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Initial Assessment and Monitoring of Nutritional Status and Malignant Pain in Lung Cancer Patients

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Abstract

Introduction. Lung cancer is a complex disease and requires a multidisciplinary approach to achieve the best results in treatment, to increase the survival rate while preserving the quality of life of the sufferer. The nutritional status of the patient is an important factor affecting outcome and recovery from disease or injury. We question whether there is a link between nutritional status and malignant pain in lung cancer patients.

Aim. A prospective trial was conducted to determine the distribution of respondents by frequency of pain according to a validated Visual Analog Scale (VAS), distribution of respondents who reported reduced food intake and distribution of factors that have led to the reduced food intake.

Methods. A prospective trial was conducted at the Department for respiratory diseases Jordanovac, University Hospital Center Zagreb, Croatia, on a sample of patients with advanced non-small cell lung cancer to determine the frequency, characteristics and treatment of chronic malignant pain (N=76). These are the results from November 2013 to June 2014. For pain assessment, we used a validated VAS. For the identification of patients at risk of malnutrition we used Nutritional risk screening tool (NRS 2002). For a rough estimate of total body adiposity, we measured dermal thicknesses using a standard caliper. Monitoring of patients was documented in the form of nursing documentation. A component of

nursing documentation was designed to monitor the nutritional status of cancer patients and has been implemented at the Department for respiratory diseases Jordanovac as required documentation. The component included collecting the following data: the stage and type of cancer and treatment, demographic characteristics, age, gender, vital signs, body weight and height, body mass index (BMI), subjective symptoms such as pain, fatigue and nausea, reduction ad rezones of food consumption.

Results. During the study 417 measurements were made: 1) 32,1% of patients reported reduced food intake, and 67,9% of respondents indicated that have not reduced their regular diet; 2) as a reason for the reduced food intake 37,7% respondents stated loss of appetite, 31,2% fatigue and 24,6% pain; 3) 59,5% subjects mainly reported absence of pain, while none of the respondents reported the existence of the highest degree of pain.

Conclusion. By regular monitoring of the intensity of the pain we achieved good control in malignant pain management, which is an important data in the assessment of nutritional status. The fact is that poorly controlled pain is present in 24% of patients and has been the reason for the reduced food intake.

Introduction

According to the Croatian Cancer Registry, in 2017, 2,232 men and 1,003 women were diagnosed with tracheal, bronchial and lung cancer, with the second being most common cancer in men (17%) and the third in women (9%) (1). Worldwide, in 2012 lung cancer occurred in approximately 1.8 million patients and caused an estimated 1.6 million deaths (2). The incidence increased over the years and in 2018 lung cancer occurred in approximately 2.1 million patients and caused an estimated 1.7 million deaths (2,3). Lung cancer refers to malignant diseases that originate from the airways and lung parenchyma. Based on the origin of the cell it is divided into small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC). In patients with lung cancer, it is necessary to define the cell type before starting with specific and personalized oncological treatment (4-6).

Cancer induces a disorder in cellular function. Thus, altered cells acquire the characteristics of rapid growth and the ability to spread to surrounding tissues in the body. Cancer cells have evolved to be able to face several obstacles, and during this process, they have become extremely resilient. Factors that are difficult to control and are responsible for about 30% of all cancers are hereditary, environmental or viral. On the other hand, approximately 70% of cancers are caused by other factors that are directly related to lifestyles, such as smoking, physical inactivity, obesity, dietary composition, and excessive alcohol and opiate consumption (4,7). The symptoms of a malignant disease are often very nonspecific which is one of the reasons for late detection of cancer. Symptoms that occur in patients with lung cancer are dry irritating cough - 50 to 75%, dyspnea - 25 to 40%, chest pain - 20 to 40%, hemoptysis - 20 to 50% (8-11), fatigue, weakness, hoarseness (12,13), pleural effusion - 10 to 15% (5,14), superior vena cava syndrome, paraneoplastic syndrome and metastasis (5). Haematological disorders are anaemia (haemoglobin ≤12 g/dL), which is present in 40% of patients who are not therapeutically covered and in 80% of patients who received chemotherapy (15), leukocytosis which is present in 15% and is most commonly associated with hypercalcemia which is considered a poor prognostic factor in survival (16,17). Thrombocytosis is present in 14% and is an independent predictor for decreased survival (18,19). The most common coagulation disorders present in patients with lung cancer are Trousseau's syndrome, deep vein thrombosis, thromboembolism, disseminated intravascular coagulation, thrombotic microangiopathy and non-thrombotic microangiopathy (5). Despite all these symptoms and concomitant conditions, it should be noted that one quarter of patients with lung cancer are asymptomatic (20) while symptoms such as loss of appetite and weight are not pathognomonic for lung cancer, therefore further diagnostic testing is needed to detect the disease (8-10).

Patients with lung cancer face several symptoms and side effects that interfere with their daily activities. Side effects negatively affect a patient's quality of life during and after oncology treatment (6) and we divide them into those related to the disease itself and those that are the result of specific oncological treatment. Side effects associated with the disease are fatigue, dyspnea, difficulty swallowing, hemoptysis, pain and cancer anorexia/cachexia. Side effects

associated with specific oncological treatment are nausea, vomiting, diarrhoea, constipation, alopecia, change in taste or smell, esophagitis, fatigue, anaemia, leukopenia, thrombocytopenia, infections, pain and thigh numbness, skin changes, pain, anorexia/cachexia (6). The prognosis of survival in patients with NSCLC decreases with the progression of the underlying disease (6) factors that predict mortality include weight loss and Eastern Cooperative Oncology Group (ECOG) Performance Status. Decreased appetite is an indicator of weight loss and a negative predictor of survival in lung cancer patients (21-26).

Factors that lead to reduced intake of nutrients in cancer patients

- Pain is the most stressful and worrying symptom for patients and their families. 80% of cancer patients are affected by pain. Fortunately, well-controlled pain is possible in most cases. Opioids are the leading therapy for moderate to severe pain and it is very important to provide adequate psychosocial support (27).
- Dyspnea is a common symptom of lung cancer and intrathoracic metastatic disease (28).
- Insomnia is a common and stressful symptom in terminally ill patients. It affects quality of life and may increase the intensity of other symptoms such as pain, anxiety or delirium (28).
- Fatigue (asthenia, weakness) is the most common and typical multidimensional symptom in lung cancer patients that affects the quality of life. In most cases, fatigue is a symptom not promptly diagnosed and treated (28).
- Nausea and/or vomiting are present in most patients due to metabolic abnormalities, opioid administration, pharmacological therapy and brain metastasis (28).
- Xerostomia, also known as dry mouth, has been described as a feeling of dryness in the mouth that makes it difficult to chew and swallow (29), which may be associated with: radiotherapy, chemotherapy, surgery (especially head and neck), drugs (anticholinergics, antidepressants, opioids, anxiolytics, antihistamines, beta-blockers), dehydration and oral infection (30).
- Radiation-induced dysphagia is a common symptom in cancer patients undergoing upper esophageal radiotherapy. These patients are at an increased risk of food aspiration. The initial management dysphagia is an immediate change in diet and food consistency (28).

Anorexia/cachexia

Anorexia and weight loss are common in patients with lung cancer, they can occur due to the underlying disease or specific oncological treatment (6). Anorexia or loss of appetite may be associated with a tumour-host interaction, loss of taste sensation, dysphagia, stomatitis, gastroparesis, nausea, vomiting, distal intestinal obstruction syndrome, specific oncological treatment, pain and depression. Anorexia leads to reduced food intake, resulting in weight loss which is a bad prognostic sign (6,28).

Cachexia is a hypercatabolic condition defined by accelerated skeletal muscle loss in the context of a chronic inflammatory response that occurs in cancer patients (28). Cachexia consists of weight loss of ≥10% over 6 months, manifested by asthenia and general weakness, changes in physical appearance and mental stress (31-35). Weight loss in patients with cachexia is not only caused by reduced food intake but is also caused by metabolic abnormalities. Metabolic abnormalities lead to an increase in basal energy that results in weight loss in skeletal muscle. Cachexia is defined using a three-stage system: pre-cachexia, cachexia, and refractory cachexia (34,36,37).

Estimation of loss of body weight is often neglected in patients who are obese, edematous or with the expansion of tumours (34,36,38). According to some studies, cachexia occurs in 50% of cancer patients (regardless of the stage of the disease), and 80% of patients with an advanced malignant disease (34). The importance of these data is significant because a loss of only 5% of body weight can significantly worsen the prognosis of cancer patients and shorten overall survival (39). Despite these findings, the problem of malnutrition in hospitals remains largely unrecognized (40). From all the above, it is important to assess and regularly monitor the nutritional status of patients, monitor and record side effects and act accordingly. Accordingly, to the importance of these data at Department for respiratory diseases Jordanovac, UHC Zareb, component of nursing documentation was designed and implemented as mandatory nursing documentation for assessment and regularly monitoring the general condition and nutritional sta-

tus patients with lung cancer. Data from the component of nursing documentation are analyzed in this paper (41).

The research aimed to determine the distribution of respondents by the frequency of the presence of pain, the distribution of subjects in which reduced food intake was present and to determine the reasons that have led to reduced food intake. The purpose of this paper was to encourage research which would lead to timely intervention in everyday clinical practice when risks of malnutrition occur. Through the observation of malnutrition, we can better assess the possible outcome of therapy and the course of the disease.

Methods

A prospective trial was conducted at the Department for respiratory diseases Jordanovac, University Hospital Center Zagreb, Croatia, in the period from November 2013 to June 2014, on a sample of patients with advanced non-small cell lung cancer. During this period patients received cancer treatment (chemotherapy) and nutrition support according to current Croatian guidelines (N=76). This sample represents a deliberately selected sample that corresponds to the patient population of the clinic.

For assessment and regulatory monitoring general condition and nutrition status in these patients, we used the mandatory part of the nursing documentation (41). Patients were informed that their data will be used in an anonymized form and will only be used for this paper. Patients were informed about the purpose of the component of nursing documentation and their rights. The response rate of patients who came to therapy was 100%. Interviewing at the department was conducted by two specially trained nurses who were responsible for administering therapy as well, thus reducing variability in data collection. Sample control and data collection were performed on all patients with advanced non-small cell lung cancer included in the study by the authorized specially trained nurses. The average duration of completing the questionnaire was between 10 and 15 minutes.

The component was created by the author of this paper and is based on real needs as well as experiences in literature. The component aimed to design monitoring of the general and nutritional status of oncology patients to monitor and possibly predict the patient's future condition, improve or deteriorate concerning nutritional status, and the possibility of taking the necessary preventive and curative measures (41).

The component included the collection of the following data: data on disease stage and cancer type, data on the type and stage of treatment - treatment line and cycles, demographic characteristics of subjects (age and gender), skinfold thickness, standardized screening using Nutritional Risk Screening 2002 questionnaire (42,43), vital signs - blood pressure (mm Hg), heart rate and number of respirations/minutes, body weight in kg, body height in cm, body mass index (BMI) - calculated in the following equation: BMI = bodyweight ÷ [height]^2, i.e. corrected for age = (m/h^2) - (a - 30)/10 ; 30<a<75. where *a* is = age. Furthermore, for comparison, we categorize levels of malnutrition based on BMI: malnutrition (category 1) BMI <18.5, ideal weight (category 2) BMI 18.5 – 24.9, overweight (category 3) BMI 25.0 – 29.9, obesity grade 1 (category 4) BMI 30.0 – 34.9. Subjective assessment of the patient identified conditions of fatigue and nausea, food intake and further analyzed the reasons for reduced nutrition (if it occurred). A subjective assessment of nausea and vomiting was followed for the first five days after chemotherapy. A visual analogue scale (VAS) was used to assess pain. The VAS scale has a range of 0–10, where the lowest value of 0 indicates no pain, and the highest value of 10 indicates unbearable pain (41,44,45).

The survey took place every time the respondents arrived for therapy. The time interval between therapies was three weeks. Each time the respondents arrived, a new list of assessments and monitoring was opened. Weight measurement was always carried out using the same scale. The respondents were in their clothes when weighed, without a jacket or shoes. Skinfold thickness was measured with an electronic calliper (Finesse), at the right upper arm.

Ethics

The component of nursing documentation was introduced as mandatory nursing documentation at the Department for respiratory diseases Jordanovac, University Hospital Center Zagreb, Croatia, in 2013. The Croatian Chamber for nurses as a regulatory body approved a component of nursing documentation, the implementation and analysis of the documentation was carried out according to the highest ethical standards of the nursing profession. The Ethics Committee of the Croatian Chamber of Nurses approved the study on the basis that it was a non-interventional study. The data were collected as part of the usual nursing history, there was no need for patients to sign a separate informed consent to participate in the study.

Statistics

The data collected were analyzed by statistical suite Statistica 16.0, licensed at the University Computing Center (SRCE, site:0082452005), and Microsoft Excel with Office Version 2010.

Differences between studied subgroups (women and men, lines of therapy, risks of malnutrition) were analyzed using descriptive statistic (frequency distributions and contingency tables), while the correlations were analyzed using bivariate (Pearson) correlation analysis.

Results

A total of 76 lung cancer patients participated in the study, of which 58 (76.3%) men and 18 (23.7%) women. 76 subjects had an average of 5 visits to our department, the total number of measurements was 417. The age range of subjects was between 47 and 89 years of age, with an average age of 65 years. The central value or median is 65, while the most common value or mode is 62.

Using descriptive analysis, we confirmed that the highest percentage of measurements of subjects in the study was during the first line of treatment (59.3%) while the lowest percentage of measurements during the study was in the fourth line of patient treatment (1.7%). The percentage of measurements observed during reevaluation between treatment lines was 15.9%. The central value is 1 while the mode is also 1.

When examining body mass index, we ranked patients by category at each measurement. From overall 417 measurements, 44.8% of patients had an ideal weight, 37.4% were overweight and 14.6% obese. To assess the nutritional status of healthy individuals the calculation of BMI is usually used. This is a relatively precise measure of body mass and is, therefore, most commonly used for health risk assessment (Table 1).

Table 1. **Gender/BMI (first measurement)**

Gender	BMI		
	Malnutrition	Ideal weight	Excessive weight
F	0%	50%	50%
M	3.4%	44.8%	51.7%

In the study, we conducted more detailed descriptive tests and compared the relationship of nutritional status with other measured and collected parameters. In each table, we have paired the nutritional status with another parameter to take a more detailed look at the distribution schedule (Table 2).

Table 2. **Nutritional status/BMI**

BMI	Nutritional status	
	Severe risk	Mild malnutrition
Malnutrition	8.3%	0%
Ideal weight	62.8%	34.1%
Excessive weight + Obesity	28.9%	65.69%

62.8% of subjects of ideal body weight were at severe risk of malnutrition and 65.9% of overweight subjects had mild malnutrition.

According to the data obtained, 3.1% of patients were malnourished at some point of the study, while none of the patients was in the category of severe obesity by body weight index. The average body mass index of the

Table 3. **Age/Weight loss (first and cumulative measurement)**

Age	Weight loss/weight gain (kg)			
	From -30 to -10	From -9 to -1	0	From +1 to +6
45 - 69	12.7% / 21.7%	56.3% / 40.1%	21.8% / 10.9%	9% / 27.1%
70+	19.1% / 33.5%	47.7% / 24%	28.6% / 19.0%	4.8% / 23.8%

patient corresponds to the category of ideal weight. The median body mass index is 25.24, which corresponds to excessive weight, while the mode is 20.30.

When included in the study, all subjects were measured, the subject with the lowest body weight weighed 47 kilograms while the subjects with the highest weight weighed 123 kilograms. The average weight of the subjects was 76.27 kilograms. The central value was 74, while the mode was 81, which is the most common recorded weight of subjects (4.3%).

In the first measurement, weight gain was only 9%, while the cumulative measurement increases the proportion of subjects who gained weight to 27%. A positive shift is seen in each category except in the category of subjects who in the first measurement had a loss greater than 10 kg (Table 3).

By analyzing the nutritional status of patients as opposed to body mass index, values were obtained in only two categories (mild malnutrition and severe risk) and 62.6% of subjects were in the category of mild malnutrition, in the severe risk category, 37.4% of subjects, while none were in the risk-free category. 67.9% of subjects who had a reduced diet during the study were at severe risk of malnutrition. In the same way, subjects who did not report reduced food intake during the study were more slightly malnourished at 89.3%.

82.1% of subjects (45-69 years of age) reported decreased food intake compared to 66.7% of subjects (70+ years of age). The study carried out 417 measurements, regardless of the age group, 32.1% reported reduced food intake and 67.9% of respondents said they did not reduce food intake. In the study group who reported that they had reduced food intake, 134 measurements were performed, the most common reasons for reduced food intake are listed in Table 4.

Table 4. **Most common causes of reduced food intake**

Reason	%
N	134*
No appetite	37.7
Fatigue/weakness	31.2
Pain	24.6
Nausea	22.9
Vomiting	19.9
Constipation/Diarrhoea	7.9

*total number of measurements

Throughout the study, lung cancer patients on a scale of 0 to 10 (where number 0 indicates a pain-free condition and number ten the highest possible level of pain) indicated the current feeling of pain at each measurement. During the study, most of the subjects reported no existence of pain (59.5%), while no subject reported the highest level of pain (Table 5).

Table 5. **Distribution of pain frequency**

VAS result	N	%
0	248	59.5
1	8	1.9
2	35	8.4
3	40	9.6
4	13	3.1
5	39	9.4
6	9	2.2
7	14	3.4
8	6	1.4
9	5	1.2
10	0	0
Total	417	100

Using a bivarious correlation test, we examined the association between the nutritional status of lung cancer patients and the loss of their body mass during the study. All tests were carried out at the risk

level of 5% (p<.05). We found that there was a high interconnection between the subjects' weight loss and their nutritional status (r=0.464; p<0.000). Such a high association was to be expected given that weight loss itself is indicative of the degree of nutritional status. We also checked the association between the subjects' weight loss and lack of appetite. We found that there was a relatively high negative association between the two factors (r=-0.370; p<0.001). The negative association, in this case, indicates that if there is reduced food intake, there is also weight loss. In the same way, if there is no reduced food intake, there is less weight loss. Through further testing, we looked at the possible link between the lines of treatment that lung cancer patients underwent through the research period and the possible lack of appetite. We found that there was no statistically significant association between treatment lines and the occurrence of the lack of appetite. By testing the association between the number of treatment cycles and reduced food intake of subjects, we did not find a significant statistical correlation and had to determine that the two parameters were not interdependent. Among other things, we were interested in whether there was a statistically significant association between the subjects' body mass index and their nutritional status. The results show that there is a relatively high association between these two factors (r=0.376; p<0.000). These results were expected since the body mass index directly affected the patients' nutritional status. By testing the association between the nutritional status of subjects and the number of cycles of chemotherapy in treatment during the study, it was shown that there was a weak correlation between these two factors (r=0.098; p<0.046). Even though the association is weak the findings nonetheless show how nutritional status and treatment cycle are interdependent. By looking at the parameters collected, we also tested the association between nutritional status and the thickness of the skin folds and found that there was a positive high association between the two parameters (r=0.410; p<0.000) - the higher the thickness of the skin folds, the higher the degree of nutritional status.

Discussion

Lung cancer has the highest mortality rate in the world (46), with a poor survival prognosis, 16% survival in 5 years (47,48). In Croatia, the incidence by type of cancer, the cancer of trachea, bronchial and lungs is in the second most common type of cancer in men and the third in women. According to the latest data from the Cancer Registry in 2017, 3235 (2232 men/1003 women) patients with tracheal, bronchial and lung cancer were diagnosed (1).

It is interesting to keep track of how the number of women suffering from bronchial, tracheal and lung cancers is growing worldwide, and we are unfortunately seeing this trend in the Republic of Croatia. In 2013, according to the data from the Department for respiratory diseases Jordanovac, University Hospital Center Rebro, Zagreb, Croatia, we also recorded an increase in the proportion of women suffering from tracheal, bronchial and lung cancer the proportion of men 75%, and women 25%, while in 2009, the proportion of men was 77% and women 23%. The gender distribution of the sample coincides with the distribution of patients by gender who underwent oncological treatment at the Department for respiratory diseases Jordanovac, University Hospital Center Rebro, Zagreb, Croatia, in 2013.

The calculation of BMI is used to assess the nutritional status of healthy individuals. This is a relatively precise measure of body mass and is, therefore, most commonly used to assess health risks. In our survey, 44.8% of respondents had an ideal body mass and 52% higher than ideal. By correlation between body mass index and nutritional status, 62.8% of subjects of ideal body weight had a severe risk of malnutrition and 65.9% of overweight subjects were mildly malnourished. The conclusion is that BMI is not necessarily relevant or sufficient to assess the nutritional status of lung cancer patients, which corresponds to the opinion of other authors who state that in the case of cancer patients BMI is not a valid indicator for assessing nutritional status. According to the results obtained by our study, BMI was not a relevant indicator for assessing nutritional status in lung cancer patients older than 65 (49).

Weight loss is common in oncology patients, it may be caused by various factors such as mucositis, dys-

phagia, loss of appetite and metabolic abnormalities (50). During our study on weight loss or gain, a positive shift in the course of treatment was observed in most subjects, except for subjects who had already had a drop in body weight greater than 10 kilograms at the first measurement. In the age group between 45 and 69 years, weight loss greater than 10 kilograms was observed in 12.7% of subjects at the first measurement, by cumulative measurement during treatment it increased to 21.7%. In the age group 70+, 19.1% of subjects had weight loss at the first measurement, by cumulative measurement during treatment it increased to 33.5%. Age-group differences are not surprising. With age, metabolic, physiological and biochemical processes change, and these changes have an adverse effect on nutritional status in older people. The sharpness of taste, smell, loss of teeth, and thus decrease the possibility of enjoying food. With ageing the body's composition changes, muscle mass decreases and metabolism slows down (49). This data indicates the importance of timely nutritional support to avoid irreversible cachexia. It is assumed that adequate caloric intake by enteral or parenteral route would be the optimal approach in addressing weight loss in oncology patients. In the terminal stages of lung cancer, the nutritional supplement has a non-beneficial effect and it is not recommended (50-52).

During our study, collected data shows that weight loss less than 10 kilograms at the first measurement and by cumulative measurements record a decrease in the proportion of weight loss during treatment. It was interesting to note that a significant decrease in body weight precedes disease progression and weight loss can be seen in part as a possible diagnostic parameter in the monitoring of lung cancer patients. Due to the small number of respondents in this sample, we did not determine the statistical significance of this occurrence. Weight loss is an important criterion for diagnosing pre-cachexia and cachexia and is a negative prognostic survival sign for cancer patients. Dewys et al. conducted a study on a sample of 3,047 lung cancer patients to determine the association between weight loss and chemotherapy treatment. They found that weight loss was correlated with decreased general patient status, reduced median survival, reduced rate of chemotherapy response, and the frequency of weight loss increased by increasing the number of metastatic changes (39).

Malnutrition is defined as the nutritional status in which energy, proteins or other nutritional ingredients are in deficit, their deficiency leads to visible and measurable adverse side effects in tissue, function and clinical outcomes. Malnutrition occurs in 40 to 80% lung cancer patients (50,53-55), unrelated to the cause leads to a decrease in quality of life (50,56-59), lower response to chemotherapy treatment (39,56,60), increased toxicity related to the chemotherapy treatment (61-63), reduces the benefits of pharmacological therapy (60,61), prolongs postoperative recovery (64,65), reduces survival (39,56,66) and it is the leading cause of mortality in the advanced stage of the disease (50,53-55).

Anorexia has been linked to reduced food intake, weight loss and can lead to cancer anorexia-cachexia syndrome (CACS) (67). CACS was identified as a risk factor for reduced quality of life and poorer survival prognosis. Most lung cancer patients will develop CACS, for this reason, it is extremely important to promptly implement early interventions in patients with cachexia. Early nutritional and pharmacological interventions as well encouragement on physical activity are used in the prevention of the occurrence of CACS (68,69). Pharmacological interventions in CACS successfully reduce or resolve a large proportion of symptoms in lung cancer patients (pain, dyspnea, nausea/vomiting, fatigue) (28), improve appetite, reduce systemic inflammation and improve anabolic metabolism (69-72).

Pain is a common problem that significantly affects the reduction in food intake. ECOG Performance Status, weight loss, dyspnea, fatigue and pain are significant prognostic indicators, associated with reduced quality of life and with a lower survival prognosis (73,74). A prospective study was conducted on a sample of 301 patients with non-small cell lung cancer to determine the frequency, characteristics and treatment of chronic malignant pain. The intensity of pain is determined by a visual analogue scale (VAS). Most patients experienced moderate and high-intensity pain (47% and 26%), and only 5% of patients had sufficient analgesic therapy, while more than 90% of patients were treated outside the recommended therapeutic guidelines (75).

In our sample by examining the pain frequency distribution of subjects, according to the visual analogue scale mild pain (VAS<3) was experienced by 10.3% of subjects, mild to medium pain (VAS 3-6) by 24.3% of subjects, and severe pain (VAS more than 6) by 6% of

subjects. No pain was reported in 59.5% of subjects, and no subjects indicated pain intensity VAS 10. A total of 24.6% of subjects reported pain as a reason for reduced food intake, which corresponds to the proportion of subjects who had inadequately controlled pain, VAS greater than 5. Comparatively to the above-mentioned study, we see a significant shift in the control of malignant pain in the study population.

Nutritional deficiency and the presence of pain are common in lung cancer patients, especially in the advanced-stage disease. Chabowski et al. conducted a study on a sample of 257 lung cancer patients to determine the association between pain perception, nutritional status and level of anxiety, depression. 23% of patients were malnourished, 33% at risk of malnutrition and 44% with a normal nutritional status. 65% of subjects had symptoms of depression and 65% of anxiety. A significant negative correlation was present between nutritional status and pain as well as between nutritional status, anxiety and depression (76).

The prevalence of nutritional status disorders, the intensity of somatic symptoms and psychological stress are common in lung cancer patients. The indication for early intervention measures (psychological and pharmacological) is extremely important in lung cancer patients who have an increased risk of malnutrition, significant levels of depression, anxiety and pain (76). Turcott et al. documented a link between well-controlled pain with opioids and improvements in nutritional status. Besides, with well-controlled pain, cancer patients had increased food intake, a better quality of life, emotional and social functioning, better pain control and sleep. With adequate opioid use, anorexia is less common in lung cancer patients compared to patients in the control group without opioid use (72).

The nutritional status disorder leads to malnutrition, which is common in oncology patients and the leading cause of a decrease in quality of life and survival. We assumed at the beginning of the study that the leading causes of food intake reduction would be the most frequent side effects of chemotherapy treatments such as nausea and vomiting, but after analyzing the data we noticed that pain was a more common cause of food intake reduction. Based on the data obtained from our sample compared to the other studies in the discussion, we can conclude that assessment and well-controlled pain is necessary for maintaining adequate nutritional status in lung cancer patients.

