance and improve nursing science and practice and that serve the purpose of transfer of original and valuable information to journal readers. Croatian Nursing Journal is published biannualy in the English language. Authors are invited to submit original papers in the form of research findings, systematic and methodological review and literature review related to nursing.

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The manuscript must be prepared using Microsoft Office Word, in a 12-point font, double spacing, in either Times New Roman, Arial or Calibri.

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The text of the manuscript should be divided into sections: Abstract and Key words, Introduction, Methods, Results, Discussion, Acknowledgment, References.

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The title page should include:

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The first page should contain the title and the abstract (summary) both in English and Croatian, of no more than 250 words each.

The abstract should state the purposes of the study or investigation, basic procedures, main findings, and principal conclusions. It should emphasize new and important aspects of the study or observations. Below the abstract, the authors should provide 3 to 8 key words or short phrases that will assist in cross-indexing the article and may be published with the abstract. Terms from the Medical Subject Headings (MeSH) list of Index Medicus should be used for key words.

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Describe the selection and identify all important characteristics of the observational or experimental participants. Specify carefully what the descriptors mean and explain how the data were collected. Identify the methods, apparatus with the manufacturer's name and address in parentheses, and procedures in sufficient detail to allow other workers to reproduce the results. Provide references to established methods and statistical methods used. Describe new or substantially modified methods, give reasons for using them, and evaluate their limitations. Identify precisely all drugs and chemicals used. Use only generic names of drugs. All measurements should be expressed in SI units.

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Present your results in logical sequence in the text, tables, and illustrations. Do not repeat in the text all the data in the tables or illustrations; emphasize or summarize main findings.

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Emphasize the new and important aspects of the study and the conclusions that follow from them. Do not repeat in detail data or other material given in the Introduction or the Results section. Include in the Discussion section the implications of the findings and their limitations, including implications for future research, but avoid unqualified statements and conclusions not completely supported by the data. Relate the observations from your study to other relevant studies. State new hypotheses when warranted, but clearly label them as such.

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Figures

Figures and illustrations should be professionally drawn and photographed. Make sure that letters, numbers, and symbols should be legible even when reduced in size for publication. Figures should be numbered consecutively according to the order in which they have been first cited in the text.

The preferred formats are JPEG and TIFF, although any format in general use that is not application-specific is acceptable. Make sure that minimum resolution should be 300 DPI.

Graphs, charts, titles and legends in accepted manuscript will be edited prior to publication. Preferred format for graphs or charts is xls or xlsx.

Abbreviations

Use only standard abbreviations. The full term for which an abbreviation stands should precede its first use in the text unless it is a standard unit of measurement.

Acknowledgments

List all contributors who do not meet the criteria for authorship, such as a person who provided purely technical help, writing assistance, or a department chair who provided only general support. Financial and material support should also be acknowledged.

References

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