Conclusion

Initial assessment and monitoring of nutritional status must be a mandatory and inseparable part of the care of lung cancer patients. The component of nursing documentation (41) contains all parameters relevant for assessing and monitoring the nutritional status of lung cancer patients. By systematically monitoring the nutritional status of patients, we can monitor and analyze the frequency and reasons for the occurrence of individual symptoms, enabling their timely detection and adequate timely intervention.

Based on the research and the results obtained, the following conclusions can be drawn: body mass index is associated with the risk of malnutrition but is not a sufficient indicator for assessing the nutritional status of cancer patients and the elderly. Although we expected an association between the stage of chemotherapy and reduced food intake, no association between the number of oncology cycles and the occurrence of reduced food intake was demonstrated. There is a poor correlation between nutritional status and treatment lines, which can be explained by the sample size and individual characteristics of the subjects. Initial weight loss greater than 10 kilograms in both age categories, and in particularly the category 70+, was associated with a reduced response to nutritional support, and during differentiated treatment weight loss continued. By continuous monitoring of pain intensity good control of malignant pain in the study population was achieved, which is an important data in the assessment of nutritional status since poorly controlled pain in 24% of subjects is the reason for reduced food intake.

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INICIJALNA PROCJENA I PRAĆENJE NUTRITIVNOG STATUSA I MALIGNE BOLI U BOLESNIKA S RAKOM PLUĆA

Sažetak

Uvod. Rak pluća jest kompleksna bolest i zahtijeva multidisciplinarni pristup kako bi se postigli što bolji rezultati u liječenju i povećala stopa preživljavanja uz istodobno očuvanje kvalitete života oboljelog. Nutritivni status bolesnika pokazao se važnim čimbenikom koji utječe na ishod i oporavak od bolesti ili ozljede. Postavljamo pitanje postoji li poveznica između nutritivnog statusa i maligne boli u bolesnika s rakom pluća.

Cilj. Provedeno je prospektivno istraživanje kako bi se utvrdila raspodjela ispitanika prema učestalosti bolova prema validiranoj vizualnoj analognoj skali (VAS), raspodjela ispitanika koji su prijavili smanjeni unos hrane i raspodjela čimbenika koji su doveli do smanjenog unosa hrane.

Metode. Istraživanje je provedeno na Zavodu za tumore pluća i sredoprsja Klinike za plućne bolesti Jordanovac Kliničkoga bolničkog centra Zagreb, na uzorku bolesnika s uznapredovalim rakom pluća nemalih stanica (N = 76). u periodu od studenoga 2013. do lipnja 2014. Za procjenu boli primijenjen je validirani VAS. Za identifikaciju pacijenata s rizikom od pothranjenosti primijenjen je alat za provjeru prehrambenih rizika (NRS 2002). Za grubu procjenu količine masnog tkiva koristili smo se kaliperom. Praćenje bolesnika dokumentirano je u obliku sestrinske dokumentacije. Sastavnica sestrinske dokumentacije osmišljena je za praćenje prehrambenog stanja oboljelih od karcinoma i implementirana je na Odjelu za respiratorne bolesti Jordanovac kao potrebna dokumentacija. Sastavnica je obuhvatila prikupljanje sljedećih podataka: stadij bolesti i tip karcinoma, tip i stadij liječenja, demografske karakteristike ispitanika, debljina kožnog nabora, standardizirani upitnik o pothranjenosti Nutritional NRS 20021, vitalni znakovi, tjelesna težina, tjelesna visina, indeks tjelesne mase, subjektivna procjena pacijenta; bol, umor i mučnina, razlozi smanjene prehrane.

Rezultati. Tijekom provedenog istraživanja izvedeno je 417 mjerenja: 1) 32,1 % ispitanika prijavilo je smanjeni unos hrane, a 67,9 % istaknulo kako nisu smanjivali redovitu prehranu; 2) najučestaliji uzroci smanjenog unosa hrane u ispitanika su bili nedostatak apetita (37,7 %), prisutnost umora/slabosti (31,2 %) i prisutnosti boli (24,6 %); 3) 59,5 % ispitanika prijavilo je nepostojanje boli, dok nijedan ispitanik nije prijavio postojanje najvećeg stupnja boli.

Zaključak. Redovitim praćenjem intenziteta boli ostvarena je dobra kontrola maligne boli kod ispitivane populacije, što je važan podatak kod procjene nutritivnog statusa. Činjenica je da je loše kontrolirana bol u 24 % ispitanika razlog smanjenog unosa hrane.

Ključne riječi: rak pluća, nutritivni status, bol, sastavnica sestrinske liste

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Attitudes and Knowledge of Students on Sexuality in Three Secondary Schools

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Keywords: adolescents, contraception, education, sexually transmitted diseases, sexuality

Abstract

Introduction. Sexuality of children and adolescents in Croatia is still considered a taboo, and sexually transmitted diseases are a significant global public health problem that is constantly growing. As a frequent consequence of irresponsible sexual behaviour and early sexual intercourse, we are faced with the problem of juvenile, most often unwanted, pregnancy. Contraceptives are used to prevent sexually transmitted diseases and unwanted pregnancies, and the most vulnerable group are the adolescents. The primary task is to educate the youth prior to them entering active sexual life.

Aim. To collect and analyse data on sexual habits, attitudes and knowledge of adolescents. To assess the need for additional education and preventive programmes.

Methods. 130 high school students, aged 17-19, participated in the survey. For testing purposes, a questionnaire was used. The questionnaire was conducted voluntarily and was completely anonymous, and a written consent was obtained from parents of juvenile participants.

Results. The adolescent subjects in this study showed insufficient knowledge of sexuality, namely the menstrual cycle, contraceptives and emergency contraception, and sexually transmitted diseases. They showed knowledge of things they could get acquainted with on a daily basis through the media and other information outlets.

Conclusion. According to the results obtained by the research, we can conclude that higher quality education of the youth is necessary, with the aim of expanding their knowledge of sexuality in order to prevent sexually transmitted diseases and the occurrence of unwanted juvenile pregnancies.

Introduction

The concept of reproductive health is defined as a state of complete physical, mental and social well-being, and refers to the reproductive system at all stages of life (1). Quality reproductive health implies informing men and women about a satisfactory and safe sexual life and the ability of realizing offspring. Sexual and reproductive health affects the general well-being of society and the quality of life, and therefore they have an important public health significance, thus covering much wider subjects. Topics such as sexual, ethical and social problems are attracting increasing interest at the global level, and consequently such topics are increasingly and more frequently researched (2).

Poor reproductive health is most often associated with ignorance, i.e. poor quality education received from parents or through the educational system, and manifests itself through sexually transmitted diseases, unwanted pregnancies, sexual exploitation in the form of violence and abuse, and sometimes death. The aim of reproductive health protection is the birth of a healthy offspring, while the enrichment of life and personal relations, which are very important for reproductive health, is the aim of sexual health protection (3).

Adolescence is a phase of maturation through which young people prepare themselves for adulthood, and it encompasses the period between 13 and 19 years of age. During adolescence, emotional, psychosocial, physical and cognitive changes occur, as well as changes in the pattern of behaviour and determination of one's own lifestyle. The results of numerous studies confirm the correlation between risky behaviour of the youth, such as alcohol and drug consumption, smoking and promiscuous behaviour, with consequences for their psychophysical, reproductive and sexual health (4,5). Nowadays, adolescents are increasingly using unverified and unreliable sources of information, such as the Internet, which is why they often encounter incorrect information, which then leads to risky sexual behaviour. Entering early into sexual relations also leads to an increase in the number of sexual partners during life, which results in an increase in the risk of contracting sexually transmitted diseases. Sexually transmitted diseases are diseases transmitted from an infected person to a healthy person via direct sexual contact, but they can still be transmitted via infected objects or in utero – from a mother to a child during childbirth. In addition, certain sexual diseases can be transmitted both anally and orally (6).

It is estimated that more than 400 million adults contract sexually transmitted diseases every year, and 60% of sexually transmitted diseases and infections occur in people under 25 years of age (7). According to the results of research conducted thus far, the most common average age of sexual intercourse in Croatia is 16 years for male adolescents, and 17 years for female adolescents (8,9). According to the data of the Croatian Institute of Public Health, 29 cases of syphilis, 229 cases of chlamydia and 13 cases of gonorrhoea were recorded in 2016 in Croatia (10).

In addition to sexually transmitted diseases as a frequent consequence of irresponsible sexual behaviour and early entering into sexual relations, there is also the problem of juvenile, most often unwanted, pregnancy as a consequence of non-use of contraceptives. In 2015 and 2016, the same number of births was recorded among mothers aged 15 or under, 4 in each year (11). In 2015, 86 abortions by juvenile pregnant women were recorded, two of them under the age of 15 (11).

The primary method of prevention of transmission and infection with sexually transmitted diseases and protection against unwanted pregnancies is the use of contraceptives. Contraception is a term coined from two words: "*contra*" – meaning against, and "*ception*" – a short form of word conception (12,18). The most common causes of lower rate of use of contraceptives among the adolescents are the lack of contraception when they require it, lack of motivation to use contraception, which in most cases is associated with insufficient knowledge and poor quality education on the importance of their use, and unexpected sexual contact, indicating the lack of readiness for sexual relations and premature entry of adolescents into such relations (13,19).

Methods

The survey was conducted from 1 March to 1 June 2017 and included 130 students from 3rd and 4th grades of secondary schools. The participants were divided into three research groups from different parts and counties of Croatia. The survey was conducted at the Medical School in Split, Bjelovar Gymnasium, Bjelovar Commercial and Trade School, and Isidor Kršnjavi Secondary School in Našice.

For the purpose of this study, a standardised and validated "Questionnaire on Contraception and Sexual Health" was used, consisting of two parts (14). The first part of the questionnaire collected sociodemographic data of the respondents: age, place of residence (city or village), sex, grade and secondary school programme, grade average and satisfaction with the same, plans to continue their education at a university, the mother's and the father's education, and whether they have siblings. The second part investigated the participants' knowledge on menstrual cycles, contraception, emergency contraception, sexually transmitted diseases, and ways of obtaining information (15).

Overall, 76 (58.5%) students from the gymnasium, 12 (9.2%) students from the commercial school and 42 (32.3%) students from the medical school participated in the survey. A total number of female subjects was 89 (68.5%), while 41 subjects were male (31.5%).

Microsoft Excel 2010 was used to analyse the data.

Ethics

The study was conducted according to the principles of the Declaration of Helsinki and recommendations for good clinical practice, with the approval of the Ethics Committee of the schools in which the study was conducted.

Results

Table 1. **In which part of the menstrual cycle do girls have the highest risk of pregnancy?**

Answers offered	Number of responses	Percentage
During the menstrual cycle	0	0
In the middle of the cycle	95	73.1
Just before the menstrual cycle starts	26	22.3
I do not know	6	4.6
Total	100	100

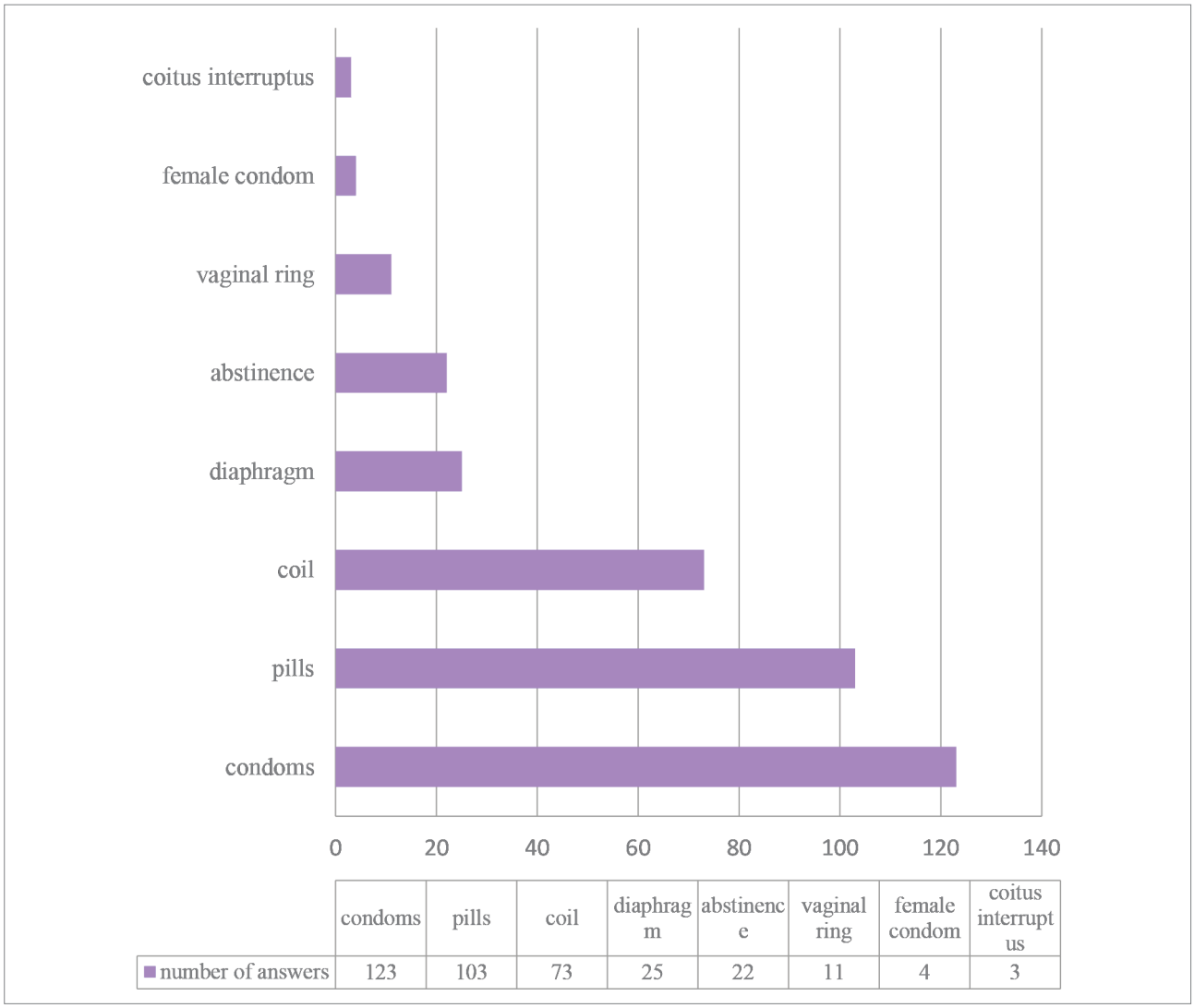
In Table 1, 95 (73.1%) respondents provided the correct answer, i.e. that girls have the highest risk of pregnancy in the middle of their menstrual cycle.

When asked: "Can a girl become pregnant during her first sexual intercourse?", no respondents claimed they did not know the answer to the question, and 123 (94.6%) respondents provided the correct answer, while 7 (5.4%) respondents answered that a girl cannot become pregnant during her first sexual intercourse. Out of 130 respondents, 92 (70.8%) provided the correct answer when asked: "Can individuals younger than 16 legally obtain contraceptives?"

In the third question regarding contraception, respondents were asked about contraception methods they are familiar with, and Graph 1 provides the distribution of their answers.

Graph 2 presents the distribution of answers to the question: "Which contraception methods are the most reliable for the youth?" The subjects had the option of selecting three answers, and the most frequent responses were condoms and birth control pills.

When asked about emergency contraception, the respondents were asked to select which of the proposed emergency contraceptives they had heard about, and 117 (90%) of the respondents knew about the hormonal pill taken after sexual intercourse, also known as the "morning after pill".



	condoms	pills	coil	diaphragm	abstinence	vaginal ring	female condom	coitus interruptus
number of answers	123	103	73	25	22	11	4	3

Graph 1. **What contraception methods are you familiar with?**

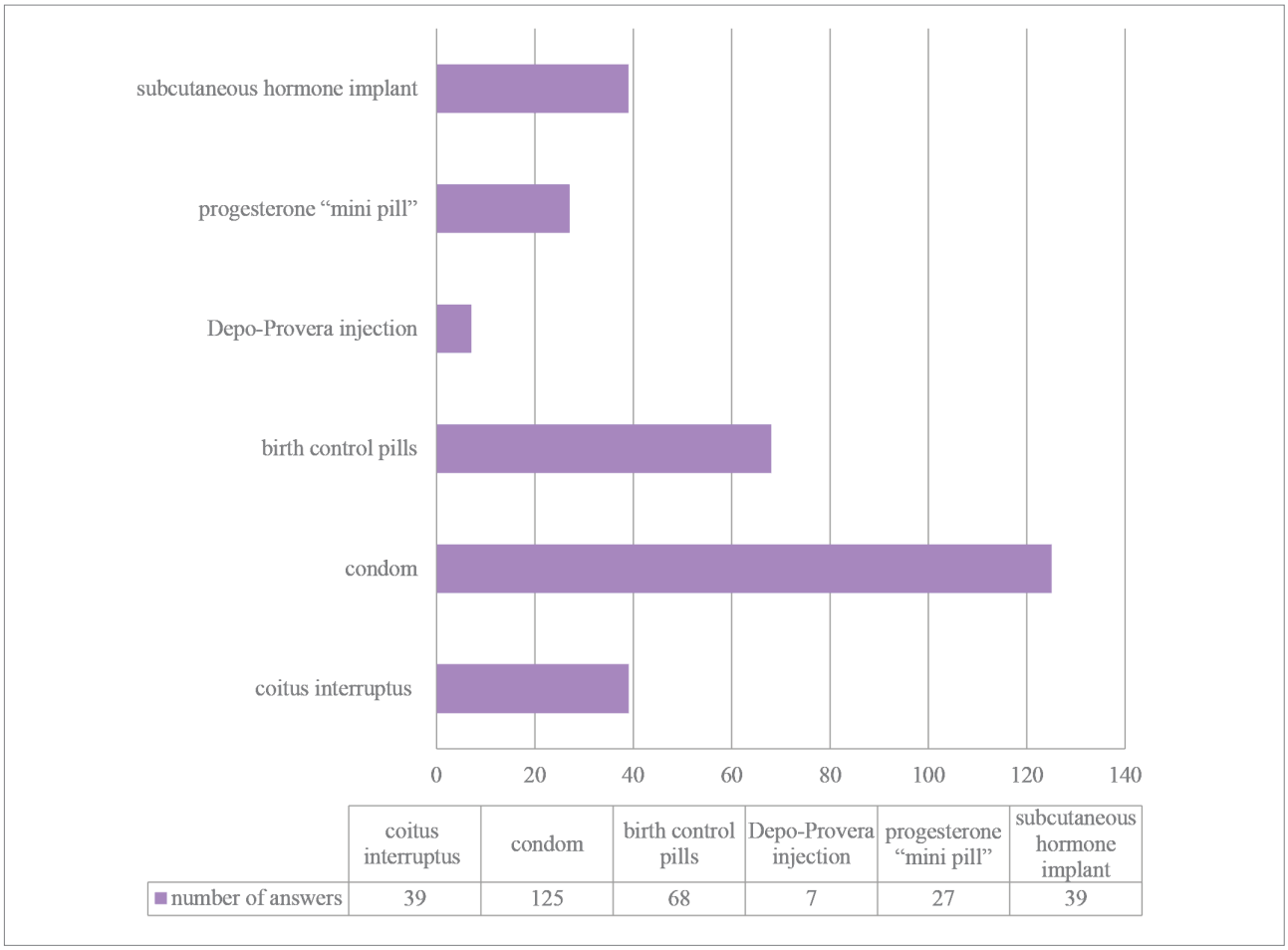
Table 2. **If you had unprotected sexual intercourse, in which time window should you take a contraceptive pill?**

Answers offered	Number of responses	Percentage
Up to 12 hours after	31	23.8
Up to 24 hours after	35	26.9
Up to 48 hours after	7	5.4
Up to 72 hours after	30	23.1
Up to 1 week after	0	0
I do not know	27	20.8
Total	130	100

Table 2 shows that 30 (23.1%) respondents answered correctly – up to 72 hours.

The majority of respondents, 97 (74.6%), chose a pharmacy as the place where an emergency contraceptive can be obtained, although emergency contraception can be obtained even from a general practitioner, at a medical clinic, and at a family planning clinic.

In Table 3, the majority of respondents, i.e. 80 (61.5%), answered they did not know the correct answer, and only 7 (5.4%) respondents offered the correct answer – the period of up to 5 days.



Graph 2. **Which contraception methods are the most reliable for the youth**

Table 3. **If you had unprotected sexual intercourse, in which time window should a physician insert a coil?**

Answers offered	Number of responses	Percentage
Up to 24 hours after	32	24.6
Up to 72 hours after	11	8.5
Up to 5 days after	7	5.4
Up to 7 days after	0	0
I do not know	80	61.5
Total	130	100

HIV, syphilis, chlamydia and hepatitis B and C are the most frequently chosen answers regarding sexually transmitted infectious diseases, while trichomoniasis is the least frequently recognised sexually transmitted infectious disease. Symptoms that are commonly recognised as caused by sexually transmitted infectious diseases are itching of the sexual organs and abnormal vaginal bleeding, while abdominal pain is the least recognized symptom caused by sexually transmitted infectious diseases. Respondents listed infertility as the most common long-term consequence of sexually transmitted infectious diseases, while spontaneous abortion was the least recognized long-term consequence of these diseases.

When asked: "Choose which of the following methods of contraception also protect against sexually transmitted diseases?", the majority of respondents, 103 (79.2%), provided the correct answer – a condom.

Discussion

Respondents showed a high level of knowledge of the menstrual cycle and most of them offered correct answers to the questions about the menstrual cycle. A particularly large percentage of correct answers was provided for the first question: "In which part of the menstrual cycle do girls have the highest risk of pregnancy?" 73.1% of respondents provided the correct answer, which is 10% more than in the identical 2011 survey, which also investigated students' knowledge on sexual health (3). In addition, in the same study, the percentage of correct answers to the question "Can a girl become pregnant during menstrual bleeding?" was 53.4%, and in this study 66.2% of respondents answered the same question correctly. Taking into account the two questions about menstrual periods and answers in both studies, we can conclude that the knowledge about the menstrual cycle among the adolescents is on a positive increase, but is still low because one third of the adolescents, i.e. 33.8%, lack satisfactory basic knowledge.

Although the percentage of correct answers to the third question "Can a girl become pregnant during her first sexual intercourse?" is significantly high, i.e. the respondents showed excellent knowledge on this issue, the adolescents do not really apply that knowledge in practice because, according to the study "Live Healthy Youth", more than half of the adolescents, i.e. 57.4%, confirmed that they did not use any contraceptives during their first sexual intercourse (16).

Since contraceptives have the purpose of preventing sexually transmitted diseases, most often among adolescents, it was expected that the respondents would have good knowledge of this topic, and they have shown this to be true since they most often listed condoms and birth control pills as methods of contraception they are familiar with. Taking into account the study conducted among students entitled "Live Healthy Youth" in which 69.2% of the youth stated that they use condoms as a mean of contraception, we can conclude that a condom is certainly the most popular and most commonly used contraceptive since almost everyone knows about it, and more than two thirds of adolescents use it. In addition, the most frequently chosen answer to the question of the most reliable methods of contraception was a condom, which again confirms that condoms are the most known and popular type of contraception among the youth, and the same results were obtained by a study conducted among adolescents in Germany (17).

The participants in this study showed poor knowledge of emergency contraception methods. Although 90% of the youth had heard about the hormonal pill after sexual intercourse, popularly known as "the morning after pill", only 23.1% of respondents knew that the emergency contraceptive pill should be taken up to 72 hours after sexual intercourse, which would mean that 76.9% of respondents did not know the correct answer to this question.

When asked which sexually transmitted diseases the participants had heard of, of nine listed sexually transmitted infectious diseases mentioned in this study the respondents most often selected syphilis, chlamydia and HIV/AIDS. Syphilis and HIV/AIDS are among the world's most well-known sexually transmitted infectious diseases, so it is not surprising that most of the respondents selected them. According to the Croatian Institute of Public Health, only 29 cases of syphilis and 77 new HIV/AIDS cases were recorded in Croatia in 2016 (10). Because of their global presence, these two diseases will always find their place at the top of every scale associated with sexually transmitted infectious diseases. Chlamydia is more frequent in Croatia than either syphilis or HIV/AIDS. Although in constant decline, the number of recorded cases of chlamydia in Croatia during 2016 was 229 (10). A very high incidence of that disease shows that chlamydia is one of the most well-known sexually transmitted diseases among the respondents. In the last question of the questionnaire, 79.2% of respondents provided a correct answer in saying that a condom is a method of contraception that also protects against sexually transmitted diseases.

Conclusion

On the basis of this study we can conclude that the adolescents do not show satisfactory knowledge in the field of basic information on reproductive health. It is precisely on this basis that we can assume that the methods and/or quality of education are inadequate and that they should be analysed in detail, as well as that systematic education of the youth should be carried out accordingly. Regardless of the constant emphasis on issues related to sexuality and reproductive health, the knowledge of the

youth and the quality of reproductive health are not improving, and as a result it is difficult to prevent or reduce the incidence of sexually transmitted infectious diseases and reduce the number of unwanted pregnancies in adolescence. One of the main causes of bad reproductive health is ignorance, which begins with education at home, and continues through the educational system. In addition, we have observed that a large number of adolescents most often give in under pressure from peers and/or the environment, ignoring in such moments their own conscience as well as knowledge, which is of great importance to them in such moments.

The adolescents who participated in this study showed insufficient knowledge on sexuality, namely menstrual cycles, contraception and emergency contraception, and sexually transmitted diseases. Their knowledge was sufficient regarding general matters, which they mostly encounter from childhood through the media and other information outlets, but when the questions probed deeper into the topics of the study, the respondents' knowledge was shown to be proportionally lower. Furthermore, the consequence of such ignorance is superficial education on sexually transmitted infectious diseases and contraceptive methods, which later leads to irresponsible sexual behaviour, and consequently to the spread and increase of the number of infected with sexually transmitted infectious diseases and the incidence of unwanted juvenile pregnancies.

Timely and quality education of the youth through adjusted health education programmes and methods is the cornerstone for the development of knowledge and correct attitudes that will contribute primarily to the preservation of reproductive health and then to its improvement as well.

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STAVOVI I ZNANJA UČENIKA O SPOLNOSTI U TRI SREDNJE ŠKOLE

Sažetak

Uvod. Spolnost djece i adolescenata u Hrvatskoj se još uvijek smatra tabu-temom, a upravo su spolno prenosive bolesti znatan globalni javnozdravstveni problem koji je u konstantnom porastu. Kao česta posljedica neodgovornoga spolnog ponašanja i prijevremenog stupanja u spolne odnose, javlja se i problem maloljetničke, najčešće neželjene trudnoće. Kontracepcijska sredstva služe za prevenciju spolno prenosivih bolesti i neželjenih trudnoća, a najugroženija skupina upravo su adolescenti. Primarna je zadaća edukacija mladih prije njihova ulaska u aktivni spolni život.

Cilj. Prikupljati i analizirati podatke o seksualnim navikama, stavovima i znanju adolescenata. Procijeniti potrebu za dodatnom edukacijom i preventivnim programima.

Metode. U istraživanju sudjelovalo je 130 učenika srednjih škola u dobi od 17 do 19 godina. U svrhu ispitivanja upotrijebljen je anketni upitnik. Anketa se ispunjavala dobrovoljno te je bila u potpunosti anonimna, a za maloljetne ispitanike dobiven je pismeni pristanak roditelja.

Rezultati. Adolescenti koji su bili ispitanici u ovome istraživanju pokazali su nedovoljno znanje o spolnosti, točnije o menstrualnom ciklusu, kontracepciji i hitnoj kontracepciji te o spolno prenosivim bolestima. Znanje su pokazivali o općim stvarima, koje uglavnom svakodnevno susreću kroz medijske i ostale sadržaje.

Zaključak. Prema dobivenim rezultatima istraživanja možemo zaključiti da je potrebna kvalitetnija edukacija mladih u cilju proširenja znanja o spolnosti u svrhu prevencije spolno prenosivih bolesti i pojave neželjenih maloljetničkih trudnoća.

Ključne riječi: adolescenti, kontracepcija, obrazovanje, spolno prenosive bolesti, seksualnost

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Hygienic Habits and Living Conditions of Romani Population in the Sisak-Moslavina County

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Abstract

Aim. To establish the degree of consciousness of the importance of hygiene among the Romani population in the Sisak-Moslavina County and to examine whether there are differences in children's health care of non-Romani population considering the number of hospitalized Romani children in general and especially regarding respiratory diseases.

Methods. The study was conducted on 100 parents of hospitalized children, 50 of them being members of the Romani population and 50 being members of non-Romani population. It was done by means of a questionnaire specially designed for this study. The categorical data is represented by the absolute and relative frequencies, while the numerical data is described with the median and the limits of the interquartile span. Categorical variable differences were tested using Fisher's exact test. The normality of numerical variable distribution was tested using the Shapiro-Wilk test. The differences in numerical variables between two independent groups were tested using the Mann-Whitney U test.

Results. The results show that due to respiratory diseases a significantly large number of Romani children (43%) were hospitalized once in six months. Fewer children of Romani research subjects who have indoor plumbing were hospitalized. Romani families tend to visit a doctor when a child is injured or for a regular check-up rather than to seek a doctor's advice. In non-Romani families, children tend to shower every day, have their own towel and better personal hygiene habits than children of Romani families. The

results clearly show hygiene habits differ greatly between Romani and non-Romani families. Neglecting their children's personal hygiene habits in Romani families points to a problem of insufficient education of the parents.

Conclusion. The obtained results point to the importance of constant encouragement and education of Romani family members, as well as the members of non-Romani families, in order for them to realize the significance of hygiene and personal hygiene habits.

Introduction

The Roma are traditionally a nomadic people typical for their customs, non-unified religious affiliation, and a tumultuous history, as well as significant differences in social, educational and hygiene habits, especially in Croatia (1). Today, in the territory of the Republic of Croatia there are scattered Romani settlements. Still, the greatest concentration is found in the territories of several counties, namely the City of Zagreb, Koprivnica-Križevci County, Sisak-Moslavina County, Međimurje County and Osijek-Baranja County. According to the latest census, 9,463 declared members of that national minority currently reside in Croatia, but it is estimated that there are in total between 30 and 40 thousand Roma.

The lack of precise data on the number of members of the Romani national minority and the unavailability of information only increase the opportunities for the Roma to be denied their rights and thus further marginalized. Poverty, low level of education, and poor motivation for education are the primary aspects of Romani's endangerment. Lapat and Šlezak (2010) point out that the Roma are the ethic group least integrated in contemporary Croatian society, for which they provide two reasons. The first relates to severe prejudice and stereotypical attitudes of the local population. The other relates to the fact that the Roma are people who are not prone to easily changing their lifestyle due to tradition, which plays a very important role in their lives (2).

The Republic of Croatia ensures equal rights to members of all national minorities in accordance with the highest international standards and in line with international conventions and other documents on human rights and the rights of national minorities which are built into the Constitution of the Republic of Croatia, Constitutional law on the rights of national minorities and other legal acts regulating the right and protection of national minorities (3). National Programme for the Roma provides good conditions and opportunities for medical education directed at the Romani population. Apart from that, other areas of concern and work are eliminating poverty or solving the problem of poverty, encouraging education, preventing behavioural disorders, applying employment measures and generally improving the quality of life of the Roma. Alongside with respecting, improving and implementing basic human rights and the rights of national minorities, one of the highest priorities is providing care to the Romani population in Croatia, primarily healthcare. Hygiene habits play a crucial role in the health of every individual. Considering the attitudes and the opinion of the Romani population on hygiene, some conclusions can be reached on the connections between hygiene habits and the health of the members of Romani families. Sadly, there are no studies on this topic in the relevant literature, which poses a significant problem in reaching general conclusions on the hygiene habits of the Roma both in Croatia and the world.

In Croatia, there are several Romani tribal groups, and in some areas they have been living for over 150 years: Lovari, Kalderash, Hajari, Sinti, Shiacs, Bayash or Koritari and Horahai, Kanjari, Arliye, Ludari. Some of them are Catholics, some Muslims and some Orthodox. Koritari speak the Roma dialect ljimba d' bjash, while Kalderash and Lovari speak Romani chib. The most populous Romani communities abide in Međimurje (30% of the total Romani population), the city of Zagreb and the Osijek-Baranja County. Many live in and around the following urban centres: Rijeka, Pula, Bjelovar, Novska, Kutina, Sisak, Karlovac, Perušić, Đurđevac, Pitomača, Slavonski Brod, Beli Manastir, Darda, and Vukovar (4).

The care of the Roma in Croatia is under the jurisdiction of the Constitutional Law on National Minorities, with a special place devoted to the Framework Convention for the Protection of National Minorities and the European Charter on Regional and Minority Languages. Despite all of that, it should be emphasized that the political and social situations are not the most favourable for the Romani population. The most frequent ob-

stacles are religious, ethnic and linguistic. In order to solve these problems, laws have been adopted for the purpose of ensuring a better integration of Roma into society. According to some statistical data, the highest concentration of Roma in Croatia is on the urban territories of Varaždin, Čakovec and Zageb, with a large part comprising the population of the Sisak-Moslavina County, especially its urban centre - Sisak. According to the abovementioned census, it can be stated that there is a statistical decrease in the number of members of all national minorities apart from Roma (5).

For the members of the Romani community to become as well integrated into society as possible, Croatia seeks to implement assimilation measures, with the importance of education being at the forefront. One such measure is the Equal Opportunities project – better integration of Romani children into the educational system of the Republic of Croatia. Taking into consideration the lower percentage of inclusion of Romani children into the school system, as well as a higher drop-out percentage, this project attempts to raise the awareness of the Romani community of the importance of education, but also raise the awareness of the education system itself, i.e. its (un)readiness to create and maintain a supportive environment in which cultural differences are appreciated, not just tolerated. At the same time, Romani children are encouraged to actively participate in the process. This is one objective where education is considered the most important factor on the path of the Roma's inclusion into society, according to Bakić-Tomić and Lapat (6). It should be noted that in Romani communities children are brought up collectively, which plays an immense role in an individual's upbringing. Bearing in mind the fact that in such instances children do not live under the supervision of immediate family members, it is only logical that they develop a different sense of belonging, physical and mental safety, as well as a different approach to moral values. As regards the insufficient inclusion of Romani children in education, particularly high-school education, it is not at all rare, albeit it is almost a rule that young Roma enter the world of adults and start their own families at a very early age. The lack of experience of adolescence is then reflected on parenthood, with Romani youth unready to raise their children. Apart from evident problems, such as immaturity, parenting is affected by other factors, such as the availability of basic services, undeveloped infrastructure, as well as various support structures. Poverty and unemployment further debilitate the growth and development of each individual, which is also the case in the Romani community, in which these problems are emphasized and crucial. Still, it should be pointed out that in spite of all that Romani communities almost as a rule consist of numerous families with a large number of children, unfailingly accompanied by a low level of education, family feuds, and inadequate healthcare (7). The medical condition of the Roma is significantly poorer than the average medical condition of the Croatian population as a whole. In most instances, they do not have health insurance and have no medical protection. The term medical condition implies vaccination, infant mortality, most common diseases, the number of labours in young Romani women, mostly aged 10 to 16, the frequency and length of breast feeding, chronic diseases, accidents, risky behaviours, nutrition and hygiene habits (8). As regards the latter, a study was conducted for the purpose of better understanding the situation within the Romani community on the specific example of the Sisak-Moslavina County. Within the framework of the programme "Colourful inclusion of Sisak" under the patronage of the Town of Sisak and UNICEF, nurses from the Health Centre Sisak and Dr. Ivo Pedišić General Hospital in Sisak organize annual educational workshops for the Romani population. Education takes place in the facilities of the school in Hrastelnica and the community centre in Capraške poljane. Furthermore, Health Centre nurses also regularly visit Romani settlements Capraške poljane and Palanjak, where they measure blood pressure and the level of blood sugar, calculate the body mass index and implement individual and group training on the importance of hygiene, healthy nutrition and healthy living.

Aim

The research aims of this paper are as follows:

To examine the frequency of hospitalization as regards hygiene habits of Romani families in relation to the frequency of hospitalization of non-Romani families.

To examine the differences in living conditions between the Romani and non-Romani populations.

To examine the attitudes of the Romani population towards hygiene habits.

To examine hygiene habits of the Romani in relation to non-Romani families.

To examine sources of information on the influence of hygiene habits on respiratory diseases.

The purpose of the study is to examine whether there are differences in hygiene habits between the Romani and non-Romani populations.

Methods

Participants

The study was conducted on a total of 100 participants, with 50 of them being members of the Romani families and 50 being members of non-Romani families hospitalized at the Paediatrics Ward of Dr Ivo Pedišić General Hospital in Sisak, Croatia, in 2018. The study was done by means of a specially designed questionnaire containing 36 questions. Prior to conducting the study, consent was obtained from the Ethical Committee of Dr Ivo Pedišić General Hospital, as well as the parents' written consent. The first part of the questionnaire encompasses the subjects' general information: data regarding age, gender, number of members of the household and the parents' level of education. The second part of the questionnaire examines the living conditions and hygienic conditions in the household. The third part of the questionnaire examines how often the parents take their children to the doctor's and in which circumstances. The fourth part of the questionnaire examines how often and for what diseases children have been hospitalized. The fifth part of the questionnaire examines the children's hygiene habits. The sixth part of the questionnaire examines the parents' education on the influence of hygiene habits on children's respiratory diseases.

Statistics

Categorical data is represented by the absolute and relative frequency. Categorical variable differences were tested by Fisher's exact test. The normality of numerical variable distribution was tested by the Shapiro-Wilk test, and due to discrepancies from the normal distribution numerical data is described with the median and the limits of the interquartile span, and non-parametric methods were used for testing differences. The differences of numerical variables between two independent groups were tested by the Mann-Whitney U test. All "*p*" values are two-sided. The significance level was set to alpha = 0.05. Statistical analysis was performed using MedCalc Statistical Software version 18.2.1 (MedCalc Software bvba, Ostend, Belgium; http://www.medcalc.org; 2018) and IBM SPSS Statistics 23 (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

Results

The study was conducted on 100 subjects, of whom 50 (50 %) were from Romani families and 50 (50 %) from non-Romani families. There are somewhat more women, 87 (87 %). In Romani families 30 (30 %) subjects did not complete primary school, with 9/30 having finished only the first four grades of primary school and 5/30 subjects having finished higher grades of primary school. To a statistically significant extent, more subjects from Romani families finished only primary school while subjects from non-Romani families graduated from high-schools, polytechnics or universities (Fischer's exact test, $p<0.001$) (Table1).

The subjects from Romani families are significantly younger, the median age being 25 (interquartile span from 21 to 30) in the span from 15 to 52 (Mann Whitney U test, $p<0.001$). According to the number of household members in a single household, there are significantly more members in Romani families (Mann Whitney U test, $p<0.001$), median 7 (interquartile span from 5 to 8 members) in the span from 2 to 12 members (Table 2).

Table 1. **Subjects' basic characteristics**				
	Number (%) of subjects			*p**
	Romani	non-Romani	total	
	Gender			
Male	5 (10)	8 (16)	13 (13)	0.37
Female	45 (90)	42 (84)	87 (87)	
Completed grade of primary school				
1st grade	3/30	0	3 (10)	-
2nd grade	2/30	0	2 (7)	
3rd grade	1/30	1/1	2 (7)	
4th grade	9/30	0	9 (29)	
5th grade	5/30	0	5 (16)	
6th grade	5/30	0	5 (16)	
7th grade	5/30	0	5 (16)	
Total	30 / 30	1 / 1	31 (100)	
Level of education				
Primary school	18 (90)	3 (6)	21 (30)	**<0.001**
High school	2 (10)	33 (67)	35 (51)	
Polytechnics	0	9 (18)	9 (13)	
University	0	4 (8)	4 (6)	
Total	20 (100)	49 (100)	69 (100)	
*Fischer's exact test				

Importance of hygiene

Opinions and attitudes on hygiene are assessed via four domains: living conditions, care for health, hygiene habits, and being informed on the influence of hygiene habits on children's respiratory diseases.

Frequency of children's hospitalizations

38 (38 %) children were hospitalized once in 6 months due to respiratory problems, and 26 (26 %) children several times in 6 months, with significantly more cases (21, i.e. 43 %) occurring among Romani families (Fischer's exact test, $p<0.001$). Due to other conditions, children were hospitalized once in 6 months in 46 (46 %) cases an only in 5 (5 %) instances several times in 6 months, with significantly more cases occurring among non-Romani families (Fischer's exact test, $p=0.002$).

Living conditions

96 (96 %) of the subjects live in brick houses, with 99 (99 %) having electricity. 92 (92 %) use a furnace for heating. Children have their own room in 70 (70 %) cases and 95 (95%) subjects regularly clean and

Table 2. **Subjects' age and number of household members**				
	Median (interquartile span)			*p**
	Romani	non-Romani	total	
Subjects' age	25 (21 - 30)	33 (28 - 40)	29 (23 - 35)	**<0.001**
Number of household members	7 (5 - 8)	4 (3 - 5)	5 (4 - 7)	**<0.001**
*Mann Whitney U test				

Table 3. **Frequency of hospitalization due to respiratory problems in relation to groups**

	Number (%) of subjects			*p**
	Romani	non-Romani	Total	
Child was hospitalized due to respiratory problems				
Never	7 (14)	28 (56)	35 (35)	**<0.001**
Once in 6 months	21 (43)	17 (34)	38 (38)	
Several times in 6 months	21 (43)	5 (10)	26 (26)	
Child was hospitalized due to other diseases				
Never	32 (65)	16 (32)	48 (48)	**0.002**
Once in 6 months	15 (31)	31 (62)	46 (46)	
Several times in 6 months	2 (4)	3 (6)	5 (5)	
Total	49 (100)	50 (100)	99 (100)	

*Fischer's exact test

Table 4. **Living conditions according to groups**

	Number (%) of subjects			*p**
	Romani	non-Romani	Total	
Live in a brick house	46 (92)	50 (100)	96 (96)	0.12
Have an indoor toilet	27 (54)	50 (100)	77 (77)	**<0.001**
Have electricity in the house	49 (98)	50 (100)	99 (99)	> 0.99
Have city plumbing in the house	29 (59)	47 (94)	76 (76)	**<0.001**
Furnace heating (wood, gas)	45 (98)	47 (94)	92 (92)	0.62
Children have their own room	32 (64)	38 (78)	70 (70)	0.19
The house is cleaned regularly (vacuuming, washing)	45 (92)	50 (100)	95 (95)	0.06
The house has a bathroom (shower, bathtub)	28 (56)	50 (100)	78 (78)	**<0.001**
The house is aired regularly	45 (90)	50 (100)	95 (95)	0.06
Children co-sleep with their parents	19 (39)	12 (24)	31 (31)	0.13

*Fischer's exact test

air their home. In 31 (31 %) cases children co-sleep with their parents, without a statistically relevant difference in terms of Romani and non-Romani families. Subjects from Romani families statistically significantly lack a toilet, city plumbing and a bathroom in the house (Fischer's exact test, $p<0.001$) (Table 4).

In the group of Romani families there are no statistically significant differences in living conditions in relation to the number of household members, while among non-Romani families there are significantly fewer of those who live in communal households with 5 to 7 household members who have indoor plumbing. Fischer's exact test, $p=0.04$) (Table 5). These questions are dichotomous, so the first number relates to those in which the condition is met, i.e. who answered the question in the affirmative.

In Romani families, significantly fewer children are hospitalized, once in 6 months in subjects who have indoor plumbing (Fischer's exact test, $p=0.03$). Children who have their own room are significantly less frequently hospitalized due to respiratory diseases (never or once in 6 months) (Fischer's exact test, $p=0.04$) (Table 6).

Care for children's health

57 (58 %) subjects often take their children to the doctor's when the child is ill and 27 (27 %) subjects sometimes don't trust the doctor and only go to the doctor's when the child is very ill, with no significant difference in terms of Romani and non-Romani families. Children from Romani families are significantly

Table 5. **Living conditions according to the number of household members**

	Number of subjects according to number of household members			*p**
	Up to 4	5 - 7	8 and more	
ROMANI FAMILIES				
Live in a brick house	8/11	24/25	14/14	0.05
Have an indoor toilet	7/11	14/25	6/14	0.53
Have electricity in the house	11/11	24/25	14/14	>0.99
Have city plumbing in the house	8/11	16/25	5/13	0.19
Furnace heating (wood, gas)	9/10	24/24	12/12	0.22
Children have their own room	10/11	15/25	7/14	0.09
The house is cleaned regularly (vacuuming, washing)	8/10	24/25	13/14	0.28
The house has a bathroom (shower, bathtub)	3/11	11/25	6/14	0.35
The house is aired regularly	10/11	22/25	13/14	>0.99
Children co-sleep with their parents	4/11	9/25	6/13	0.86
NON- ROMANI FAMILIES				
Live in a brick house	33/33	15/15	2/2	-
Have an indoor toilet	33/33	15/15	2/2	-
Have electricity in the house	33/33	15/15	2/2	-
Have city plumbing in the house	33/33	12/15	2/2	**0.04**
Furnace heating (wood, gas)	31/33	14/15	2/2	>0.99
Children have their own room	24/33	12/14	2/2	0.68
The house is cleaned regularly (vacuuming, washing)	33/33	15/15	2/2	-
The house has a bathroom (shower, bathtub)	33/33	15/15	2/2	-
The house is aired regularly	33/33	15/15	2/2	-
Children co-sleep with their parents	9/33	3/15	0/2	0.84

*Fischer's exact test

more often taken to the hospital when they are injured or for a regular check-up, and significantly less frequently when all they need is medical advice (Fischer's exact test, $p<0.001$) in relation to children from non-Romani families (Table 7). There are no significant differences in care for children's health in relation to the number of household members (Table 11). In Romani families, a significant number of children who were often taken to the doctor's when they were injured (Fischer's exact test, $p<0.001$), for regular appointments (Fischer's exact test, $p=0.007$), or simply for a piece of advice from the doctor (Fischer's exact test, $p=0.001$) were not hospitalized due to respiratory problems when compared to children who were never taken to the doctor's or only occasionally (Table 8).

Hygiene habits

98 (98 %) subjects state that they remind the children daily to wash their hands before a meal, and 95 (95 %) that every child has his or her own toothbrush. Children change their underwear every day, as stated by 92 (92 %) subjects, with no significant difference in terms of whether the family is Romani or not. In non-Romani families children take a shower every day significantly more (Fischer's exact test, $p=0.002$), and it is stated that it is not enough to change a towel once a week significantly more (Fischer's exact test, $p<0.001$), as well as that children sleep in their pyjamas (Fischer's exact test, $p<0.001$).

In the group of non-Romani families, children brush their teeth in the morning and in the evening significantly more, while in Romani families 21 (43 %) sub-

Table 6. **Living conditions according to the frequency of hospitalization due to respiratory diseases**

	Number (%) of subjects according to the number of hospitalization instances			*p**
	Never	Once in 6 months	Several times in 6 months	
ROMANI FAMILIES				
Live in a brick house	5/7	21/21	19/21	0.05
Have an indoor toilet	4/7	11/21	11/21	>0.99
Have electricity in the house	7/7	21/21	20/21	>0.99
Have city plumbing in the house	7/7	9/21	12/21	**0.03**
Furnace heating (wood, gas)	7/7	19/21	18/21	>0.99
Children have their own room	7/7	10/21	14/21	**0.04**
The house is cleaned regularly (vacuuming, washing)	7/7	17/21	20/21	0.73
The house has a bathroom (shower, bathtub)	6/7	10/21	11/21	0.24
The house is aired regularly	7/7	18/21	19/21	0.84
Children co-sleep with their parents	2/7	8/21	9/21	0.85
NON- ROMANI FAMILIES				
Live in a brick house	28/28	17/17	5/5	-
Have an indoor toilet	28/28	17/17	5/5	-
Have electricity in the house	28/28	17/17	5/5	-
Have city plumbing in the house	25/28	17/17	5/5	**0.48**
Furnace heating (wood, gas)	26/28	16/17	5/5	>0.99
Children have their own room	20/27	14/17	4/5	0.88
The house is cleaned regularly (vacuuming, washing)	28/28	17/17	5/5	-
The house has a bathroom (shower, bathtub)	28/28	17/17	5/5	-
The house is aired regularly	28/28	17/17	5/5	-
Children co-sleep with their parents	8/28	3/17	1/5	0.79

*Fischer's exact test

jects state that they brush their teeth in the morning and in the evening, with 20 (41 %) answering that they do not know (Fischer's exact test, $p<0.001$). A toothbrush is not used for more than three months by significantly more subjects from non-Romani families, 43 (83 %) of them, while 16 (32 %) subjects from Romani families answered that they do not know how long the children use their toothbrushes (Fischer's exact test, $p<0.001$) (Table 10).

There are no significant differences in hygiene habits according to the number of household members (Table 10) and frequency of hospitalization due to respiratory problems (Table 11).

Information on the influence of hygiene habits on respiratory diseases

86 (86 %) subjects are informed on the influence of hygiene habits on respiratory diseases, significantly more from non-Romani families (Fischer's exact test, $p=0.04$), with significantly more (28, i.e. 56 %) stating that they had been informed by a doctor (Fischer's exact test, $p=0.005$). 59 (59 %) subjects had been informed by a nurse, 23 (23 %) by a friend and 54 (54 %) subjects by family, with no significant differences in terms of whether the family is Romani or not (Table 13).

Table 7. **Care for children's health in relation to groups**

	Number (%) of subjects			*p**
	Romani	**non-Romani**	**Total**	
Take the child to the doctor's when he or she is ill				
Never	2 (4)	1 (2)	3 (3)	0.55
Sometimes	17 (35)	22 (44)	39 (39)	
Often	30 (61)	27 (54)	57 (58)	
Take the child to the doctor's when he or she is injured				
Never	2 (4)	4 (8)	6 (6)	**<0.001**
Sometimes	39 (80)	22 (44)	61 (62)	
Often	8 (16)	24 (48)	32 (32)	
Take the child to the doctor's for a regular check-up				
Never	1 (2)	1 (2)	2 (2)	**<0.001**
Sometimes	25 (51)	3 (6)	28 (28)	
Often	23 (47)	46 (92)	69 (70)	
Go to the doctor's when they need medical advice				
Never	37 (76)	7 (14)	44 (44)	**<0.001**
Sometimes	8 (16)	28 (56)	36 (36)	
Often	4 (8)	15 (30)	19 (19)	
Do not trust the doctor and only go to the doctor's when the child is very ill				
Never	30 (61)	36 (72)	66 (67)	0.49
Sometimes	16 (33)	11 (22)	27 (27)	
Often	3 (6)	3 (6)	6 (6)	
Total	49 (100)	50 (100)	99 (100)	

*Fischer's exact test

Discussion

The results of the questionnaire show that due to respiratory problems 38 % of children were hospitalized once in 6 months, and 26 % children were hospitalized several times in six months, significantly more (43 %) from Romani families. Due to other diseases, 46 % of cases were hospitalized once in 6 months, and only 5 % cases were hospitalized several times in six months, significantly more among non-Romani families. As far as living conditions are concerned, the results clearly demonstrate that indoor toilets, indoor plumbing and bathrooms are significantly lacking for subjects from Romani families. In Romani families, significantly fewer children were hospitalized (once in 6 months) among subjects who have indoor city plumbing. Children who have their own room are significantly less frequently hospitalized due to respiratory disease (never or once in 6 months). Children from Romani families are significantly more often taken to the doctor's when they are injured or for a regular check-up, and significantly less frequently for medical advice.

In non-Romani families significantly more children take a shower every day, each has his or her own towel, the participants state significantly more that it is not enough to change a towel once a week, and children sleep in their pyjamas more often. To a significant extent, children brush their teeth in the morning and in the evening in the group of non-Romani families, while among Romani families 21 (43 %) subjects claim that the children brush their teeth in the morning and in the evening, while 20 (41 %) answered that they do not know. 86 % of subjects are

Table 8. **Care for children's health in relation to the number of household members**

	Number (%) of subjects according to the number of household members			*p**
	Up to 4	**5 - 7**	**8 and more**	
ROMANI FAMILIES				
Take the child to the doctor's when he or she is ill				
Never	1 (9)	1 (4)	0	
Sometimes	3 (27)	9 (38)	5 (36)	0.89
Often	7 (64)	14 (58)	9 (64)	
Take the child to the doctor's when he or she is injured				
Never	0	2 (8)	0	
Sometimes	8 (73)	19 (79)	12 (86)	0.66
Often	3 (27)	3 (13)	2 (14)	
Take the child to the doctor's for a regular check-up				
Never	0	1 (4)	0	
Sometimes	3 (27)	14 (58)	8 (57)	0.26
Often	8 (73)	9 (38)	6 (43)	
Go to the doctor's when they need medical advice				
Never	6 (55)	19 (79)	12 (86)	
Sometimes	2 (18)	4 (17)	2 (14)	0.17
Often	3 (27)	1 (4)	0	
Do not trust the doctor and only go to the doctor's when the child is very ill				
Never	7 (64)	15 (63)	8 (57)	
Sometimes	3 (27)	8 (33)	5 (36)	0.98
Often	1 (9)	1 (4)	1 (7)	
Total	11 (100)	24 (100)	14 (100)	
NON-ROMANI FAMILIES				
Take the child to the doctor's when he or she is ill				
Never	0	1 (7)	0	0.25
Sometimes	14 (42)	8 (53)	0	
Often	19 (58)	6 (40)	2 (100)	
Take the child to the doctor's when he or she is injured				
Never	3 (9)	1 (7)	0	
Sometimes	14 (42)	8 (53)	0	0.73
Often	16 (48)	6 (40)	2 (100)	
Take the child to the doctor's for a regular check-up				
Never	0	1 (7)	0	
Sometimes	3 (9)	0	0	0.32
Often	30 (91)	14 (93)	2 (100)	
Go to the doctor's when they need medical advice				
Never	5 (15)	2 (13)	0	
Sometimes	19 (58)	9 (60)	0	0.42
Often	9 (27)	4 (27)	2 (100)	
Do not trust the doctor and only go to the doctor's when the child is very ill				
Never	22 (67)	13 (87)	1 (50)	
Sometimes	9 (27)	2 (13)	0	0.16
Often	2 (6)	0	1 (50)	
Total	33 (100)	15 (100)	2 (100)	

*Fischer's exact test

Table 9. **Care for children's health in relation to the frequency of hospitalization due to respiratory problems**

	Number (%) of subjects in relation to the frequency of respiratory problems			*p**
	Never	**Once in 6 months**	**Several times in 6 months**	
ROMANI FAMILIES				
Take the child to the doctor's when he or she is ill				
Never	1 (14)	0	1 (5)	
Sometimes	0	10 (48)	7 (33)	0.08
Often	6 (86)	11 (52)	13 (62)	
Take the child to the doctor's when he or she is injured				
Never	1 (14)	1 (5)	0	
Sometimes	1 (14)	20 (95)	18 (86)	**<0.001**
Often	5 (71)	0	3 (14)	
Take the child to the doctor's for a regular check-up				
Never	1 (14)	0	0	
Sometimes	0	14 (67)	11 (52)	**0.007**
Often	6 (86)	7 (33)	10 (48)	
Go to the doctor's when they need medical advice				
Never	2 (29)	17 (81)	18 (86)	
Sometimes	3 (43)	4 (19)	1 (5)	**0.007**
Often	2 (29)	0	2 (10)	
Do not trust the doctor and only go to the doctor's when the child is very ill				
Never	3 (43)	15 (71)	12 (57)	
Sometimes	2 (29)	6 (29)	8 (38)	0.16
Often	2 (29)	0	1 (5)	
Total	7 (100)	21 (100)	21 (100)	
NON-ROMANI FAMILIES				
Take the child to the doctor's when he or she is ill				
Never	1 (4)	0	0	
Sometimes	16 (57)	4 (24)	2 (40)	0.10
Often	11 (39)	13 (76)	3 (60)	
Take the child to the doctor's when he or she is injured				
Never	4 (14)	0	0	
Sometimes	11 (39)	9 (53)	2 (40)	0.57
Often	13 (46)	8 (47)	3 (60)	
Take the child to the doctor's for a regular check-up				
Never	1 (4)	0	0	
Sometimes	2 (7)	1 (6)	0	> 0.99
Often	25 (89)	16 (94)	5 (100)	
Go to the doctor's when they need medical advice				
Never	4 (14)	2 (12)	1 (20)	
Sometimes	16 (57)	9 (53)	3 (60)	0.98
Often	8 (29)	6 (35)	1 (20)	
Do not trust the doctor and only go to the doctor's when the child is very ill				
Never	18 (64)	14 (82)	4 (80)	
Sometimes	8 (29)	2 (12)	1 (20)	0.75
Often	2 (7)	1 (6)	0	
Total	28 (100)	17 (100)	5 (100)	

*Fischer's exact test

Table 10. **Hygiene habits in relation to groups**

	Number (%) of subjects			*p**
	Romani	Non-Romani	Total	
Children are reminded daily to wash their hands before a meal	49 (98)	49 (98)	98 (98)	>0.99
Every child has his or her own toothbrush	45 (90)	50 (100)	95 (95)	0.06
Children take a shower every day	29 (58)	42 (84)	71 (71)	**0.008**
Every person in the house has his or her own towel	32 (64)	46 (92)	78 (78)	**0.002**
It is not enough to change a towel once a week	21 (42)	45 (90)	66 (66)	**<0.001**
Children are responsible for their own cleanliness	10 (20)	21 (42)	31 (31)	**0.04**
Children sleep in their pyjamas	32 (64)	47 (94)	79 (79)	**<0.001**
Children brush their teeth in the morning and in the evening	21 (43)	44 (88)	65 (65)	**<0.001**
A toothbrush is not used for more than three months	17 (34)	43 (86)	60 (60)	**<0.001**
Children change their underwear every day (underpants, undershirts)	44 (88)	48 (96)	92 (92)	0.06

*Fischer's exact test

Table 11. **Hygiene habits in relation to number of household members**

	Number/total subjects according to the number of household members			*p**
	Up to 4	5 - 7	8 and more	
ROMANI FAMILIES				
Children are reminded daily to wash their hands before a meal	11/11	24/25	14/14	> 0.99
Every child has his or her own toothbrush	10/11	21/25	14/14	0.64
Children take a shower every day	8/11	15/25	6/14	0.47
Every person in the house has his or her own towel	9/11	16/25	7/14	0.53
It is not enough to change a towel once a week	6/11	9/25	6/14	0.61
Children are responsible for their own cleanliness	5/11	7/25	1/14	0.24
Children sleep in their pyjamas	8/11	17/25	7/14	0.50
Children brush their teeth in the morning and in the evening				
Yes	7/11	11/24	3/14	
No	0	5/24	3/14	0.17
I do not know	4/11	8/24	8/14	
A toothbrush is not used for more than three months				
Yes	2/11	11/25	4/14	
No	6/11	9/25	2/14	0.09
I do not know	3/11	5/25	8/14	
Children change their underwear every day (underpants, undershirts)	11/11	21/25	12/14	0.79
NON-ROMANI FAMILIES				
Children are reminded daily to wash their hands before a meal	33/33	14/15	2/2	0.34
Every child has his or her own toothbrush	33/33	15/15	2/2	-
Children take a shower every day	27/33	13/15	2/2	> 0.99
Every person in the house has his or her own towel	31/33	14/15	1/2	0.23
It is not enough to change a towel once a week	30/33	14/15	1/2	0.26
Children are responsible for their own cleanliness	14/33	6/15	1/2	> 0.99
Children sleep in their pyjamas	31/33	14/15	2/2	> 0.99
Children brush their teeth in the morning and in the evening	28/33	14/15	2/2	0.73
A toothbrush is not used for more than three months	29/33	13/33	1/2	0.40
Children change their underwear every day (underpants, undershirts)	31/33	15/15	2/2	> 0.99

*Fischer's exact test

Table 12. **Hygiene habits in relation to the number of hospitalizations due to respiratory problems**

	Number/total subjects according to the number of hospitalizations due to respiratory diseases			*p**
	Never	Once in 6 months	Several times in 6 months	
ROMANI FAMILIES				
Children are reminded daily to wash their hands before a meal	7/7	21/21	20/21	> 0.99
Every child has his or her own toothbrush	7/7	21/21	16/21	0.16
Children take a shower every day	6/7	10/21	12/21	0.28
Every person in the house has his or her own towel	6/7	11/21	14/21	0.10
It is not enough to change a towel once a week	5/7	10/21	6/21	0.11
Children are responsible for their own cleanliness	3/7	2/21	4/21	0.16
Children sleep in their pyjamas	6/7	12/21	13/21	0.62
Children brush their teeth in the morning and in the evening				
Yes	5/7	9/21	6/20	0.43
No	1/7	3/21	4/20	
I do not know	1/7	9/21	10/20	
A toothbrush is not used for more than three months				
Yes	0	7/21	9/21	0.06
No	6/7	6/21	5/21	
I do not know	1/7	8/21	7/21	
Children change their underwear every day (underpants, undershirts)	7/7	17/21	19/21	0.73
NON-ROMANI FAMILIES				
Children are reminded daily to wash their hands before a meal	28/28	16/17	5/5	0.44
Every child has his or her own toothbrush	28/28	17/17	5/5	-
Children take a shower every day	21/28	16/17	5/5	0.17
Every person in the house has his or her own towel	24/25	17/17	5/5	0.40
It is not enough to change a towel once a week	26/28	16/17	3/5	0.11
Children are responsible for their own cleanliness	11/28	8/17	2/5	0.95
Children sleep in their pyjamas	25/28	17/17	5/5	0.48
Children brush their teeth in the morning and in the evening	23/28	16/17	5/5	0.44
A toothbrush is not used for more than three months	24/28	15/17	4/5	> 0.99
Children change their underwear every day (underpants, undershirts)	26/28	17/17	5/5	0.61

*Fischer's exact test

acquainted with the influence of hygiene habits on respiratory diseases, significantly more so from non-Romani families, with a relevant 56 % stating that information was obtained from a doctor. It is possible that poorer hygiene habits in Romani families are affected by poor conditions, rather than incompetence. Not being aware of the personal hygiene habits of their own children within Romani families speaks of the problem of poor communication among family members, as well as traces of family neglect. According to a study by Belak, Madarasova Geckova, van Dijk, and Reijneveld, the Romani community in

Table 13. **Information on hygiene habits according to groups**

	Number (%) of subjects			*p**
	Romani	**non-Romani**	**Total**	
Are informed on the influence				
Yes	39 (78)	47 (94)	86 (86)	
No	10 (20)	3 (6)	13 (13)	**0.04**
I do not know	1 (2)	0	1 (1)	
Were informed by a doctor				
Yes	13 (26)	28 (56)	41 (41)	
No	33 (66)	21 (42)	54 (54)	**0.005**
I do not know	4 (8)	1 (2)	5 (5)	
Were informed by a nurse				
Yes	26 (52)	33 (66)	59 (59)	
No	22 (44)	16 (32)	38 (38)	0.41
I do not know	2 (4)	1 (2)	3 (3)	
Were informed by a friend				
Yes	7 (14)	16 (32)	23 (23)	
No	38 (76)	33 (66)	71 (71)	0.05
I do not know	5 (10)	1 (2)	6 (6)	
Were informed by their family				
Yes	26 (52)	28 (56)	54 (54)	
No	22 (44)	21 (42)	43 (43)	0.88
I do not know	2 (4)	1 (2)	3 (3)	
Total	50 (100)	50 (100)	100 (100)	

*Fischer's exact test

Slovakia has similar problems with living conditions which greatly affect their medical state, as well as other problems in terms of using medical services. Only a few affluent members of the Romani community used medical services every time the need arose, while others used them only in instances of utmost necessity. Those who were not able to use medical services at their own expense would unjustifiably use the services of emergency medical assistance or some method of self-treatment (9). The results of the study demonstrated that information on the importance of education is not obtained by Romani families from their family members, not even noticeably within the educational system, but instead from healthcare workers with whom they have had direct contact when visiting a hospital ward or during lengthy hospitalization. The situation in Romani families included in this study is comparable to cases of the Romani population on the territory of the entire country and wider, which is why the results obtained from the questionnaire and the conclusions derived from them can be used for the purpose of educating Romani families on the importance and rules of hygiene habits. In the case of the latter, progress has been achieved in the case of the Roma in the Sisak-Moslavina County, more specifically the urban centres of Sisak, Kutina and Popovača. A higher education level of the Roma is one of the major concerns of the Association for the development and improvement of the lives of the Roma, the goal of which is to promote the importance of education and employment of the members of the Romani national minority, and whose activities focus on overcoming basic obstacles when employing the Roma, low education levels among the Roma, and the general opinion amongst the Roma that they cannot find employment due to their nationality.

At the same time, by actively working on increasing the employment rate of the Romani population, the Association regularly submits bids for public works, which is a system for including the Roma in working on keeping their settlement clean and ensuring proper waste management in general, thus improving the quality of life in the Romani community, which presents a big step in developing awareness on the importance of hygiene. Since in 2006 60% of Roma of legal age on the territory of the Republic of Croatia had health insurance, the obtained result of 80% is undoubtedly an indicator of progress (10,11).

Spatial management in Romani settlements is another important activity of the Association, especially as Romani settlements in Sisak are mostly located within construction areas, but without communal infrastructure. For the purposes of repairing and legalizing the Romani settlement in Capraške poljane, direct and constant appeals of the Association to the town administration and to the Government of the Republic of Croatia in 2012 led to 50 families being provided with electricity free of charge, which is one of the praiseworthy steps forward in solving the aforementioned problem. The Association pays particular attention to the elderly and disabled, who due to poverty cannot realize their rights to fulfil basic needs, such as going to the doctor's, and additionally provides support for the protection of youth by organizing common social events or trips to the seaside, encouraging youth to continue their education through the system of socialization and working on preventing underage marriage, which is one characteristic of the Romani tradition and one which needs to be overcome through educating the Romani youth. Certainly, what is crucial is the education of entire families on the importance of personal hygiene, the consequences of becoming sexually active prematurely and education on sexually transmitted diseases (12).

Examination of literature has not provided relevant articles or research on the opinions and attitudes of the Romani population on the importance of hygiene. The authors are aware of a closely connected study on being acquainted with healthy lifestyle habits among Romani students. Mađarić Tuksar (2017) thus states that when researching Romani students, it was discovered that those students are not sufficiently integrated in society and live in relatively inappropriate living conditions. The indicator of that are their undeveloped hygiene habits, which is specifically shown in the said study. In order to solve this burning issue, education of both parents and students needs to be performed by school institutions and healthcare workers (13). Taking into consideration the research of Mađarić Tuksar, a parallel can be drawn between the two studies, with an emphasis on education of the Romani population on the importance of hygiene by continually pointing out the necessity of changing lifestyle habits and with the goal of developing awareness on the importance of hygiene.

Conclusion

Based on the study conducted and the results obtained, the following conclusions can be drawn:

- Children from Romani families are more often hospitalized due to respiratory problems.
- There are significantly more subjects from Romani families who do not have indoor toilets, indoor plumbing, or bathrooms.
- Children of subjects from Romani families are significantly less frequently hospitalized if the families have indoor plumbing; children who have their own rooms are also less frequently hospitalized for respiratory diseases.
- Children from Romani families are significantly more frequently taken to the doctor's when they are injured or for a regular check-up, and significantly less frequently for medical advice.
- Romani families are less informed regarding the influence of hygiene habits on diseases.
- The level of awareness of the importance of hygiene habits of members of Romani families is at a lower level than those of members of non-Romani families.

All of the above highlights the importance of constant encouragement and education of family members from both Romani and non-Romani populations on the importance of hygiene and strengthening of hygiene habits, but it is even more important to ensure the necessary infrastructure and improvement to living conditions.

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HIGIJENSKE NAVIKE I ŽIVOTNI UVJETI ROMSKE POPULACIJE U SISAČKO-MOSLAVAČKOJ ŽUPANIJI

Sažetak

Cilj. Pokazati stupanj razvijenosti svijesti o važnosti higijene među romskom populacijom u Sisačko-moslavačkoj županiji. Ispitati postoje li razlike u brizi o zdravlju djece neromske populacije s obzirom na broj hospitalizirane djece romske populacije općenito i s obzirom na respiratorna oboljenja.

Metode. Ispitivanje je provedeno na 100 roditelja trenutačno hospitalizirane djece: 50 pripadnika romske populacije i 50 pripadnika neromske populacije, s pomoću anketnog upitnika posebno konstruiranog za ovo istraživanje. Kategorijski podaci predstavljeni su apsolutnom i relativnom frekvencijom. Numerički podaci opisani su medijanom i granicama interkvartalnog raspona. Razlike u kategorijskim varijablama testirane su Fisherovim egzaktnim testom. Normalnost raspodjele numeričkih varijabli testirana je Shapiro-Wilkovim testom. Razlike numeričkih varijabli između dviju nezavisnih skupina testirane su Mann-Whitneyjevim U testom.

Rezultati. Iz rezultata je vidljivo da je zbog respiratornih oboljenja jednom u šest mjeseci hospitalizirano znatno više djece (43 %) iz romskih obitelji. Kod romskih obitelji znatno manje djece hospitalizirano je kod ispitanika koji imaju gradski vodovod u kući. Djecu iz romskih obitelji znatno više vode liječniku kad su ozlijeđena, na redovitu kontrolu, a znatno manje idu liječniku kad samo trebaju neki savjet. U neromskim obiteljima znatno se više djece tuširа svaki dan, svatko ima svoj ručnik i bolje razvijene higijenske navike. Iz rezultata je vidljivo da se poznavanje higijenskih navika znatno razlikuje u slučajevima romskih i neromskih obitelji. Zanemarivanje osobnih higijenskih navika djece unutar romskih obitelji ukazuje na problem nedovoljne edukacije roditelja.

Zaključak. Rezultati ukazuju na važnost konstantnog poticanja i educiranja članova obitelji i romske, kao i neromske populacije o važnosti higijene i razvijanju higijenskih navika, posebice unutar obitelji.

Ključne riječi: higijenske navike, respiratorne bolesti djece, romska populacija

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Reasons for Student Enrollment in Nursing Studies

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Abstract

The aim of the research was to determine the reasons for students enrolling in nursing studies, priorities in the choice of studies and differences in the reasons and priorities for choosing enrollment with regard to previously completed high school. The research was conducted on full-time nursing students of the University of Applied Health Sciences who enrolled in the first year of study in the academic year 2017/2018 and 2018/2019. For the purpose of the research, an anonymous questionnaire was used. The questionnaire includes questions related to demographic data and questions about the reasons related to enrollment in nursing studies, whether any of their family members or friends work in the health care system and whether any of the members of their family is a health worker. Students were required to rank their choice of the study of nursing on a scale of 1 to 10 at the time of enrollment. Students who have previously completed high school for nurses most often stated the expansion of existing knowledge, the acquisition of new knowledge, and the continuation of previous education as the reasons for enrolling in nursing studies. Students who have completed other types of high schools stated interest in medicine, nursing, health, helping others, good employment opportunities, and nursing being interesting as reasons for enrollment. Participants in this research significantly more often stated that their family members do not work in the health care system. When enrolling in the study, the majority of the students' first choice was the study of nursing at the higher education institution where the research was conducted - in the 2017 74.7% of participants, and in 2018 67.3% of participants. There is no statistically significant difference in the average ranking of the choice of the nursing study with respect to the year of enrollment (p=0.692). Information on the reasons for enrollment can help in planning the promotion of studies and nursing profession in public to encourage students to enroll.

Introduction

Today, nursing care is provided by 27.9 million nurses worldwide. Although there is an increase in the number of nurses, the World Health Organization reports a shortage of 5.9 million nurses (1). The lack of nurses is also observed in the health care system of the Republic of Croatia - in the EU countries there are on average 8.4 nurses per 1000 inhabitants, while in Croatia the ratio is lower and amounts to 6.3 nurses per 1000 inhabitants (2).

One of the basic ways to increase the number of nurses is to educate more pupils and students and that they stay in the profession. It is important to carefully select students, encourage their enrollment in nursing education programmes, know the reasons for enrollment so that, if necessary, they can be modified during the educational process. Knowing the reasons for enrollment can contribute to increasing the number of enrolled students if they are pointed out when promoting studies and the profession in public, that is, data can be obtained that may indicate the need to change how nursing profession is presented in public.

Educating nurses is demanding, expensive and time consuming therefore it is important to prepare students for professional nursing practice and for staying in the profession. Research shows that more than 20% and up to 40% of students drop out of their studies (3-6). Research shows that students enroll in nursing studies for altruistic reasons such as the desire to provide care for the sick and infirm (7-14), economic reasons such as job security (9-11, 13-16), and their previous experience with nurses and the health environment (9, 17). As a significant factor for enrollment, students state the value of the nursing profession in the community (10) and the diversity of work environments (9, 11, 15, 16). Important for the choice of profession are the role models in the family, among friends, the influence of the family as well as positive experience with nurses (9, 11, 15-18). Positive previous experience in caring for the sick, and insufficient knowledge of the nursing profession often cause an idealistic perception of nursing, which can cause stress and discomfort during studies due to the discrepancy between the ideal picture of nursing and nursing as it really is (17, 19). The initial realistic view of nursing is associated with successful completion of studies and remaining in the health sector (15, 20).

The study of nursing in the Republic of Croatia is enrolled by students with previously completed high school education. Traditionally, a large number of students after graduating from high school for nurses continue their education in the study of nursing and they make up the majority of the students. In recent years, the number of students enrolling in nursing studies after completing other types of high schools has increased, with the largest number of them previously graduating from gymnasiums.

The aim of the research was to determine the reasons for enrollment in the study of nursing, priorities in the choice of studies and differences in the reasons and priorities for choosing to enroll in relation to previously completed high school. We also wanted to find out whether any of the family members or friends works in the health care system, i.e. whether any of the family members is a health worker, and whether there are differences between the two generations of students.

Methods

Study design

A cross-sectional survey was conducted.

Participants

The research was conducted on full-time nursing students of the University of Applied Health Sciences who enrolled in the first year of study in the academic years 2017/2018 and 2018/2019.

In October 2017, 103 participants completed the questionnaire. The majority of N=93 participants were female (90.3%). The age range was between 18 and 23 years, M=19.53. The majority of participants 87.09% (N=81) completed high school for nurses. Other participants graduated from other types of high schools, most often gymnasiums.

In October 2018, 107 participants completed the questionnaire. The majority of participants were fe-

male 96 participants (89.7%). The age ranged from 18 to 31 years, M=19.65. The majority of participants 57.9% (N=62) completed high school for nurses. Other participants completed other types of high schools, most often gymnasiums 31% (N=34).

Data collection

Students voluntarily completed an anonymous questionnaire, developed for the purposes of this research, which includes questions related to demographic data (age, gender, high school education) and questions related to reasons for enrollment in nursing studies. When completing the questionnaire, students were asked to state three reasons why they enrolled in nursing studies (open-ended question where they could state from one to three reasons). It was also necessary to state whether any of their family members or friends work in the health care system and whether any of their family members is a health care worker. Students were required to rank their choice of the study of nursing on a scale of 1 to 10 at the time of enrollment in higher education. A written copy of the questionnaire was distributed to students during a lecture in the field of nursing care, and filling of the questionnaire lasted about 10 minutes.

Ethics

The Ethics Committee of the educational institution in which the research was conducted approved the conduction of the research (Class: 602-04/17-18/588, Reg. No. 251-379-1-17-02). Participants were given an oral explanation of the purpose of the survey, and they also received a written notice for the participants where the purpose of the survey was explained. Students participated in the research voluntarily and anonymously.

Results

The answers of the students related to the reasons for enrollment in the study were entered in a table and analyzed according to the content of the answers. They were categorized according to the similarity of the answers and the answers of students who previously graduated from high school for nurses were compared with the answers of the students who previously graduated from other types of high schools.

Table 1. **Overview of all answers of students who enrolled in the first year of study in 2017.**

All answers	gymnasium and other types of high schools	nursing high school
continuing previous education in the profession	0	**22**
desire to study (student role)	6	6
status - title, working with doctors	1	13
loves the job of a nurse	0	**32**
expanding existing knowledge	0	**42**
broader competences	0	4
greater (good) employment opportunity	**13**	12
working with people	3	5
likes to help	8	14
higher salary	1	7
advancement in profession	0	11
better working conditions	0	6
wants to be a nurse	2	0
interesting and dynamic work	7	7
interest in medicine/nursing, health	**17**	3
humanity	3	1
new experiences	0	5
other	1	5
Total	62	195

In a survey conducted in 2017, students who previously graduated from a nursing high school most often stated the following as reasons for enrolling in nursing studies: expanding existing knowledge (42 participants), loving the job of a nurse (32 participants) and continuing previous education (22 participants). Among students who had previously com-

pleted other types of high schools, the most common reasons were interest in medicine, nursing, health (17 participants) and good employment opportunities (13 participants).

Table 2. **Overview of the answers of students who enrolled in the first year of study in 2017 listed as their first reason for enrollment**

	gymnasium and other types of high schools	nursing high school
continuing previous education in the profession	0	18
desire to study (student role)	4	4
status - title, working with doctors	0	7
greater (good) employment opportunity	4	0
likes to help	0	6
working with people	0	2
job security	0	1
higher salary	0	1
advancement in profession	0	4
wants to be a nurse	1	0
interesting and dynamic work	3	1
interest in medicine/nursing, health	7	0
better working conditions	0	1
expanding existing knowledge	0	**18**
loves the job of a nurse	0	14
other	4	0
Total	23	77

When the reasons given in the first place are analyzed, the results are very similar to the overall results. Students who had previously completed a high school for nurses stated the following as the most important reasons for enrolling in nursing studies: the expansion of existing knowledge (18 participants) and the continuation of previous education (18 participants). Students who had previously completed other types of high schools most often indicated an interest in medicine, nursing and health care as most important reasons (7 participants).

Table 3. **Overview of all answers of students who enrolled in the first year of study 2018.**

All answers	gymnasium and other types of high schools	nursing high school
desire to study (student role)	4	15
job security	14	15
helping other people	**24**	8
interesting	**16**	6
interest in medicine/nursing	10	0
working with people	13	0
wants to be a nurse	5	0
humane	2	1
good occupation	5	0
continuing previous education in the profession	0	**28**
acquiring new knowledge	0	**22**
higher salary, better work conditions	0	11
likes to be a nurse	0	17
expanding existing knowledge	0	8
other	4	10
Total	97	141

In a survey conducted in 2018, students who had previously completed a high school for nurses as reasons for enrolling in nursing studies most often stated the following: continuing previous education (28 participants) and acquiring new knowledge (22 participants). For students who had previously completed other type of high school education, the most common reasons were helping others (24 participants) and that nursing is interesting to them (16 participants).

When the reasons stated as first are analyzed, the results are very similar to the overall results. Students who had previously completed a high school for nurses as the primary reasons for enrollment in the study of nursing most often stated the continuation of previous education (23 participants). Students who had previously completed other types of high school as their primary reason stated that nursing was interesting to them.

Table 4. **Overview of the answers of students who enrolled in the first year of study 2018 listed as their first reason for enrollment**

	gymnasium and other types of high schools	nursing high school
desire to study (student role)	3	9
job security	5	2
helping other people	5	2
interesting	**9**	3
interest in medicine/nursing	5	0
working with people	6	0
wants to be a nurse	5	0
continuing previous education in the profession	0	**23**
acquiring new knowledge	0	6
higher salary, better work conditions	0	1
status	0	1
likes to be a nurse	0	9
advancement in profession	0	3
other	1	1
Total	39	60

When analyzing the answers to the questions on ranking nursing studies at enrollment, the Mann Whitney U test was applied because the Kolmogorov-Smirnov test of normality of the distribution of ranking found that the distribution of results differs significantly from the normal distribution (p=0.000).

When enrolling in the study, most students in the first place mentioned the study of nursing at the higher education institution where the research was conducted. In the 2017 sample, the study of nursing was the first choice for 77 (74.7%) participants, and in 2018 for 72 (67.3%) participants. The study of nursing was the first or second choice for more than 80% of participants (89.3% and 82.2% of participants, respectively).

There is no statistically significant difference in the average ranking of the choice of nursing study with respect to the year of enrollment (2017 or 2018) M-W U=5278.500; p=0.692.

Table 5. **Overview of the answers to the question about ranking nursing studies when choosing a study programme**

Rank	2017	2018
1	77	72
2	15	16
3	4	6
4	0	3
5	2	1
6	3	1
7	1	0
8	0	1
9	0	0
10	1	0
Not stated	0	7

When analyzing data related to the questions whether a family member or a friend works in the health care system or whether they are a health care worker, the chi-square test was applied.

Table 6. **Overview of the answers to the question "Does a family member or a friend work in healthcare?"**

works in the health care system	2017		2018	
	nursing high school	other high schools	nursing high school	other high schools
Yes	42	11	27	21
No	39	11	31	20
Total	81	22	58	41

There is no statistically significant difference in the variable "family member or friend working in health care" with respect to the type of school students graduated from, neither for students enrolled in 2017 (χ^2=0.024; df=1; p=0.878), nor for students who enrolled in 2018 (χ^2=0.210; df=1; p=0.647).

During the analysis of the whole sample (all participants, both years) it was found that there is no statistically significant difference in the variable "family member or friend working in health care" with respect to the type of school students graduated from (χ^2=0.023; df=1; p=0.879).

Further analysis of data on a sample of 2017 participants found that there was no statistically significant difference in the ratio of answers to the question "Does a family member or friend work in health care?" (χ^2=0.087; df=1; p=0.768), and that in the sample of participants from 2018, there is no statistically significant difference in the ratio of answers to the question "Does a family member or friend work in health care?" (χ^2=0.040; df=1; p=0.841). Also, when analyzing the answers of all participants, no statistically significant difference was found in the ratio of answers to the question "Does a family member or friend work in health care?" (χ^2=0.005; df=1; p=0.944).

Table 7. **Overview of the answer to the question - Is a family member a health worker?**

health care worker	2017		2018	
	nursing high school	other	nursing high school	other high schools
Yes	23	6	16	12
No	58	16	42	29
Total	81	22	58	41

There is no statistically significant difference in the variable "family member is a health worker" with regard to the type of school the students graduated from, neither in the group of participants who enrolled in 2017 (χ^2=0.011; df=1; p=0.917), nor in the group of participants who enrolled in the study in 2018 (χ^2=0.034; df=1; p=0.855).

During the analysis of the whole sample (all participants, both years) it was found that there is no statistically significant difference in the variable "family member is a health worker" with regard to the type of school students come from (χ^2=0.006; df=1; p=0.940).

Further analyses of data on a sample of participants from 2017 found that statistically significantly more students than expected answered "No" to the question "Is a family member a health worker" (χ^2=19660; df=1; p=0.000). Also, in the sample of participants from 2018, statistically significantly more students than expected gave the answer "No" to the question "Is a family member a health worker" (χ^2=19360; df=1; p=0.000). When analyzing the answers of all participants included in the research, statistically significantly more students than expected gave the answer "No" to the question "Is a family member a health worker" (χ^2=39020; df=1; p=0.000).

Discussion

Since the study of nursing is enrolled by students who have previously completed various types of high schools, and for some participants the study of nursing is a continuation of education in the nursing profession, we expected different answers to the question about the reasons for enrollment.

In both generations, students who previously completed nursing high school most often state the expansion of existing knowledge, the acquisition of new knowledge, and the continuation of previous education as the reasons for enrolling in nursing studies. In the 2017 generation, a larger number of participants stated that they like the job of a nurse (31%) as a reason for enrolling in the study programme, compared to 2018, when they stated that they like being a nurse (15.8%). Although the results are expected, we can say that they are important for the development of the profession and the planning of nursing staff because they speak of the desire for further professional development and some students state that they love or like the work they do. These students are familiar with the job of a nurse, they have decided to stay and develop professionally in the nursing profession, and it is to be expected that upon completion of their studies, they will be employed as nurses. As in most countries students enroll after graduating from other types of high schools since nursing education begins at the undergraduate level, data from other surveys can be compared with data obtained in this survey, and it refers to students who had previously completed other types of high school education.

Most of the participants who had previously graduated from other types of high schools most often state the following reasons for enrollment: interest in medicine, nursing, health, nursing is interesting to them, helping others and good employment opportunities. Participants of this research, as well as par-

ticipants in other studies, single out altruistic (7, 8, 9, 10, 11, 12, 14) and economic reasons such as job security (10, 9, 11, 14, 15, 16). In addition, they state that nursing is interesting to them. Analyzing the literature, we can see that the reasons for enrolling in the study of nursing have not changed significantly in the last twenty years. The desire to help and job security still dominate.

Participants in this study did not state, i.e. stated in small numbers, the diversity of work placements and the dynamics of nursing. Given the current shortage of nurses, it is important at all levels of education and enrollment in educational programmes to present the nursing profession as realistically as possible, but also show the dynamism and diversity of the nursing profession, the possibility of advancement with generally known information about the profession (helping other people, working with the ill, working with people) in order to encourage students to enroll in the study. The literature states positive influence of family members or friends on the choice of studies (profession) as well as previous positive experiences with nurses (9, 11, 16, 17), with special emphasis on the influence of a mother or a grandmother (15). In the survey, participants answered the question of whether a family member or friend works in health care. Slightly more participants answered "Yes" in the survey conducted in 2017 (51.4% of participants), while in the sample of participants from 2018, slightly more participants answered "No" (51.5%). By analyzing the results, we did not find statistically significant differences between individual groups of participants or in the entire sample.

Participants also answered the question "Is any of the family members a health worker?". In both samples, the majority of participants had given the answer "No" (71.8% in 2017, and 71.7% in 2018). The analysis of the results did not reveal a statistically significant difference with regard to the type of school from which the students come, neither for 2017 nor for 2018. Further processing of the data in the sample from 2017 and 2018 found that statistically significantly more students than expected answered "No" to the question whether a family member is a health worker. Also when analyzing the answers of all participants involved in the research, statistically significantly more students than expected answered "No".

In the results related to the question whether a family member or a friend works in health care and whether a family member is a health worker, the results of the participants in this research differ from the results of the participants in other research. The answers to the question about the reasons for enrollment also did not indicate a large number of answers related to the influence of family or friends. This question could be asked in future research and over several generations of students to determine whether the results relate only to these two generations of students or they can be generalized. Also, in the research that would be conducted on nurses, the question could be asked whether they would recommend their profession to their children and to provide an explanation of their answer. Namely, the job of a nurse is stated to be very demanding and difficult, and it is possible that nurses do not recommend this profession to their children and family members.

When choosing their studies, most students' first choice was the study of nursing at the higher education institution where this research was conducted. In the 2017 sample, the study of nursing was the first choice for 77 (74.7%) participants, and in 2018 for 72 (67.3%) participants. The study of nursing was the first or second choice for more than 80% of participants (89.3% and 82.2% of participants, respectively). These data indicate that the study of nursing is the desired study for most students and it is to be expected that they are motivated to study but also to be a nursing professional.

The main limitation of the research is related to the place of research because the research was conducted at only one higher education institution for which there is the greatest interest enrollment in Croatia, and part of the results may be related to the fact that students were highly motivated to enroll in the study and acquire knowledge and skills from nursing practice. The research should be conducted on multiple nursing studies, over several generations to gain a more detailed insight into the reasons for enrolling in the study.

Conclusion

This research sought to determine the reasons for student enrollment in nursing studies. It was found that the results obtained between the two groups of

participants differed - students who had previously completed high school for nurses and students who had previously completed other types of high school, which was expected. Students who had previously completed high school for nurses as reasons for enrollment in nursing studies most often state the expansion of existing knowledge, acquisition of new knowledge and continuation of previous education, and students who have completed other types of high school state interest in medicine, nursing, health, they find nursing interesting, helping others and good employment opportunities. The results of students who had completed other types of high schools are consistent with the results of other research. Other research state the fact of a family member or friend working in health care system or them being a health care worker as a positive factor for student enrollment. Participants in this research significantly more often state that family members do not work in the health care system. It was also found that the study of nursing at the higher education institution where the research was conducted was usually the first or second choice of students, which means that students in the choice of enrollment in nursing studies gave priority to the higher education institution where the research was conducted.

Information on the reasons for enrollment can help in planning the promotion of studies and the nursing profession in public to encourage students to enroll. A realistic portrayal of the profession is important in order to prevent the creation of an idealized image of the profession and the subsequent dropping out of studies or leaving the profession after graduation.

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RAZLOZI UPISA STUDENATA NA STUDIJ SESTRINSTVA

Sažetak

Cilj istraživanja bio je utvrditi razloge upisa studenata na studij sestrinstva, prioritete u izboru studija te razlike u razlozima i prioritetima izbora upisa na studij s obzirom na prethodno završenu srednju školu. Istraživanje je provedeno na studentima redovnog studija sestrinstva Zdravstvenog veleučilišta koji su upisali prvu godinu studija u akademskim godinama 2017./2018. i 2018./2019. U svrhu istraživanja primijenjen je anonimni upitnik koji obuhvaća pitanja koja se odnose na demografske podatke i pitanja koja se odnose na razloge povezane s upisom na studij sestrinstva, radi li netko od članova njihove obitelji ili prijatelja u sustavu zdravstva te je li netko od članova njihove obitelji zdravstveni radnik. Studenti su morali navesti na kojem se mjestu odabira na skali od 1 do 10 nalazio studij sestrinstva prilikom upisa na visoka učilišta. Studenti koji su prethodno završili srednju školu za medicinske sestre kao razloge za upis na studij sestrinstva najčešće navode proširivanje postojećih znanja, stjecanje novih znanja i nastavak prethodnog obrazovanja. Studenti koji su završili druge srednje škole kao razloge za upis navode interes za medicinu, sestrinstvo, zdravstvo, pomaganje drugima, dobre mogućnosti zapošljavanja i to da im je sestrinstvo zanimljivo. Ispitanici u ovom istraživanju znatno češće navode da članovi obitelji ne rade u zdravstvu. Prilikom upisa na studij većina studenata na prvom je mjestu navela studij sestrinstva pri visokoškolskoj ustanovi na kojoj je provedeno istraživanje, u uzorku 2017. 74,7 % ispitanika, a 2018. 67,3 % ispitanika. Nema statistički značajne razlike u prosječnom rangu odabira studija sestrinstva s obzirom na godinu upisa studija (p = 0,692). Podaci o razlozima upisa na studij mogu pomoći pri planiranju promocije studija i sestrinske profesije u javnosti kako bi potaknuli studente na upis.

Ključne riječi: sestrinstvo, obrazovanje, razlozi upisa na studij

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Job Satisfaction - a Predictor of Working Efficiency and Intentions to Remain in Nursing

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Abstract

Introduction. We consider job satisfaction through the prism of the work we do, the working conditions, the relationships with colleagues and superiors, and the opportunity to advance and earn. Nurses make up 50% of the total workforce in the healthcare system and it is beyond question that their number in the system directly affects the quality of nursing care. The most common dissatisfaction at work is insufficient staff, poor working conditions, poor relationship with colleagues and superiors, and impossibility to advance.

Aim. The objectives of the study were to examine the satisfaction of nurses in the job and to assess whether they were considering leaving their current job and how they were assessing their health and working productivity.

Methods. The study involved 155 nurses from three Clinical Hospital Centers in Croatia (Osijek, Rijeka and Zagreb). The study was designed as a cross-sectional study. It started on January 1, and ended on June 30, 2018. The first part refers to the demographic data of the respondents, while the second part contains questions related to the intention of leaving the present job, self-assessment of health status and working productivity and job satisfaction.

Results. In the answers to job satisfaction claims, the respondents with the bachelor's and master's degree in nursing compared to the respondents who completed secondary education, responded with a higher percentage that they were dissatisfied with the working conditions and the possibility of promotion (46.2%). They are dissatisfied with the relationship with their superiors (70%), as well as with the work they do (54%). Respondents at all levels of education are equally satisfied with their relationships with colleagues and with their earnings.

Conclusion. Most of the respondents are satisfied with the relationship with their superiors, colleagues and work, and dissatisfied with the possibility of advancement and salary. Most of them answered that they rarely think about leaving their job, and they assess their health as good and work productivity as normal.

Introduction

Job satisfaction, performance and loyalty to the organization are three related attitudes toward work. The great interest and presence of research on these attitudes suggests that they directly affect the motivation of workers and the intention to stay in the profession. A sense of satisfaction is a positive emotion that every person strives for and is considered one of the basic human needs. Satisfaction is the feeling a person experiences when he or she fulfills one's aspirations or desires. According to the International Social Research Program conducted in 1997 in 21 countries, it has been proven that satisfaction levels influence the quality of work (1). Healthcare professionals are one of the most important factors in the healthcare system, and job satisfaction plays an important role in an advanced daily society. The number of nurses and doctors per capita is an important indicator of the development of the healthcare system. As nurses account for 50% of the workforce in the healthcare system, it is beyond question that their number in the system directly affects the quality of nursing care (1). The daily increase in administrative and other tasks prevents nurses from performing the basic task of caring for the patient, which results in dissatisfaction with the performance of work tasks. We look at job satisfaction through the prism of the work we do, the working conditions, the relationships with colleagues and superiors, and the opportunity to advance and earn money. The most common dissatisfaction of nurses at work are: insufficient staff, poor working conditions, poor relationships with colleagues and superiors, and impossibility to advance. In addition to causing dissatisfaction, they are often mentioned in the literature as the main causes of stress, which ultimately results in dissatisfaction with the work they perform and the services they provide (2). The increasing exposure of workers to a high risk of stress, conflict and burnout at work, job dissatisfaction and declining work capacity have led to an increase in interest in the problems associated with the psychosocial environment of healthcare workers, which have received little or no attention until recently (3). With the accession of the Republic of Croatia to the European Union, the door opened for the migration of working-age population both into European countries and beyond. A larger outflow of nurses is also noticeable, which puts additional strain on the system, which already has a shortfall of around 12, 000, and every other nurse in Croatia is over 45 years old. More than 1,000 nurses have gone abroad and 2, 000 have requested certificates of departure (4).

Aim

The research aims are as follows**:**

1. Examine the satisfaction of nurses with the working conditions, the relationships with superiors, relationships with colleagues, promotion opportunities, earnings and the work they perform
2. Assess whether nurses are considering leaving their current job
3. Examine how nurses evaluate their health and working productivity
4. Examine whether there is a difference in the assessment of job satisfaction, thinking about leaving the current job and assessment of work ability by age, gender and qualification.

Methods

Respondents

The study included 155 nurses from three Clinical Hospital Centers in the Republic of Croatia (Osijek, Rijeka and Zagreb). Health professionals of both genders and all levels of education (secondary school degree, college and university level, including master's and doctoral degrees in nursing science) were included. All respondents were informed of the purpose and manner of conducting the survey, indicating that their participation was voluntary and anonymous. The secrecy of the information is guaranteed by sealed envelopes. The consent of the clinic man-

agers and the departments at which the study was conducted was sought and obtained. The study was approved by the Ethics Committees of all the institutions listed.

Data collection

The study was designed as a cross-sectional study. It started on January 1st and ended on June 30th, 2018. Relevant data were collected through a modified questionnaire written for the purpose of this research, modeled on the 2015 Vukelić survey (5).

The first part deals with the demographic data of the respondents (age, gender, qualifications and marital status), while the second part contains 9 questions related to the intention of leaving the present job, self-assessment of health status and working productivity and job satisfaction. The intention of leaving the job was assessed by one question that respondents rated with a Likert type scale from 1 (I didn't think about it) to 5 (I thought about it very often). Work productivity was also assessed by one question using the Likert-type scale from 1 (lower than usual) to 3 (higher than usual). Current health status was also assessed by one question using the a Likert-type scale from 1 (very poor) to 5 (very good). Job satisfaction was assessed with six questions pertaining to the assessment of general satisfaction with the following aspects of work: working conditions, relationship with superior, relationship with colleagues, promotion opportunities, earnings and the job they perform. A similar job satisfaction scale was used in a 2007 in the study by Sounders.

Results

The study involved 155 subjects.

Most of the respondents were female (85.8%), 32.9% of them belonged to the age group of 30-39 years, and the average age was 40.5 years (SD 10.89). The most represented were the respondents with the secondary level of education (69.7%). Most of the respondents were married (70.3%), as shown in Table 1.

Table 1. **Distribution of respondents by gender, age, education level and marital status**

		N	%
Gender	Men	22	14.2
	women	133	85.8
	In Total	155	100
Age	19 - 29 years	23	14.8
	30 - 39	51	32.9
	40 - 49	43	27.8
	50 - 59	34	21.9
	60 and older	4	2.6
	Total	155	100
Education level	secondary school	108	69.7
	BA	34	21.9
	MA/ PhD	13	8.4
	Total	155	100
Marital status	Single	28	18.1
	Married	109	70.3
	Divorced	18	11.6
	Total	155	100

Although no statistically significant difference was found in the answers to job satisfaction claims with regard to the nurses qualifications, the MA/PhD respondents, compared to the ones with a secondary school degree, responded with a higher percentage that they were dissatisfied with their working conditions and the possibility of promotion (46.2%). Most respondents of all levels of education are satisfied with the relationship with their superiors, as well as with the work they do. Respondents of all education levels are approximately equally satisfied with their colleagues and earnings (Table 2).

According to job satisfaction claims women are more satisfied (72%) compared to men. In a larger percentage, about 70% of the male respondents are more dissatisfied with their possibility to advance. 64% male and 61% female respondents were dissatisfied with their earnings. Both male and female respondents are most satisfied with their relationship with their superiors, their colleagues and the work they do (Table 3).

Considering the age of the respondents, the greatest dissatisfaction was expressed by the respond-

Table 2. **Job satisfaction of nurses by education level**

		Education level						
		Secondary school		BA		MA/PhD		*p**
		N	%	N	%	N	%	
I am satisfied with the conditions in which I work.	I completely disagree	11	10.2	5	14.7	3	23.1	0.532
	I disagree	25	23.1	6	17.6	3	23.1	
	I am not sure	37	34.3	13	38.2	5	38.5	
	I agree	30	27.8	6	17.6	1	7.7	
	I completely agree	5	4.6	4	11.8	1	7.7	
I am satisfied with the relationship with my superior.	I completely disagree	2	1.9	1	2.9	1	7.7	0.111
	I disagree	5	4.6	5	14.7	2	15.4	
	I am not sure	28	25.9	7	20.6	6	46.2	
	I agree	53	49.1	12	35.3	2	15.4	
	I completely agree	20	18.5	9	26.5	2	15.4	
I am satisfied with the relationship with my colleagues.	I completely disagree	3	2.8	0	0	1	7.7	0.328
	I disagree	3	2.8	3	8.8	1	7.7	
	I am not sure	19	17.6	7	20.6	5	38.5	
	I agree	55	50.9	16	47.1	5	38.5	
	I completely agree	28	25.9	8	23.5	1	7.7	
I am satisfied with the opportunity to advance at work.	I completely disagree	12	11.1	4	11.8	4	30.8	0.755
	I disagree	19	17.6	6	17.6	2	15.4	
	I am not sure	40	37.0	12	35.3	5	38.5	
	I agree	23	21.3	7	20.6	1	7.7	
	I completely agree	14	13.0	5	14.7	1	7.7	
I am satisfied with my earnings.	I disagree	15	13.9	5	14.7	4	30.8	0.859
	I completely disagree	24	22.2	5	14.7	2	15.4	
	I am not sure	28	25.9	9	26.5	3	23.1	
	I agree	35	32.4	12	35.3	3	23.1	
	I completely agree	6	5.6	3	8.8	1	7.7	
I am satisfied with the job I do.	I completely disagree	6	5.6	1	2.9	1	7.7	0.313
	I disagree	3	2.8	4	11.8	1	7.7	
	I am not sure	23	21.3	4	11.8	5	38.5	
	I agree	46	42.6	15	44.1	3	23.1	
	I completely agree	30	27.8	10	29.4	3	23.1	

* Fisher's exact test
Statistically significant value

ents in the age group of 40-49 years of age. They are mostly dissatisfied with the working conditions, the relationships with colleagues and superiors, the opportunities for promotion and earnings, as well as with the work they do. They are dissatisfied with the working conditions (85%), they are dissatisfied with their earnings (74%), while the majority of respondents in the age group of 19-29 years are dissatisfied with the possibility of advancement (80%), (Table 4).

Respondents in the 40-49 age group (p=0.007, Fisher's exact test) most often thought about changing

Table 3. **Job satisfaction of nurses (N=155) by gender**

		Gender				
		Men		Women		*p**
		N	%	N	%	
I am satisfied with the conditions in which I work.	I completely disagree	2	9.1	17	12.8	0.578
	I disagree	5	22.7	29	21.8	
	I am not sure	6	27.3	49	36.8	
	I agree	6	27.3	31	23.3	
	I completely agree	3	13.6	7	5.3	
I am satisfied with the relationship with my superior.	I completely disagree	0	0	4	3	0.858
	I disagree	1	4.5	11	8.3	
	I am not sure	6	27.3	35	26.3	
	I agree	11	50	56	42.1	
	I completely agree	4	18.2	27	20.3	
I am satisfied with the relationship with my colleagues.	I completely disagree	0	0	4	3	0.475
	I disagree	0	0	7	5.3	
	I am not sure	6	27.3	25	18.8	
	I agree	9	40.9	67	50.4	
	I completely agree	7	31.8	30	22.6	
I am satisfied with the opportunity to advance at work.	I completely disagree	4	18.2	16	12	0.291
	I disagree	1	4.5	26	19.5	
	I am not sure	7	31.8	50	37.6	
	I agree	7	31.8	24	18	
	I completely agree	3	13.6	17	12.8	
I am satisfied with my earnings.	I disagree	3	13.6	21	15.8	0.914
	I completely disagree	6	27.3	25	18.8	
	I am not sure	5	22.7	35	26.3	
	I agree	7	31.8	43	32.3	
	I completely agree	1	4.5	9	6.8	
I am satisfied with the job I do.	I completely disagree	1	4.5	7	5.3	0.290
	I disagree	0	0	8	6	
	I am not sure	2	9.1	30	22.6	
	I agree	13	59.1	51	38.3	
	I completely agree	6	27.3	37	27.8	

* Fisher's exact test

their current job, and more often stated that their work productivity in the last 6 months was lower than usual (p=0.031, Fisher's exact test) (Table 5).

Changes in the present job were more commonly thought of by respondents with a university degree (p=0.001, Fisher's exact test). They (53.8%) very often thought about changing jobs. Respondents of all levels of education have rated their health status as very good and good. Mostly MA/PhD respondents, 38.5% of them rated their productivity as lower than usual in the past six months (Table 6).

Although there was no significant difference in the intention to leave the present job, when considering self-reported health status and productivity with re-

Table 4. **Job satisfaction of nurses (N=155) by age**

		AGE										*p**
		19 - 29 years		30 - 39 years		40 - 49 years		50 - 59 years		60 and > years		
		N	%	N	%	N	%	N	%	N	%	
I am satisfied with the conditions in which I work.	I completely disagree	2	8.7	5	9.8	10	23.3	2	5.9	0	0	0.220
	I disagree	5	21.7	13	25.5	10	23.3	6	17.6	0	0	
	I am not sure	7	30.4	17	33.3	17	39.5	12	35.3	2	50	
	I agree	9	39.1	11	21.6	4	9.3	11	32.4	2	50	
	I completely agree	0	0	5	9.8	2	4.7	3	8.8	0	0	
I am satisfied with the relationship with my superior.	I completely disagree	0	0	1	2	3	7	0	0	0	0	0.571
	I disagree	1	4.3	3	5.9	6	14	2	5.9	0	0	
	I am not sure	6	26.1	14	27.5	9	20.9	12	35.3	0	0	
	I agree	13	56.5	20	39.2	17	39.5	14	41.2	3	75	
	I completely agree	3	13	13	25.5	8	18.6	6	17.6	1	25	
I am satisfied with the relationship with my colleagues.	I completely disagree	0	0	1	2	3	7	0	0	0	0	0.335
	I disagree	1	4.3	4	7.8	2	4.7	0	0	0	0	
	I am not sure	6	26.1	8	15.7	10	23.3	7	20.6	0	0	
	I agree	13	56.5	24	47.1	21	48.8	17	50	1	25	
	I completely agree	3	13	14	27.5	7	16.3	10	29.4	3	75	
I am satisfied with the opportunity to advance at work.	I completely disagree	1	4.3	6	11.8	10	23.3	3	8.8	0	0	0.214
	I disagree	7	30.4	8	15.7	4	9.3	6	17.6	2	50	
	I am not sure	9	39.1	16	31.4	20	46.5	12	35.3	0	0	
	I agree	3	13	13	25.5	5	11.6	9	26.5	1	25	
	I completely agree	3	3	8	15.7	4	9.3	4	11.8	1	25	
I am satisfied with my earnings.	I disagree	1	4.3	7	13.7	10	23.3	5	14.7	1	25	0.147
	I completely disagree	6	26.1	14	27.5	7	16.3	4	11.8	0	0	
	I am not sure	4	17.4	12	23.5	15	34.9	8	23.5	1	25	
	I agree	12	52.2	12	23.5	10	23.3	14	41.2	2	50	
	I completely agree	0	0	6	11.8	1	2.3	3	8.8	0	0	
I am satisfied with the job I do.	I completely disagree	0	0	3	5.9	4	9.3	1	2.9	0	0	0.344
	I disagree	2	8.7	1	2	4	9.3	1	2.9	0	0	
	I am not sure	5	21.7	9	17.6	13	30.2	5	14.7	0	0	
	I agree	12	52.2	22	43.1	15	34.9	13	38.2	2	50	
	I completely agree	4	17.4	16	31.4	7	16.3	14	41.2	2	50	

* Fisher's exact test

Table 5. **Nurses intent to leave their current job, self-assessment of health status and work productivity by age**

		AGE										
		19 - 29 years		30 - 39 years		40 - 49 years		50 - 59 years		60 and > years		*p**
		N	%	N	%	N	%	N	%	N	%	
Have you considered leaving the current job in the past six months?	I didn't think about that	5	21.7	9	17.6	9	20.9	15	44.1	3	75	**0.007**
	I rarely thought about it	6	26.1	20	39.2	6	14	5	14.7	1	25	
	I thought about it from time to time	7	30.4	12	23.5	12	27.9	10	29.4	0	0	
	I've often thought about that	4	17.4	4	7.8	4	9.3	3	8.8	0	0	
	I thought about it very often	1	4.3	6	11.8	12	27.9	1	2.9	0	0	
How would you rate your current health?	Very bad	0	0	1	2	3	7	1	2.9	0	0	0.199
	Bad	1	4.3	3	5.9	4	9.3	4	11.8	1	25	
	Neither good nor bad	1	4.3	12	23.5	15	34.9	5	14.7	0	0	
	Good	15	65.2	23	45.1	15	34.9	18	52.9	3	75	
	Very good	6	26.1	12	23.5	6	14	6	17.6	0	0	
What has been your work productivity in the past six months compared to your usual work performance?	Lower than usual	0	0	6	11.8	13	30.2	4	11.8	1	25	**0.031**
	Same as usual	19	82.6	37	72.5	25	58.1	29	85.3	3	75	
	Higher than usual	4	17.4	8	15.7	5	11.6	1	2.9	0	0	

* Fisher's exact test
Statistically significant value

spect to the gender of the respondents, female respondents were more likely to think about leaving the present job compared to men. 23% of women and 18.2% of men very often and often thought about leaving their present job (Table 7).

Discussion

The purpose of this research was to determine whether nurses are satisfied with the work they are doing in terms of the working conditions, the relationships with superiors and colleagues, the earnings and the opportunity to advance. Furthermore, we wanted to find out if nurses were considering leaving their current job and how they were assessing their current work productivity.

The study was conducted at three clinical hospital centers (Osijek, Rijeka and Zagreb) in Croatia. The results of the research show that nurses from these healthcare institutions express their dissatisfaction with the working conditions, the possibility of promotion, the earnings and the job they perform, while they are generally satisfied with their superiors and colleagues as shown in Tables 2, 3 and 4. The respondents who participated in this study were mostly young and middle-aged (30 to 50 years). The mean age of the respondents was 40.5 years (SD 10.89), which corresponds to the age structure of participants in similar studies conducted in Croa-

Table 6. **Nurses intent to leave their current job, self-assessment of health status and productivity by professional qualification**

		Education level						*p**
		Secondary school		BA		MA/PhD		
		N	%	N	%	N	%	
Have you considered leaving the current job in the past six months?	I didn't think about it	30	27.8	10	29.4	1	7.7	**0.001**
	I rarely thought about it	27	25	9	26.5	2	15.4	
	I thought about it from time to time	32	29.6	6	17.6	3	23.1	
	I've often thought about that	12	11.1	3	8.8	0	0	
	I thought about it very often	7	6.5	6	17.6	7	53.8	
How would you rate your current health?	Very bad	3	2.8	1	2.9	1	7.7	0.977
	Bad	10	9.3	2	5.9	1	7.7	
	Neither good nor bad	23	21.3	7	20.6	3	23.1	
	Good	53	49.1	16	47.1	5	38.5	
	Very good	19	17.6	8	23.5	3	23.1	
What has been your work productivity in the past six months compared to your usual work performance?	Lower than usual	15	13.9	4	11.8	5	38.5	0.128
	Same as usual	82	75.9	24	70.6	7	53.8	
	Higher than usual	11	10.2	6	17.6	1	7.7	

* Fisher's exact test
Statistically significant value

Table 7. **Nurses intent to leave their current job, self-assessment of health status and productivity by gender**

		Gender				*p**
		Men		**Women**		
		N	**%**	**N**	**%**	
Have you considered leaving the current job in the past six months?	I didn't think about it	5	22.7	36	27.1	0.910
	I rarely thought about it	7	31.8	31	23.3	
	I thought about it from time to time	6	27.3	35	26.3	
	I've often thought about that	2	9.1	13	9.8	
	I thought about it very often	2	9.1	18	13.5	
How would you rate your current health?	Very bad	1	4.5	4	3.0	0.735
	Bad	1	4.5	12	9.0	
	Neither good nor bad	3	13.6	30	22.6	
	Good	13	59.1	61	45.9	
	Very good	4	18.2	26	19.5	
What has been your work productivity in the past six months compared to your usual work performance?	Lower than usual	2	9.1	22	16.5	0.443
	Same as usual	16	72.7	97	72.9	
	Higher than usual	4	18.2	14	10.5	

* Fisher's exact test

tia (7). A large number of women are represented among the participants in this research, with a share of 85.8%. This result is expected because it is a female-dominated occupation. The high proportion of women in the health profession is also indicated by the results of most previous research in the field of nursing (8,9). Almost (70%) respondents had a university degree, followed by bachelor in nursing with a share of (21.9%), while respondents with a master in nursing were represented by 8.4%. The results of the study differ from the results of the research of foreign authors where there were mostly respondents with bachelor degrees (with a share of 45%) and a significantly higher number of nursing masters (22.5%) (10). The situation has improved significantly over the last 15 years. Nursing education for the past 15 years has taken off. Since the signing of the Bologna Declaration in 2005, there have been significant changes in the educational structure of nurses in Croatia. In doing so, these healthcare professionals were given the opportunity to advance in the profession. Thus, in Croatia, after five years of nursing secondary school education, we have a bachelor's degree in nursing science, a nursing master and PhD.

The analysis of the total data did not find any statistically significant differences in job satisfaction with regard to the level of education. However, in response to the claims regarding working conditions and the possibility of promotion, the MA/PhD respondents expressed a higher percentage of dissatisfaction than the respondents with a secondary level of education, which was expected. It is indisputable that the advancement of medicine and nursing imposes an ongoing need for training, which the system has recognized, and has enabled nurses to improve at all levels of education. Nursing is a profession, but also a job that allows nurses to live. Deficit and dissatisfaction also stem from the fact that highly educated nurses do not work in accordance with their educational background. There are currently about 10,000 nurses with a bachelor and master degree in the system, but their qualifications are not recognized within the system. These are serious problems whose solutions and proposals have not yet been accepted (11). In a study by Spevan et al. we find results that indicate that employees with lower levels of education are less satisfied than those with higher degrees (12). This difference can be explained by the fact that the use of any instrument that examines job satisfaction may depend on the condition of the subjects at the time of questioning. The literature indicates that the results of the use of certain instruments depends on the working conditions (staff may sometimes become accustomed to being satisfied with even the worst conditions), as well as on the employees' habit of managing staff, and certainly not of the resentment policy (13). Overall, no statistically significant difference was found between male and female respondents. The analysis of some issues revealed that women were more dissatisfied with the conditions in which they work, 72%, and the possibility of advancement, 70%, than men. 64% of male and 61% of female respondents were dissatisfied with their earnings. Both male and female respondents are most satisfied with their relationship with their superiors, their colleagues and the work they do. Respondents mostly answered that they had rarely or occasionally thought about leaving their current job in the last six months. Most respondents assess their health as good and their work productivity as the same as usual.

According to the Croatian Nursing Council, there were 40000 nurses in the Republic of Croatia in 2019, taking into account that about 700 nurses retire annually, and about 2 000 apply for certificates of departure, and this trend still continues. Also, over the past few years, there has been a shortage of 12000 nurses at all levels.

Conclusion

In this research, nurses answered that they were most satisfied with the relationship with their superiors, colleagues, and the work they perform (72%). The largest number of male respondents are dissatisfied with the possibility of advancement (70%), and the majority of respondents of both genders are dissatisfied with their salary (64%). Respondents mostly answered that they had rarely or occasionally thought about leaving their current job in the last six months. Most respondents assess their health as good and very good, and their work productivity as the same as usual.

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ZADOVOLJSTVO POSLOM – PREDIKTOR RADNE UČINKOVITOSTI I NAMJERE OSTANKA U SESTRINSTVU

Sažetak

Uvod. Zadovoljstvo poslom promatramo kroz prizmu posla koji obavljamo, uvjete rada, odnose s kolegama i nadređenima te mogućnosti napredovanja i zarade. Budući da medicinske sestre čine 50 % radne snage u zdravstvenom sustavu, neupitno je da njihov broj u sustavu direktno utječe na kvalitetu sestrinske skrbi. Kao najčešće nezadovoljstvo na poslu medicinske sestre navode: nedovoljan broj djelatnika, loše uvjete rada, loše odnose s kolegama i nadređenima te nemogućnost napredovanja.

Cilj. Ciljevi istraživanja bili su ispitati zadovoljstvo medicinskih sestara i tehničara poslom i procijeniti razmišljaju li o napuštanju sadašnjeg posla te kako procjenjuju svoje zdravstveno stanje i radnu produktivnost.

Metode. Istraživanje je obuhvatilo 155 medicinskih sestara i tehničara iz tri klinička bolnička centra u Hrvatskoj (Osijek, Rijeka i Zagreb**)**. Istraživanje je bilo ustrojeno kao presječna studija provedena od 1. siječnja do 30. lipnja 2018. Prvi dio odnosi se na demografske podatke ispitanika, dok su u drugom dijelu sadržana pitanja koja se odnose na namjeru napuštanja sadašnjeg posla, samoprocjenu zdravstvenog stanja i radne produktivnosti te zadovoljstva poslom.

Rezultati. Na tvrdnje povezane sa zadovoljstvom poslom ispitanici s VSS-om u odnosu na one sa SSS-om odgovorili su u većem postotku da su nezadovoljni uvjetima u kojima rade i mogućnošću napredovanja (46,2 %). Odnosom sa svojim nadređenima zadovoljno je oko 70 %, a poslom koji obavljaju 54 % ispitanika. Odnosom s kolegama i zaradom približno su podjednako zadovoljni ispitanici svih razina obrazovanja.

Zaključak. Najveći broj ispitanika zadovoljan je odnosom s nadređenima, kolegama i poslom, a nezadovoljan mogućnošću napredovanja i plaćom. Većinom su odgovorili da rijetko i s vremena na vrijeme razmišljaju o napuštanju posla, a svoje zdravlje procjenjuju dobrim i radnu produktivnost uobičajenom.

Ključne riječi: zadovoljstvo, učinkovitost, produktivnost, sestrinstvo, zdravlje

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The Effects of Preoperative Education, Marking and Adequate Positioning of Stoma on Self-Esteem and The Quality of Life of Patients with Intestinal Ostomy and Their Families

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Abstract

Aim. The purpose of this systematic review is to examine all available research studies on quality of life of ostomy patients and their families, which is contingent upon the effects of adequate preoperational education, the best and most acceptable ostomy site marking on the patients' abdomen, and subsequently, the effect on the ostomy patients' self-esteem.

Methods. A literature search was carried out using scientific electronic databases - Science Direct, PubMed and Medline. Analysed period was from 2010 to 2016 in order to get insight into the most recent findings. Search terms included preoperative education, stoma marking, quality of life, self-esteem, influence on family life. Overview of articles was made in three stages.

Results. We found 1440 scientific articles. In the first stage, we eliminated 1271 articles because they were unsuitable. In the second stage, we analysed 34 articles and made a conclusion based on 13 full text available articles.

Conclusion. The patient is content while being treated in the hospital; however, only after the patient has been released do the hardships occur, which are often the main cause of discontent, isolation, anxiety, and fear – thus resulting in diminished quality of life. Preoperational education and marking the most acceptable place for ostomy procedure significantly affect the self-esteem and the quality of life of ostomy patients and their families. Ostomy patients need to be followed up, and the home care system, as well as the support systems of public health care for patients with a gastrointestinal ostomy, need to be strengthened.

Introduction

Colorectal cancer is prevalent among the malignant tumours of the gastrointestinal tract, and it affects both sexes almost equally. The most common treatment for colorectal cancer is surgery, and the result of 10% of the cases is a permanent ostomy. There are different types of ostomy, but colostomy, ileostomy, and urostomy are most common (1). Surgical procedure of implementing stoma is a health-saving or lifesaving surgical procedure. The number of people living with a stoma is about 1.5 million all over the world. Unfortunately, despite many prevention measures and national prevention programmes, the number still increases. Ostomy is not a handicapping procedure. Living well with an ostomy can be achieved through proper patient preparation, education, and planning. Provision of individualized comprehensive care facilitates physical and psychological rehabilitation (1). The predictors of adjustment to ostomy include successful ostomy self-care, satisfaction with body image, the amount of social support, and time elapsed since surgery (2,3). Survivor competence related to ostomy care has been described as the most important predictor of positive adjustment to ostomies. Ostomy construction is an important step in the course of a bowel resection or anastomosis and a primary procedure for diverting the faecal stream or alleviating obstruction. Ostomy patients suffer significant physiological challenges that can affect psychological variables and health-related quality of life (HRQOL) (4). The most common underlying conditions resulting in the need for stoma surgery are colorectal cancer (45.8%), bladder cancer (7%), diverticulosis (7%), inflammatory bowel disease (1.8%), ileus (7%), perforations and fistulae (2.6%), peritonitis, inborn anomalies, gastrointestinal tract injuries (2.9%), and abnormalities and spine damage resulting in the inability to control the defecation (5). Colitis, ulcerative colitis and Crohn's disease are the most common reasons for performing an ileostomy procedure. Taking into consideration the causes which lead to the need for performing an ostomy procedure, it is clear that ostomy is performed among people of all age groups and of various socio-demographic profiles. The changes resulting from an ostomy procedure are not merely of gastrointestinal and physiological nature, but ostomy also influences self-esteem and positive self-image of the patient, thus prompting changes in the person's family life, as well as the professional, social, and emotional life of an individual, which may result in anxiety and depression (5,6). The postoperative outcome has traditionally been assessed in terms of survival or improvement of disease-related symptoms. These criteria place no emphasis on the patient's overall perception of the impact of the procedure on subjectively experienced distress or wellbeing (7). According to Ross at al. (8), patients with ostomies express aspects of a more negative body image and future prospects, diminished social functioning, and a higher reported level of depression than in patients without a stoma. In addition, according to Gervaz et al. (9), patients with permanent stomas who had undergone abdominoperineal resection had their general QOL improved, but their body image and stoma-related problems were only slightly improved after one year. Alternatively, some studies report that body image or QOL of patients with temporary stomas recover after the repair of the stoma (10). After stoma formation patients should be independent in their own stoma care. According to many research studies that have been conducted so far, stoma nurse specialists have a key role in caring for patients with a stoma, both pre- and postoperatively (11). Salvadena et al. (12), emphasize that marking the spot on the abdomen surface, as well as adequate positioning of the stoma are a priority of preoperational preparations. McKenna at al. (13), compare health-related quality of life in patients receiving preoperative stoma marking by the certified wound, ostomy, and continence nurse (CWOCN) to the health-related quality of life of patients who did not receive preoperative marking. The analysis demonstrated significantly higher HRQOL in the marked group compared to the unmarked group. „Numerous research studies confirm that stoma siting is often regarded as the most important part of preoperative preparation" (13). Marking the abdominal skin at the proposed stoma site takes place after a period of assessment, discussion, observation, consideration, and evaluation that began on the first meeting between the patient and the nurse (14). The sources also highlight that the position of the stoma should allow the patient to manage it independently and to resume their normal activities after recovery. The success of the stoma can depend on its site and the general condition the patient is in. An adequately positioned stoma decreases the chances of ostomy-related complications, such as peristomal dermati-

tis resulting from leakage of the pouching system. It may also influence the predictability of a pouch's wear time, the ability of the patient to adapt to the ostomy and become independent and may even help control health care costs (12). Sands at al. (15), highlight the importance surgical techniques, adherence to the basic surgical principles, proper preoperative patient counselling, and pre-operative stoma marking, all of which may prevent many of these complications and enable the surgeon to create the perfect stoma. If any of these should lack, there is a great probability of the occurrence of complications that may result in reoperative surgery to revise the stoma and quality of life. Danielsen et al. (16), compare the costs of treating stoma patients before and after having implemented a preoperational educational programme for them, as well as the programme's impact on the quality of life. The results show that the educational programme for stoma patients improves their quality of life, but a significant difference in the average costs of the overall treatment has not been found. However, a significant difference has been found regarding the reduction of costs related to unplanned readmissions (p=0.01) as well as a reduction in visits to a general practitioner (p=0.05). The life changes that individuals with an ostomy undergo may have psychological and social consequences. For these people, living with a new device in their body may lead to fear, embarrassment, and self-doubt. As Cetolin at al. stress, the family is of fundamental importance, given its role as a form of support to the ostomate. Thus, we cannot neglect the feelings and vulnerability of family members. They need to be provided with support systems - a multi-professional health team could play an important role in informing the family and improving the quality of life of the ostomates, as well as that of the family unit (17).

The purpose of this integrative review of research studies is to explore factors involved in the quality of life of persons with an ostomy, especially regarding education, preoperative stoma marking, and the effect of the new life situation on the ostomate's self-esteem and their family members.

Methods

The sources of documents

This methodology updates information related to a specific topic, and it is based on published research studies. The overview of the articles on the topic of quality of life with an intestinal stoma was arranged in PubMed, Sciencedirect and MedLine databases. A literature search was conducted between November 2015 and February 2016. The search terms used were: ostomy education, stoma marking, quality of life, self-esteem and family. In order to acquire more articles related to the topic, a cross-search with the keywords was performed using the Boolean connector AND.

Process of inclusion of documents in the review

The first stage consisted of ruling out the articles who did not include the topic of quality of life of people with an intestinal ostomy and their family, self-esteem, education, and stoma marking. Because of the immense number of articles found, the time span of the publications was limited to the last five years (2010-2016), in order to get insight into the most recent findings.

The second stage included searching for articles that were available as a free full text. The research studies were then divided into three categories:

1. the influence of education and stoma marking on the quality of life of stoma patients,
2. self-esteem and quality of life of stoma patients,
3. quality of family life of stoma patients.

The third stage encompassed the summarizing of relevant interpretations through meticulous reading, so study design could be analysed.

Figure 1 shows the flow diagram of the study selection process.

Analysis

Step 1. The analysis of the appearance of documents was performed.

Step 2. The content analysis was performed.

The influence of preoperative education, stoma marking on the quality of life and self-esteem of a person with an ostomy and their family were the main focus of the review and the results are displayed in the tabular form separately (Table 2-4).

Having gathered all the available research studies in full form, the analysis could commence. They were grouped in three categories, and the focus of analysis included research methods, sample size, and research aims and purposes; we analysed the downsides and searched for guidelines for further scientific research directed towards public health action with the aim to improve the quality of life of intestinal stoma patients and their families.

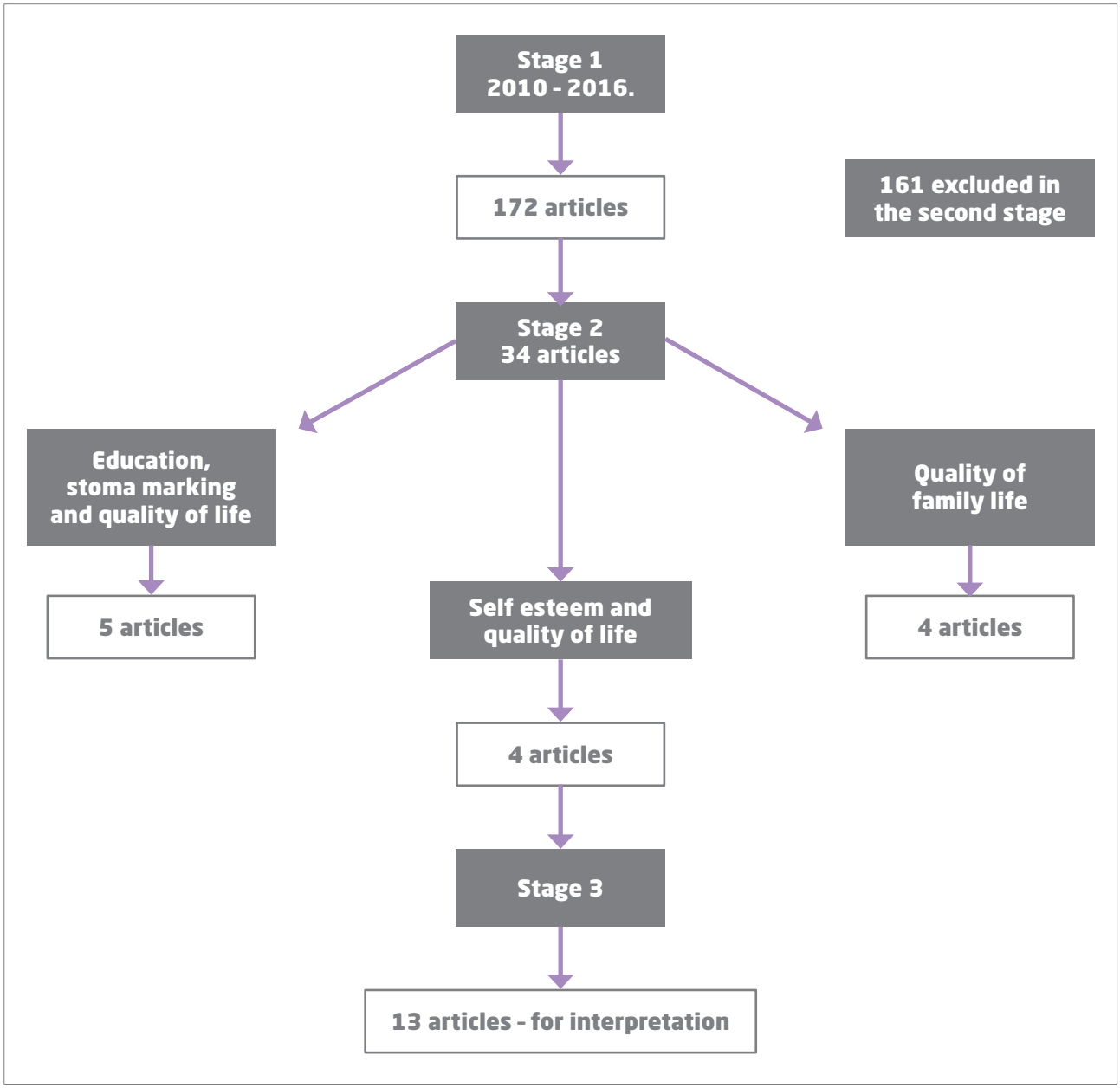

Figure 1. **The flow diagram of the study**

Results

Table 1. **Study design - education and stoma marking=quality of life**

Author	Study type	Methods	Study aim	Conclusion
Sun V, et al. (18)	Qualitative analysis Survey study	8 focus groups The City of hope QOL Ostomy specific was used to assess HRQOL. 33 participants - CRC survivors with a stoma	Pinpointing the biggest challenges that stoma patients suffering from colorectal cancer encounter. Problems with ostomy location and pouch	Clothing adaptation, problems with equipment, leakage, hernias, activity limitations result from inadequately positioned stoma which can be prevented by preoperational marking.
Danielsen AK, Rosenberg J. (16)	Case-control study 50 patients	HRQOL was measured before hospital discharge, three and six months after stoma creation and educational interventions involving lay teachers, along with a health professional teacher.	To explore a structured patient education programme on health-related quality of life.	Patients enrolled in an educational programme led by a team of specialised health workers show significantly higher HRQOL.
Coca C, Fernández de Larrinoa I, Serrano R, García-Llana H. (4)	Multicenter, quasi-experimental, prospective, longitudinal study	Two validated scales were used to determine HRQOL: EQ-5 D (Spanish version) and the Montreux questionnaire. 402 patients with intestinal stoma	To compare HRQOL in a group of patients treated in hospitals that employ nurses specializing in ostomy care and education versus patients who were cared for at hospitals that did not employ nurses specializing in ostomy care and education.	Their findings strongly suggest that patients undergoing ostomy surgery should be provided access to a nurse specialist in ostomy care since their results highlight the potential benefit promoting the HRQOL of patients.
Trninić Z, et al. (7)		Quality of life was measured using two instruments: the European Organization for Research and Treatment for Cancer (EORTC) QLQ C-30 questionnaire (version 3.0) and the EORTC colorectal module QLQ C-38 questionnaire. 91 patients with colorectal cancer	To compare QOL between the stoma and non-stoma CRC patients and compare both groups with a healthy population sample.	Significantly better results in physical functioning were observed in the healthy group when compared with two other groups of colorectal cancer patients, the group with colostomy and the group without colostomy. Financial difficulties were significantly more expressed in the group with colostomy than the other two groups.
McKenna LS, et al. (13)	Quasi-experimental, Nonrandomized cohort comparison study	Comparison of two groups of patients having had their stoma procedure done in the period from 2008 to 2010. The experimental group consisted of 35 patients who received preoperative ostomy education and stoma site marking by ostomy and continence nurse. The control group consisted of 24 patients who did not receive preoperative stoma site marking or preoperative education.	To compare health-related quality of life (HRQOL), in patients receiving preoperative stoma marking by a certified wound, ostomy, and continence nurse to patients who did not receive preoperative marking.	The patients who underwent stoma site marking reported significantly higher HRQOL than those who did not.

Table 2. **Study design - self-esteem=quality of life**

Author	Study type	Methods	Study aim	Conclusion
Golicki D, Styczen P, Szczepkowski M. (19)	Multicentre cross-sectional study	Stoma patients filled out (directly or over the telephone) WHOQOL-BREF questionnaires on the day they were discharged from the hospital and three months after discharge. Control group: patients of the internal medicine department	To evaluate the quality of life using a validated WHOQOL – BREF questionnaire and to identify limitations to the quality of life of stoma patients.	Quality of life at three months after the surgery has been assessed as higher. Limitations regarding patients' sexual life and working ability have been identified.
Hong KS et al. (10)	Prospective observation	Three-part questionnaire (consisting of body image scale, self-esteem scale and depression scale), has been filled out four weeks after the operation by 42 patients with a temporary stoma (TS) and 23 with a permanent stoma (PS). 65 patients (2009 - 2012)	To compare the psychological attitude of patients and to determine the most appropriate psychological care for patients with temporary and permanent stomas.	Contrary to the initial presumption, body image scale, self-esteem scale and BDI did not show a significant difference between PS and TS group.
Salome GM, de Almeida SA, Silveira MM. (20)	Clinical, primary, descriptive, analytical study 70 patients with intestinal stoma	Three instrument-questionnaire consisting of questions on demographics and stoma, Rosenberg Self-Esteem Scale/UNIFESP-EPM, and Flanagan Quality of Life Scale was used in the data collection.	To evaluate the clinical and sociodemographic factors and correlate them to the self-image and self-esteem of the patients.	The patients examined exhibit low self-image and self-esteem in connection with activities that characterize life with a stoma and in sociodemographic data, meaning that these individuals had negative feelings about their own bodies.
Salome GM, et al. (6)	Clinical, primary, descriptive, analytical, prospective study	The data has been collected using three instruments (demographics questionnaire, Flanagan QOLS, and Subjective well-being scale) in the period from December 2012 to May 2013. 70 stoma patients	Investigate the subjective well-being and quality of life.	The study shows that the loss of social status in patients with a stoma, the social stigma they face, suffering from the embarrassment, low self-image and self-esteem results in low quality of life, social isolation, and anxiety. A great problem regarding the patients' level of education was identified, as it was noted that most patients (47 or 67.14%) were illiterate.

Table 3. **Study design - family=quality of life**

Author	Study type	Methods	Study aim	Conclusion
Andersson G, Engstrom A, Sodeberg S. (21)	Open-ended interview study	Five women who had rectal cancer and received colostomy procedures, and remained professionally active.	To describe women's experience of living with a colostomy after rectal cancer surgery.	Additional rehabilitation is needed, as well as nursing care that focuses on adjustment to temporary or permanent changes in life.
Da Silva AL, et al. (22)	A prospective quantitative comparative case-control study 36 partners of patients with a permanent colostomy and 72 healthy individuals	Two groups of subjects – spouses of people with permanent colostomies compared with those of partners of healthy individuals.	To determine the way in which partners of patients with permanent colostomies perceive everyday life, especially the sexual aspect of life.	Reduction in sexual interest and frequency of intercourse compared with the control group. Health workers should devote more time and attention to educate partners of people with a stoma.
Zhang T, et al. (23)	Descriptive correlation study	Four scales were used – EORTC QLQ -C30, EORTC QLQ-CR38, ADS, SRQS. From Aug. 2011 to Feb. 2012 111 colostomy patients	To explore the QOL and acceptance of disability and social support of colostomy patients as well as the relationship between these factors.	The sexual functioning had the lowest function score and female sexual problems had the highest SY score. Patients feel marginalized by society. Relationship of the highest quality is the family relationship. Emotional support and care from family are extremely important to the patients. However, they eschew social activity and contacts in the community.
Leyk M, et al. (24)	Multicentre Qualitative comparative study	Interview during monthly meetings of colostomy support groups. Three groups of subjects: 1st group – subjects living with a colostomy for 1 year or less 2nd group – subjects living with a colostomy for 1-5 years 3rd group – subjects living with a colostomy for more than 5 years	To evaluate the influence of social and family support on health-related quality of life, while taking into consideration time elapsed after the ostomy procedure.	People with a higher level of social support from their families have higher HRQOL. A positive effect has been found to be related to the time elapsed from the surgery: the longer the period of living with an ostomy, the greater the influence of social support.

Education and stoma marking

With education, the focus is on self-care of the stoma and marking of the stoma site on the patients' abdomen (16). Numerous complications which often have a negative effect on the quality of life of ostomates and their families can be avoided by adequate marking and positioning of the stoma. Most frequent complications are content leakage, dermatitis, parastomal hernia, prolapse of the stoma, and stoma retraction. Nurses can have a key role in caring for patients with a stoma, both pre- and postoperatively (16). Nursing care of the stoma should begin at diagnosis, on the occasion of surgery indication and on the day of creating the stoma (20). The family should be included in the education process, in accordance with the patient's wishes. Enterostomal therapists are specialized nurses who have a special licence to take care of stomas, chronic wounds, and incontinence. Those patients who have not met with an enterostomal therapist and gotten their education before the operation and know the system can provide for them feel agitated and worried. What worries them most is whether the stoma will be placed in the best place possible (21). Sun at al. (18), conducted a qualitative analysis involving eight focus groups, trying to find out which are the specific troubles of the patients with permanent and long-terms ostomies, and the necessary adaptations to alleviate them. The largest bulk of the problems result from inadequately positioned stomas, due to the lack of preoperational marking. These problems are clothing adaptation, equipment problems (which result in leakage and skin damage), activity limitations, dietary adjustment, absence from work and early retirement. The designs and equipment of public toilets are a problem and concern in everyday life. Further research is needed to explore factors related to family knowledge and acceptance of ostomies, as well as the ways in which supportive environment can influence facing with and adjustment to the life of a person with a stoma. Danielsen and Rosenberg (16), explored in their case-control study how structured education influences the health-related quality of life of stoma patients. The conclusion was that specifically targeted educational programmes led by specially trained professional health workers improve HRQOL. Coca C et al. (4), corroborated in their multi-centre quasi-experimental prospective longitudinal study the justifiability of the existence of nurse specialists in ostomy care and their positive effect on HRQOL. Salome at al. explored the subjective well-being and quality of life of patients from Brazil using Flanagan QOL Scale and Subjective well-being scale (SWBS). This study has shown the importance of the professional (nurse, doctor or psychologist) using comprehensible and simple language that is suited to the patient. Ostomy patients should be well guided, trained, and taught the skills necessary to take care of themselves, regardless of their level of education, age, or social status. The benefits of marking the place of the stoma on the abdomen as a technique of preoperational preparation along with adequate education have been explored by McKenna et al. (13). By comparing two focus groups, they confirmed that the group that underwent adequate education and marking of the stoma before the procedure reported significantly higher HRQOL than those who did not. Speaking about education, it is important to note the study of Hong KS at al. (10), which confirmed that preoperational education is left out from most of the urgent cases of implementing a temporary stoma, and the information given to the patient during hospital treatment is merely cursory. In spite of the expectation that the patients who will be living with a stoma for a short period (6 months – 1 year) will not have as low self-esteem and body image - they do. Therefore, even if they will be living with a stoma for a short period, patients with a stoma need to be educated accurately about living with a stoma.

Self-esteem and quality of life

The assessment of self-esteem is becoming increasingly important and necessary for the majority of ostomates. These people start experiencing life differently, which entails significant changes to their standard of living and rhythm of life. Thus, they may feel rejected, seeking seclusion because of their body odour and elimination of faeces through the abdomen (20). According to numerous research studies, their system of values becomes different with time. Along with malignant diseases, the majority of ostomates must face the radical change of their physical appearance and functioning. According to Trninic et al. (7), ostomates suffering from cancer express aspects of a more negative body image, lower social functioning, and higher levels of depression than patients without stomas. On the other hand, the study of Hong KS et al. (10), which compares permanent and temporary ostomates, tells us that, in spite of the aforementioned expectation that temporary

ostomates should not suffer as badly from low self-image, there is no significant difference between the two groups regarding their self-esteem. It has also been noted that both groups were suffering from depression. It was also found that the lower economic status of the patients, the higher the body image score. It is also important to note the fact that the change of self-esteem was in a way contingent upon the life, character traits, and expectations of the ostomates before the procedure has been undertaken. According to Salome at al. (2015) ostomized patients who had previously had low self-esteem and self-image also had negative feelings about their own bodies after the procedure, and those patients who previously had not had issues regarding their self-image and self-esteem, developed them after the procedure in relation to their stomas. According to Jang et al. (25), the quality of life of a permanent ostomate is at its lowest in the first month after the operation. After the third month following the operation, all the dimensions of functioning improve. Lian's study (26), tells us that global QOL, psychological functioning, carrying out social roles, cognitive, emotional and social functioning improved significantly in the third postoperative month. If no metastases developed in the six months following the operation and implementation of the gastrointestinal stoma, the patients generally accept their stomas and adapt to life with a stoma. Salome and Almeida (20) conducted research on the correlation between sociodemographic and clinical factors and self-image and self-esteem. After comparing data related to the stoma and sociodemographic profiles with the Rosenberg Self-Esteem Scale/UNIFESP and Body Investment Scale, it became obvious that all patients demonstrated a decrease in self-esteem and self-image. It is also important to note the fact that people who have not been notified that they would be subjected to ostomy and in whom no marking was done showed worsening in self-esteem and self-image in relation to other features related to injury and sociodemographic data.

Family and quality of life

Regarding family life and support, according to Andersson at al. (21), people with stomas do not consider themselves sexually attractive and are often apprehensive about their partners' reaction. Rectum operation may bring about anatomical changes in the vagina, causing pain during intercourse. Women experience problems of sexual nature more often. Most of these problems include apprehension regarding odour control, pouch management, or sexual positions that prevent pressure on the stoma. Da Silva et al. (22), confirmed in their research that sexuality plays a major role in maintaining a satisfying level of quality of life of stoma patients, their families and partners. Family support is essential, and spouses and partners directly experience the patient's changed life (27). Therefore, spouses and partners need to be included in the educational programmes in order to deal with the situation in the best possible manner. According to the statements of the interviewees, family and friends were important to them. While spending time with them, ostomates do not think about their stomas, or possible flatulence or sounds they make. Ability to work is also very important. Returning to their previous working environments is very important. Uneasiness occurs most often because of the bathroom issue and where they would change their bags (22). Leyk et al. (24), conducted research with three focus groups with the aim of getting an insight into the influence of social support of the family in relation to the time of living with a gastrointestinal stoma. The groups were divided and interviewed regarding the time they were living with stomas. Level of social support and HRQOL were not significantly related in persons living with a colostomy for less than a year. It is evident that time is an important factor for HRQOL since the whole family finds itself in an unknown situation when their member gets a stoma. The longer a person lives with a stoma, the stronger is the social support of the family. The family also has to go through a period of adaptation. Many interviewees also state that the more time passes, the more they regard ostomy procedure lifesaving or relieving treatment, which makes them face the situation more easily (22).

Discussion

The aim of this review was to examine patient-related studies describing ostomy education and marking and their influence on self-esteem and quality of the patient's and family life. Most often used methods of the above-described studies are descriptive, qualitative, and cross-sectional studies. All studies confirm

that stoma has a negative influence on the patients' quality of life. When a patient receives a stoma, he/she begins to face many changes in his/her daily life that occur not only on the physiological level, but also on psychological, emotional, and social levels. This has its consequences: suffering, pain, deterioration, uncertainty about the future and fear of rejection (6). When speaking about the quality of life of stoma patients, it is important to note that common questionnaires on the quality of life are not sensitive enough to detect specific effects of the stoma itself on the quality of life of the patient. With a multidimensional QOL instrument, focusing on the effects of the intestinal stoma, specific areas of concern of ostomates can be identified. They include physical well-being and symptoms, psychological well-being, social well-being and spiritual well-being (28). The analysis of the aforementioned research studies shows that the most commonly used validated questionnaires for assessing the quality of life of ostomates are: Short form 36 (SF-36), City of Hope, Health-related quality of life (HRQOL), Rosenberg Self-Esteem Scale/UNIFESP-EPM, Body image scale, Self-esteem scale, Beck depression inventory, The Flanagan quality of life scale, Subjective well-being scale (SWBS), Social relation Quality scale (SRQS), Ostomy adjustment scale, Cancer-specific Quality of life questionnaire (QOL – CR 38), the European Organization for Research and Treatment of Cancer Quality of life (EORTC QOL-C30), EQ-5D. Open-ended questions are also commonly used. In order to adequately compare results and studies, it is necessary to include as many countries as possible in the validation of the questionnaires and to conduct research studies regarding the assessment of the quality of life of patients with a stoma.

Education and stoma marking

Regarding the results on education and stoma marking research, it is important to note with the aim of improving the quality of life of stoma patients that it is vital to implement preoperational marking and to make sure that the patients get continuous education from specifically trained healthcare professionals. Regarding adaptation, another important aspect of it is the role of the healthcare professional in assisting the person with an ostomy from the period before surgery to hospital discharge, but it is also their role to help family and social environment to adapt. Enterostomal therapist, along with surgeons mark the place for the stoma. It is necessary to provide stoma marking and education, regardless of the urgency of the case. A duly done stoma that is adequately placed prevents numerous complications and is bound to improve the quality of life of the stoma patient.

Self esteem

Ostomates bring up negative aspects of the changes to their self-esteem. It is essential to sensitize the environment of the patient and strengthen the patient's self-esteem using the techniques of positive psychology.

Family life

The presence of the family in the adaptive period is fundamental to the patient; family members help with explanations, dialogue, advice, and, most importantly, convey comfort and safety and provide ways to accept being a person with a stoma (28). It is thus necessary to ensure support for the family members and include them in the process of education. Further research is needed regarding the review of family relations even after the patient's discharge from the hospital, so they could be opportunely provided with adequate support.

It is also important to conduct further research with the aim of improving sexual functioning and relations, which are often stated as problems by the partners of the patients.

Limitations and strengths of this review

The most important limitation of this review is the inclusion only of studies available in full which have been analysed. An important strength of this review is the collection and analysis of the most used methodology, sample sizes, aims and conclusions, as well as a list of studies available in the searched scientific-medical corpora in the last five years. The searched corpora contain only one study on this topic published in this region, which opens a wide space for further research. A lack of public health programmes for the people with stomas of the gastrointestinal tract has been noted.

Future research

It is necessary to conduct validation of the questionnaires regarding the quality of life of stoma patients in Slovenia, Croatia, and other countries of the region in the future, so the results could be compared, the necessary corrective measures could be undertaken, and public health programmes for improving the quality of life of stoma patients could be developed. It is also necessary to strengthen educational programmes for ostomates and their families from the point of diagnosis, as long as they live with it, regardless of whether it is a permanent or temporary colostomy. It is also of vital importance to mark and adequately position stoma to all the patients who are suspected or known to need the ostomy procedure. Primary health care needs to strengthen educational programmes and programmes for monitoring the quality of life of ostomates and their families, such as patient flow and home care services. There is also space for research regarding sexual life of ostomates. Further research is needed in the field of quality of life of ostomates' families, and how they face the situation they find themselves in. It is also necessary to conduct research on the social environment and their awareness of ostomates.

Conclusion

Teaching the patient how to live with an ostomy can be a challenging experience for all healthcare professionals. The patient with an ostomy needs encouragement, support, and counselling to learn how to integrate self-ostomy care into daily activities. Evidence from studies show that adaptation to ostomy management and self-care is a long-term process, and readjustment is often needed when the individual's condition changes. Education and marking of the most acceptable place for the stoma have a major influence on the ostomates' self-esteem and quality of life of both ostomates' and their families. The patients and their families must be included in the processes of deciding, educational programmes, social support and continuous evaluation of the processes, from the point of diagnosis and throughout life. It is necessary to apply ostomy patient flow, strengthen the home care system, and public health systems of support for ostomates. Taking into consideration the insight in scientific corpora gained in this overview, there is a lack of research studies from Croatia, Slovenia, and the other countries of the region. More society education programs are needed to help patients and their family in order for their quality of life to be as high as possible.

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UČINCI PRIJEOPERACIJSKE EDUKACIJE, OZNAČAVANJA I PRIMJERENOG POLOŽAJA STOME NA SAMOPOUZDANJE I KVALITETU ŽIVOTA PACIJENATA SA STOMOM I NJIHOVIH OBITELJI

Sažetak

Cilj. Svrha je ovog sustavnog pregleda proučiti sva dostupna istraživanja kvalitete života pacijenata sa stomom i njihovih obitelji, što ovisi o učincima primjerene prijeoperacijske edukacije, najboljeg i najprihvatljivijeg mjesta za stomu označenog na pacijentovu abdomenu te poslijeoperacijskom učinku na samopouzdanje pacijenta sa stomom.

Metode. Provedeno je istraživanje literature s pomoću znanstvenih elektroničkih baza podataka Science Direct PubMed i Medline. Proučen je period između 2010. i 2016. kako bi se dobio uvid u najnovije rezultate istraživanja. Pri pretraživanju upotrijebljeni su sljedeći pojmovi: prijeoperacijska edukacija, označavanje mjesta za stomu, kvaliteta života, samopouzdanje, utjecaj na obiteljski život. Pregled članaka proveden je u tri faze.

Rezultati. Pronađeno je 1440 znanstvenih članaka. U prvoj fazi eliminiran je 1271 članak koji nije odgovarao istraživanju. U drugoj fazi analizirana su 34 članka te je donesen zaključak na temelju 13 dostupnih cjelovitih tekstova.

Zaključak. Pacijent je zadovoljan za vrijeme liječenja u bolnici; no problemi nastupaju nakon otpuštanja iz bolnice, a često su uzroci nezadovoljstva, osamljenosti, anksioznosti i straha – sve to dovodi do snižene kvalitete života. Prijeoperacijska edukacija i označavanje najprihvatljivijeg mjesta za stomu znatno utječu na samopouzdanje i kvalitetu života pacijenata s ostomijom i njihovih obitelji. Potrebno je kontinuirano pratiti pacijente sa stomom te unaprijediti sustav kućne njege i sustav javnozdravstvene podrške za pacijente s gastrointestinalnom stomom.

Ključne riječi: prijeoperacijska edukacija, označavanje i primjeren položaj stome, kvaliteta života

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An Overview of Fall Prevention Strategies Among Adult Patients in Hospital Settings

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Abstract

Falls present a major challenge for health care systems: they correlate with poor patient outcomes, extend the length of hospitalization, and increase overall medical expenditure. According to existing literature, risk factors for the occurrence of falls include the male gender, urinary incontinence, muscle weakness, agitation or confusion, and dementia. Studies have shown that the combined practice of identifying risk factors and implementing appropriate fall prevention interventions leads to a reduction in the incidence of falls among hospital patients. As the largest group of health professionals committed to providing high-quality care, nurses play an important role in preventing falls among patient populations. In order to prevent falls and maintain patient safety, it is important to identify the most effective strategies for fall prevention. This study presents an overview of previously published strategies and intervention practices on fall prevention in hospital settings around the world. The most common interventions include fall risk assessment, environment/equipment modifications, patient education/family education on fall prevention interventions, staff education on fall reporting and fall prevention, fall risk alerts, medication management, physical fitness of patients, assistance with transfer and toileting and effective team communication and leadership. Ultimately, it is incumbent upon nurses, other healthcare professionals and the entire hospital system to develop effective strategies in order to prevent falls among hospitalised patients.

Introduction

A fall is a preventable incident which frequently occurs in hospital settings. The National Database of Nursing Quality Indicators (NDNQI) established by the American Nurses Association (ANA) defines a fall as an unplanned descent to the floor (or extension of the floor, e.g. trash can or other equipment) with or without injury to the patient which occurs on an eligible reporting nursing unit. Furthermore, the NDNQI definition includes all types of falls, whether they result from physiological reasons (fainting) or environmental reasons (slippery floor), as well as assisted falls, i.e. incidents when a staff member attempts to minimize the impact of the fall. Finally, the NDNQI excludes from its definition falls by visitors, students and staff members; falls on other units not eligible for reporting; falls of patients from eligible reporting units when the patients are not on the units at the time of the fall (e.g. a patient falls in the radiology department) (1). Bittencourt et al. (2017) classify factors associated with the risk of falls in hospitalized adult patients into four categories: hospitalization, comorbidities, intrinsic/psychological factors and extrinsic factors. In their study of 612 patients, they found an association between falls and clinical neurological hospitalization and surgical trauma; diabetes mellitus, systemic arterial hypertension, visual impairment and vertigo; fear of falling (psychological factors) and mats/carpets (extrinsic factors) (2). According to Scheffer et al. (2008), fear of falling correlates with negative consequences such as actual falling, avoidance of everyday activities, decreased physical activity, depression and lower quality of life (3). Other commonly mentioned risk factors include a recent fall; muscle weakness; behavioural disturbance, agitation or confusion; urinary incontinence or frequency; prescription of "culprit" drugs; postural hypotension or syncope (4); age and the male gender (5); and dementia (6). Falls are rarely evenly distributed across units, with much higher rates reported from areas such as elderly care, neurology, and rehabilitation units (7). Hospital falls may cause physical injuries, anxiety, loss of confidence and impaired rehabilitation of the patient (8-10). Approximately 30% of all falls result in injury, particularly among older adults (11). Hospital falls also cause anxiety in hospital staff, as both patients and their family members perceive hospitals as inherently safe environments; any fall disrupts this image, which may in turn lead to complaints or even litigations (5). The frequency of falls of hospitalized patients in Croatia is estimated at 45 falls in 100.000 hospital days (12), with reported rates ranging from 7 to 302. It is important to note that there is still a decrease in the reporting of falls and the submission of data to the Croatian national quality agency. Estimates for the UK range from 210 to 840 per 100.000 hospital days, depending on the type of hospital (5). In the United States, fall-related injuries are among the 20 most expensive medical conditions. The estimated prevalence of falls in the United States based on the NDNQI definition is a rate of 356 per 100.000 hospital days (13). Thus, fall prevention programs represent an important arena in healthcare settings and are crucial in maintaining patient safety. A systematic review of best practices for fall preventions is a major factor in providing quality care to patients. According to the World Health Organization (WHO), nursing encompasses autonomous and collaborative care of individuals of all ages, families, groups and communities, sick or well and in all settings. Nurses are key to preventing falls because they spend the most time with the patient, assess the risk of falls, constantly monitor changes in the patient's medical condition, plan interventions to prevent falls, and educate the patient and caregivers about fall prevention methods. Effective fall prevention strategies are an important factor that can reduce patients' risk of falling and preserve their safety in hospital environments. A better understanding of the most effective strategies to prevent falls in the hospital setting is important in order to preserve patient safety.

The aim of this study is to present an overview of recent literature on strategies and program interventions aimed at fall prevention in hospital settings.

Methods

The search was focused on studies about strategies and program interventions on fall prevention among adults in hospital settings. The first step involved a search to identify relevant studies in the electronic

databases Science Direct and Pub Med. The inclusion criteria were articles in English published between 2009 and 2020 and articles with full texts available online. Upon the entry of the keywords into the database, the titles of potential articles were obtained. After analysing the title of the paper, the second step was the analysis of the abstracts and the full text.

Results

In a 2012 review article, Spoelstra et al. drew on data from published studies to propose evidence-based interventions for the reduction of falls among hospitalized patients. The authors demonstrated the efficacy of multifactorial fall prevention programs, which consist of the following interventions: fall risk assessment, door/bed/patient fall risk alerts, environmental and equipment modifications, staff and patient education, medication management and additional assistance with transfer and toileting (14).

In 2015, a group of Australian researchers conducted a study on an individualized patient education initiative that was a part of the Safe Recovery fall prevention program. The aim was to alert patients to their personal risk of falls, raise their knowledge about falls epidemiology and falls prevention, and to motivate them to engage in falls prevention strategies. In order to prevent falls, the following interventions were carried out: falls risk assessment, environmental modification, medical and mobility interventions, staff education about falls reporting and falls prevention, falls risk alert stickers and nurse-led discussions with patients about falls prevention (15).

In 2015, a group of United States nurses reported on the outcomes of a project entitled "No Fall Zone," designed to decrease the overall total number of falls. This project included a staff education component which relied on a two-part video simulation: the first part re-enacted a real-life fall of a patient that resulted in harm, while the second part showed how the same scenario should have been handled. Staff education also included trainings pertaining to falls policy, documentation requirements, and the Morse Fall Scale. The clinical outcomes of the project demonstrated that the specific interventions the nursing team employed had a measurable impact on fall reduction (16).

Another evidence-based study conducted in 2019 described a fall prevention program which consisted of the following interventions: purposeful rounding; evaluation of nurses' baseline knowledge and identification of gaps through simulation sessions; providing education through a debriefing session after initial simulation; observation of changes in behaviour during simulation; and identifying needs for further education through teach-back methodology and performance validation. The results of the study revealed that the implementation of appropriate interventions decreased patient falls and injuries (17).

In 2016 Eastern Association for the Surgery of Trauma Practice Management Guideline proposed the deployment of the following interventions in fall prevention among elderly individuals: supplementation of vitamin D and calcium, use of hip protectors, performance exercise programs, environment modification, falls risk assessment (18). It should be noted, however, that some of the authors of this study did not approve of vitamin D supplementation and pointed out that dietary substitution of vitamin D is only recommended in people with increased risk of vitamin D deficiency. Therefore, vitamin D supplementation was not unanimously recommended for all patients in aiding fall prevention (19).

A study by Tucker, Sheikholeslami, Farrington et al. (2019) conducted among hospitalized oncology patients suggested the following interventions for fall prevention: patients' engagement in fall risk assessment and management, effective team communication and the creation of a culture of true engagement with appropriate leadership and resources (20).

Tan, Khoo, Chinna et al. (2018) presented a multifactorial intervention scheme with demonstrable success in the reduction of fall rates among older adults in South-East Asia. Authors proposed the following interventions: a modified Otago exercise program, home hazards modification, visual intervention, cardiovascular intervention, medication review and falls education (21).

Toren and Lipschuetz's study (2017) on falls in hospital settings proposed an individualized intervention program employing the following strategies: estimation of the patient's medical condition; estimation of the patient's participation in the assessment process and their understanding of their medical condition; and evaluation of their behavioural intentions (22). This customized approach is based on the patient's specific profile.

Pearson and Coburn's evidence-based study (2011) assessed improvements to falls prevention measures in the context of the "Flex Program" (the Medicare Rural Hospital Flexibility Program in the United States) and Critical Access Hospitals (CAHs). These prevention programs included: tracking and analysis of falls; identifying and monitoring patients at high risk of falls; providing education for staff; use of special equipment (e.g. bed/chair alarms, lift devices); and implementation of physical therapy and exercise programs. The authors highlighted that effective falls prevention interventions must be interdisciplinary, ideally involving pharmacy, nursing, medical and physical therapy and quality officers. Furthermore, the study recommended additional interventions in falls prevention: toileting regimens for elderly patients who may be cognitively impaired or incontinent; medication review; the use of bed alarms and personal alarms; staff education; and restraints (including, among other methods, limiting restraint use or lowering bedrails). The authors indicated that the published evidence on the preventive use of bedrails is conflicting, since some studies report that their use increases the risk of falls, and others conclude the opposite (23).

France, Slayton, Moore et al. (2017) presented a multicomponent fall prevention strategy implemented hospital-wide at an academic medical centre, the Vanderbilt University Hospital (VUH) in the United States (24). The strategy is summarized in Table 1.

A study conducted in 2017 among hospital inpatients in England and Wales identified the following multifactorial fall risk assessment elements for fall prevention: assessment of mobility, toileting and continence needs, medication review, vision, confusion (dementia and delirium) and orthostatic blood pressure. The proposed ways of reducing environmental risks included the use of mobility aids (canes and walking frames), environmental modifications such as minimising clutter, clear (pictorial) signage coupled with attention to appropriate footwear, spectacles and hearing aid (25). The overview of studies on strategies and program interventions on fall prevention among adults in hospital settings included in the analysis is summarized in Table 2.

Available reviews agree that multicomponent fall prevention interventions have better patient outcomes than single interventions. Stern and Jayasekara (2009) suggest that it is possible that certain multifactorial interventions are more effective than others and that increasing patient education or targeting fall risk factors may be especially beneficial (26). Oliver et al. (2010) also conclude that fall prevention programs in the hospital setting have usually only been successful in reducing falls when multiple interventions were deployed (7). However, Sherrington et al. (2011) conclude that exercise as a single intervention can prevent falls and that the effects of exercise as a single fall prevention intervention are comparable to those from multifaceted interventions (27).

Table 1. **A fall prevention strategy implemented at the VUH academic medical centre (24)**

1. Leadership
a. Unit-based fall champions and committees
b. Weekly fall prevention audit rounds with real-time coaching, mentoring, and recognition
c. Unit celebrations to recognize and reward success
2. Education
a. Fall prevention campaign focused on improving staff education and unit culture
b. Revising patient and family education and engagement
c. Environmental safety education on use of bed and chair alarms
d. Re-educating staff on standardized risk assessment tool (Morse Scale)
3. Rounding
a. Targeted toileting focus during purposeful rounding
b. Shift safety huddles
c. Safety rounding with quality partner
d. Shift leader rounding
4. Environment
a. Systems engineering assessment of physical environment
b. Keeping doors open
c. Moving patients closer to nursing station with more regularity
d. Visual cues of high fall risk patients with yellow socks, yellow armband, and door sign
e. Increased accessibility and use of existing bed alarms
5. Data Transparency
a. Performance boards to display and monitor current and historical performance
b. Daily e-mail reports of daily and monthly fall data to unit and hospital leadership

Table 2. **Overview of the studies on strategies and program interventions on fall prevention among adults in hospital settings included in the analysis**

Author	Fall risk assessment	Environment/ equipment modifications	Patient education/ family education on fall prevention interventions	Staff education about falls reporting and falls prevention	Fall risk alerts	Medication management	Physical fitness of patients	Assistance with transfer and toileting	Leadership/ effective team communication
Spoelstra et al. (14)	x	x	x	x	x	x		x	
Hill et al. (15)	x	x	x	x	x		x		
Cangany et al. (16)				x					
Fridman et al. (17)				x					
Crandall et al. (18)	x	x				x	x		
Tucker et al. (20)	x								x
Tanet al. (21)		x	x			x	x		
Toren et al. (22)			x						
Pearson et al. (23)	x	x		x		x	x	x	
France et al. (24)		x	x	x				x	x
Morris et al. (25)	x	x			x	x			

Conclusion

The present study provides an overview of recent literature on best practices for fall prevention in hospital settings around the world. The results of the various studies identified the most frequent interventions: fall risk assessment, environment/ equipment modifications, patient education/family education on fall prevention interventions, staff education on falls reporting and falls prevention, fall risk alerts, medication management, physical fitness of patients, assistance with transfer and toileting and effective team communication and leadership. In order to ensure quality of care and implement effective interventions aimed at preventing falls, it is essential to employ a multidisciplinary team approach. Great responsibility is placed on nurses, other healthcare professionals, and the entire hospital organization to develop effective strategies for preventing falls among hospitalised patients.

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PREGLED LITERATURE O STRATEGIJAMA U PREVENCIJI PADA KOD ODRASLIH PACIJENATA U BOLNIČKIM UVJETIMA

Sažetak

Padovi predstavljaju velik problem zdravstvenog sustava. Povezani su s lošim ishodima bolesti, produžuju dužinu boravka u bolnici i uzrokuju povećane troškove za zdravstveni sustav. Prema postojećoj literaturi, postoje mnogi faktori rizika za pad: muški spol, urinarna inkontinencija, slabost mišića, uznemirenost ili konfuzija, demencija. Identifikacija rizičnih čimbenika povezanih s provedbom odgovarajućih intervencija sprječavanja pada pokazala se učinkovitom u smanjenju učestalosti padova među bolničkim pacijentima. Medicinske sestre čine najveću skupinu zdravstvenih radnika. Cilj im je pružiti visokokvalitetnu zdravstvenu njegu. Također, imaju važnu ulogu u prevenciji pada. Da bi se spriječio pad i održala sigurnost pacijenta, važno je identificirati najučinkovitije strategije prevencije pada. Cilj je ovog rada predstaviti pregled objavljenih strategija i intervencijskih programa o prevenciji pada u bolničkim uvjetima. Rezultati različitih studija širom svijeta identificirali su sljedeće najučestalije intervencije za prevenciju pada: procjena rizika od pada, modifikacija okoline, edukacija pacijenata/obitelji o intervencijama za prevenciju pada, edukacija medicinskih sestara o dokumentiranju padova i strategijama prevencije pada, upozorenja o riziku za pad, učinkovita primjena lijekova, poticanje fizičke aktivnosti, osiguranje pomoći pri kretnju i odlasku do toaleta te učinkovita komunikacija unutar tima i vodstvo tima. Važno je naglasiti da je velika odgovornost na medicinskim sestrama, drugim zdravstvenim radnicima i cijeloj bolničkoj organizaciji da razviju učinkovite strategije kako bi se spriječio pad.

Ključne riječi: padovi, strategije prevencije padova, intervencije, pacijent, medicinske sestre

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Chronic Alcohol Use and Accompanying Noncommunicable Diseases

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Abstract

Introduction. Heavy and chronic alcohol use connotes frequent, continuous and persistent consumption of alcoholic drinks over an extended period of time. Importantly, heavy consumption of alcohol causes many health problems to the drinker and the society at large, as over 5.1% of the global burden of morbidity and injuries are attributable to alcohol usage alone.

Aim. The purpose of this study is to identify some of the noncommunicable diseases that are associated with chronic alcohol consumption through a systematic and narrative review, with detailed descriptions of the occurrences.

Methods. A systematic and narrative review of literature that evaluates noncommunicable diseases associated with chronic alcohol consumption was carried out using Google, Medline and databases of major international health organizations. Keywords used as search terms were alcoholism, chronic alcohol use and heavy alcohol use; these terms were matched with occurrences and risk of noncommunicable diseases. Studies included in this review are clinical trials, meta-analyses, randomized controlled trials, and systematic and review articles.

Results. The findings revealed that chronic alcohol use is either a single or joint risk factor for Alzheimer's disease and dementia, arthritis, brain malfunction, cancer (most commonly of the oropharynx, larynx, oesophagus, liver, colon, rectum or breast), chronic obstructive pulmonary disease (COPD), diabetes, epilepsy, heart diseases and cardiovascular diseases, immune system dysfunction, malnourishment and vitamin deficiencies, mood disorders, bipolar disorder and depression, osteoporosis and bone malformation, pancreatitis, and ulcers and gastrointestinal problems.

Conclusion. These findings are background information as they revealed some of the noncommunicable diseases associated with chronic alcohol use. Hence, more and precise long-term cohort studies are necessary for a better understanding of the occurrences and epidemiology of noncommunicable diseases as a result of chronic alcohol use.

Introduction

Heavy or chronic alcohol use connotes frequent, continuous and persistent consumption of alcoholic drinks over an extended period of time which is destructive and deleterious to health because it negatively affects the body overall. Alcohol, also known as liquor or ethanol, is a psychoactive substance with a high dependency rate, and has been used in numerous societies and cultures for decades (1). Heavy consumption of alcohol causes many problems to the drinker and the society at large, posing a risk factor for various diseases and infections, as well as causing social and economic burden and harm to other people, for example families, relatives, friends, work associates and strangers (1).

Alcohol abuse can have severe consequences for the abuser (2). When large amounts of alcohol are consumed, the excess builds up in the bloodstream. Afterwards, the heart circulates alcohol throughout the body, leading to alterations in the normal bodily functions, and a single bout of binge-drinking can result in significant bodily impairment, damage, or even death (3). If excessive alcohol consumption occurs consistently, it can lead to the development of many chronic diseases and other serious health problems (3). Statistics suggest that alcohol abuse results in over three million deaths worldwide every year, which represents 5.4% of all global deaths (1). Furthermore, alcohol abuse is a risk factor for over two hundred diseases and types of injuries (1). Likewise, heavy consumption of alcohol is associated with the risk of developing mental and behavioural disorders, alcohol dependence, major noncommunicable diseases such as liver cirrhosis, some types of cancer and cardiovascular diseases, as well as injuries resulting from violence and traffic accidents (1). Importantly, the consequences for health associated with heavy alcohol intake are enormous, and the focus of this study is on the accompanying noncommunicable diseases that are associated with heavy and chronic alcohol consumption.

The pattern of alcohol use in the world

According to the World Health Organization (WHO), over 5.1% of the global burden of morbidity and injury is attributable to alcohol usage, as alcohol consumption causes death and disability relatively early in life (1). In addition, in the age range of 20-39, approximately 13.5% of total deaths are linked to alcohol (1). In Britain, there were over eight thousand deaths linked to alcohol abuse in 2007 (13.3 per 100.000 population in 2007). Although this was lower than in 2006, it was double the number of recorded deaths in 1991 (6.9 per 100.000 population in 1991) (4). Also, the findings from a study from the United Kingdom revealed that alcohol consumption causes about 4.1% of cancer cases in the UK (12.500 cases per year) (5). In Scotland, the National Health Scheme (NHS) estimated that in 2003 one in every twenty deaths could be linked to alcohol abuse (6). Furthermore, in Scotland, a 2009 report noted that the death rate from alcohol-related diseases was 9,000, a number three times that of 25 years previously (7).

In Russia, excessive alcohol consumption, especially among men, has recently caused more than half of all the deaths between the ages of 15 and 54 (8). In the United States of America, heavy alcohol use is the fourth leading preventable cause of death, as it results in approximately 88.000 deaths yearly, which includes one in ten overall deaths among adults between the ages of 20 and 64 (3,9). Furthermore, heavy alcohol use alone costs the US government over 249 billion dollars, approximately $2.05 per drink in 2010 (9).

Chronic alcohol use incorporates binge drinking, heavy drinking and any form of alcohol consumption by pregnant women or anyone under 21 years of age (9). Binge drinking is characterized as the intake of more than three alcoholic drinks on one occasion for a woman, or the intake of more than four consecutive alcoholic drinks for a man, while heavy drinking is characterized as the intake of more than seven alcoholic drinks in a week for a woman, or more than fourteen alcoholic drinks in a week for a man (9).

According to the Centers for Disease Control and Prevention (CDC), more than half of all deaths and three-quarters of the costs due to excessive alcohol consumption are the result of binge drinking (9). It has been further estimated that over 36.5 million of US adults, approximately one in six, binge drink at least once per week, with an average consumption of more than six alcoholic drinks per binge, resulting in an overall consumption of 17 billion binge drinks annually by US adults, approximately 470 binge drinks per an individual binge drinker (9).

Methods

A combination of the systematic and the narrative review approach was adopted for this study. A systematic review was used to identify and select viable studies, while a narrative review was used to provide detailed explanations and descriptions of the studies identified. The keywords used as search terms were alcoholism, chronic alcohol use and heavy alcohol use, and these terms were then matched with the occurrences of noncommunicable diseases.

Inclusion and exclusion criteria

Google and Medline databases were searched extensively, and the studies included in this review are clinical trials, meta-analyses, randomized controlled trials and systematic and review articles. Furthermore, the databases of major national and international health organizations (for example, The World Health Organization and Centers for Disease Control and Prevention) were searched to obtain relevant data for the study.

The researchers also included the full text of articles written in English, while abstracts written in other languages were translated into English. The year of publication was not a criterion in the selection of studies. Afterwards, extensive data screening was performed, and all documents that do not concur with the aims and objectives of the study were excluded in the final analysis to reduce the number of studies.

Papers included in the final analysis

Upon the entry of the keywords into the databases, thousands of potential articles were obtained. After analysing the titles of the papers, the second step was the analysis of their abstracts. Extensive screening was performed, and the inclusion and exclusion criteria were fully implemented, reducing the number of studies to appropriate numbers. 80 studies were included from the Medline database, while 9 other documents were obtained from other databases. In total, eighty-nine (89) studies were deemed appropriate and were included in this review study for detailed narration.

Chronic alcohol use and noncommunicable diseases

Excessive consumption of alcohol over a long period of time predisposes an individual to organ and system damage (10). Likewise, extended heavy alcohol use predisposes an individual to the onset of chronic diseases and other serious problems, for instance alcohol use disorder (AUD) and problems with learning, memory and mental health (9,11-14).

Results and discussion

Alzheimer's disease and dementia: There is an underlying neurobiological link between alcohol use and Alzheimer's disease (AD) (3). This is confirmed by the fact that alcohol use, alcohol abuse and dependence cause cognitive impairment (15). Also, alcohol adds to the cognitive burden seen in dementia through additional mechanisms of neurodegenerative processes and may contribute at various mechanistic points in the genesis and sustenance of AD pathology via neuroinflammation (15).

Heavy alcohol consumption is associated with a faster rate of cognitive decline in AD patients, suggesting that it may accelerate the progression of AD (16). Therefore, drinking habits might alter the course of AD negatively (16). In addition, there is ample evidence of a causal association between alcohol consumption and an earlier Alzheimer's disease age of onset survival (AAOS) and increased γ-glutamyl transferase blood concentrations (17). Although modest alcohol consumption (≤12.5 g/day) is associated with a reduced risk of dementia, with 6 g/day of alcohol conferring a lower risk than other levels, excessive drinking (≥38 g/day) may instead elevate the risk (18).

Finally, long-term consumption of alcohol aggravates cognitive decline, increases the permeability of the blood-brain barrier (BBB), leads to pathomorphological changes and downregulates some related structural proteins (zonula occludens-1, VE-cadherin, and occludin) and functional proteins (major facilitator super family domain-containing protein-2a [Mfsd2a]), low- density lipoprotein receptor-related pro-

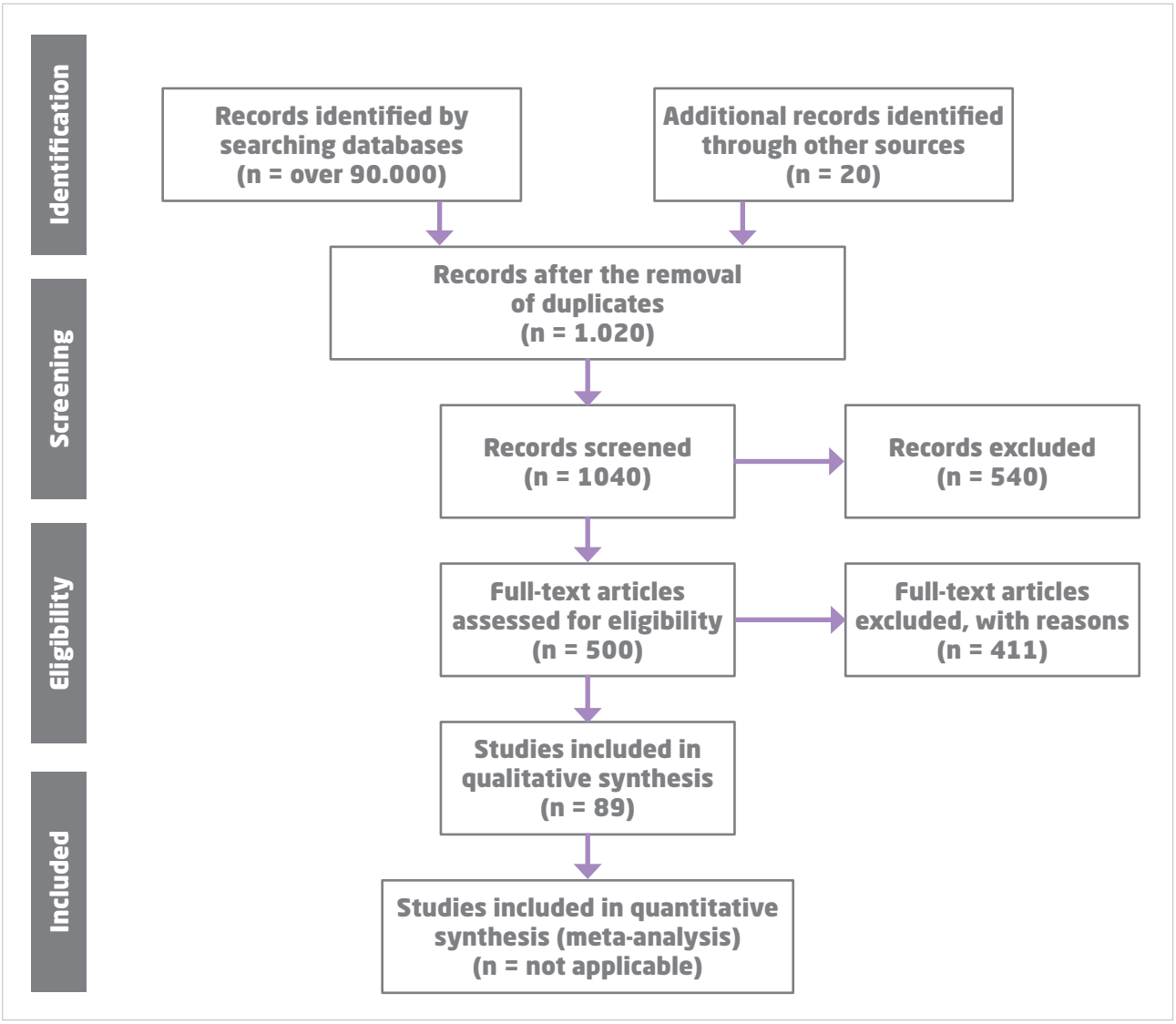

Figure 1. **Flow of information through different phases of the systematic review**

tein-1 (LRP1), receptor for advanced glycation end products (RAGE), and aquaporin-4 (AQP4) in the BBB (19). Hence, these novel findings suggest that long-term consumption of alcohol induces neural lesions, which is related to the destruction of the integrity of the blood-brain barrier (BBB) (19).

Arthritis: Chronic alcohol consumption is also linked to arthritis (3). A study on alcohol consumption as a predictor of the progression of spinal structural damage in axial spondyloarthritis revealed that drinking alcohol showed a significant correlation with the progression of spinal structural damage for both modified Stoke Ankylosing Spondylitis Spinal Score (mSASSS) and syndesmophyte progression (20). The findings of this study showed the association between alcohol consumption and spinal structural progression in axial spondyloarthritis (axSpA) patients for the first time (20). Also, increased body mass index (BMI) and even moderate alcohol intake were associated with an increased risk of psoriatic arthritis (PsA) in people with psoriasis (21).

Some studies have shown that moderate alcohol consumption offers protection against rheumatoid arthritis (RA). For instance, according to a study on the interplay between alcohol, smoking and human leucocyte antigen (HLA) genes in RA aetiology, the findings revealed that, when compared with non-drinking, low and moderate alcohol consumption was

dose-dependently associated with a reduced risk of alcohol on anticitrullinated protein antibody (ACPA) positive and ACPA-negative RA, but it was advised that a protective role of alcohol on RA risk must be interpreted with caution from a clinical and public health perspective (22).

Impact on the brain: Alcohol is associated with blurred vision, memory lapses, slurred speech, difficulty walking and slow reaction time, all of which are due to the effect of alcohol on the brain (3). Chronic drinking increases the incidence of intracerebral haemorrhage (ICH), which can have severe consequences. Chronic alcohol abuse also tends to elevate blood pressure, resulting in increased occurrence of hypertensive intracerebral haemorrhage (HICH) and exaggerated HICH-contributed brain injury (23).

Alcohol consumption during pregnancy can produce a variety of central nervous system (CNS) abnormalities in the child, resulting in a broad spectrum of cognitive and behavioural impairments that constitute the most severe and long-lasting effects observed in foetal alcohol spectrum disorders (FASD) (24). The consequences of prenatal alcohol exposure on glial cells, including radial glia and other transient glial structures present in the developing brain, astrocytes, oligodendrocytes and their precursors and microglia contribute to abnormal neuronal development, reduced neuron survival and disrupted brain architecture and connectivity (24). In addition, prenatal alcohol exposure affects iron homeostasis of specific brain areas (prefrontal cortex [PFC]) and the hippocampus, which could be involved in maladaptive cognition (25). Also, past and recent patterns of intermittent heavy alcohol consumption are associated with reduced frontal cortical thickness (i.e. "thinness") of the right mid-anterior cingulate cortex (ACC) and left posterior cingulate cortex (PCC) in emerging adults, but not the parieto-occipital sulcus (POS) (26). While cortical thinness can predate binge drinking, this pattern of maladaptive consumption may have acute neurotoxic effects that interfere with the finalization of neuromaturational processes in the vulnerable frontal cortex, resulting in increased microarchitectural pruning (26).

The findings from a study on the burden of binge and heavy drinking on the brain in adolescents and young adults suggest that altered neural structure and activity in binge- and heavy-drinking youth may be related to the neurotoxic effects of consuming alcohol in large quantities during a highly plastic neurodevelopmental period, which could result in neural reorganization and increased risk for developing alcohol use disorder in the future (27).

Cancer: Chronic alcohol consumption increases the chances of developing different types of cancer, including cancer of the mouth, oesophagus, larynx, stomach, liver, colon and rectum, as well as breast malignancies, since both acetaldehyde and alcohol itself contribute to this heightened risk (3).

There is strong evidence that alcohol causes cancer in seven places in the body, and probably others as well. These are the cancer of the oropharynx, larynx, oesophagus, liver, colon, rectum and breast, and current estimates suggest that alcohol-attributable cancers at these sites make up 5.8% of all cancer deaths globally (28,29). Also, there is some evidence of reversibility of risk in laryngeal, pharyngeal and liver cancers when alcohol consumption ceases (28,29). All types of alcoholic beverages are associated with an increased risk of cancer, which suggests that ethanol itself is the crucial compound that causes this effect (30).

The International Agency for Research for Cancer has classified alcohol consumption and acetaldehyde associated with alcohol consumption as carcinogenic for humans (group 1): the oral cavity, pharynx, larynx, oesophagus, colon, rectum, liver and female breast are places where cancer develops as a result of alcohol consumption (30). Although the process by which alcohol consumption exerts its carcinogenic effects has not been fully understood, credible occurrences include: a genotoxic effect of acetaldehyde; increased oestrogen concentration, which is important for breast carcinogenesis; a role as solvent of tobacco carcinogens; production of reactive oxygen species and nitrogen species; and change in folate metabolism (30). Furthermore, there is a linear increase in diseases as the intake of alcohol increases: oral, oesophagus, and colon cancer fall into this pattern, as very little is known about safe margins of alcohol consumption (30).

Given the linear dose-response relation between alcohol intake and risk of cancer, control of heavy drinking remains the main target for cancer control (30). In healthy subjects, European Code against Cancer recommends keeping daily consumption within two drinks for men and one drink for women (30). There is insufficient data to support the actually safe intake of alcohol as any level of alcohol consumption

increases the risk of developing alcohol-related cancer (30).

The findings of a study on alcohol consumption and serum metabolite concentrations in young women revealed that alcohol was significantly associated with several serum metabolites such as the amino acid sarcosine, the omega-3 fatty acid eicosapentaenoate, and the steroid 4- androsten-3beta, 17beta-diol monosulfate were positively associated with alcohol intake (31). Furthermore, the findings of a study on light to moderate amount of lifetime alcohol consumption and risk of cancer in Japan revealed that light to moderate alcohol consumption appears to be associated with elevated cancer risks in Japan (32).

Chronic obstructive pulmonary disease (COPD): Arvers has shown that there is a connection between COPD and alcohol consumption (33). Importantly, with a progressive desensitization of ciliary response, ethanol exposure reduces airway mucociliary clearance; as a result, this important innate primary defence mechanism which protects the lungs from the deleterious effects of different pollutants, allergens and pathogens, is weakened (33).

Chronic alcohol exposure alters the adaptative immune response to pathogens (decreasing the phagocytic function of macrophages) and leads to an inflammatory response (pro-inflammatory cytokines) (33). Also, respiratory function is impaired by alcohol misuse: asthma, chronic obstructive pulmonary disease, lung infections, and the acute respiratory distress syndrome are more frequent and severe (33). In addition to neurodevelopmental effects, alcohol consumption at high levels during pregnancy is associated with immunomodulation and premature birth (34). Premature birth, in turn, is associated with increased susceptibility to various infectious agents such as respiratory syncytial virus (RSV) (34). Hence, chronic maternal ethanol consumption during the third trimester of pregnancy alters innate immune gene expression in foetal lung (34). These alterations may underlie increased susceptibility of preterm infants exposed to ethanol in utero, to RSV and other microbial agents (34). Also, exposure to ethanol during the last trimester of pregnancy alters the maturation and immunity of the foetal lung (35). Hence, ethanol-mediated alterations in foetal lung maturation and immunity may explain the increased incidence of respiratory infections in neonates exposed to ethanol in utero (35).

The volatility of alcohol promotes the movement of alcohol from the bronchial circulation across the airway epithelium and into the conducting airways of the lung; prolonged and heavy exposure to alcohol impairs mucociliary clearance, may complicate asthma management, and likely worsens outcomes including lung function and mortality in COPD patients (36). Although smoking is the primary cause of lung cancer, a slightly greater risk of lung cancer was associated with the consumption of less or = 30 g alcohol/d than with no alcohol consumption. Alcohol consumption is also strongly associated with greater risk in male never smokers (37).

Chronic alcohol intake increased lung fibrosis in the bleomycin-model of lung injury, as this effect was related to increased production of transforming growth factor β (TGFβ) and expression of α-smooth muscle actin suggests that the lung is a target for alcohol, and that chronic alcohol intake may predispose the lung to disrepair after injury (38). The overexpression of pro-fibrotic growth factors and pro-inflammatory cytokines, and the generation of oxidant stress may lead to lung cellular dysfunction, aberrant tissue remodelling and loss of lung function (38).

In addition to the classic consequences of endotoxemia associated with liver cirrhosis that were described several decades ago, important research in the last ten years has shown that cytokines may also induce damage in remote organs such as brain, bone, muscle, heart, lung, gonads, peripheral nerve and pancreas, as these effects are even seen in alcoholics without significant liver disease (39).

Crohn's disease: A European prospective cohort study (EPIC) found that there was no evidence of associations between alcohol use and the odds of developing either ulcerative colitis (UC) or Crohn's disease (CD) (40). Nevertheless, dietary guidelines for Crohn's disease and ulcerative colitis include nutritional deficiency screening, avoiding foods that worsen symptoms, eating smaller meals at more frequent intervals, drinking adequate fluids, avoiding caffeine and alcohol, taking vitamin/mineral supplementation, eliminating dairy if lactose intolerant, limiting excess fat, reducing carbohydrates and reducing high-fibre foods during flares (41).

Diabetes: Interestingly, light and moderate alcohol consumption was associated with a lower risk of type 2 diabetes (T2D), whereas heavy alcohol consumption was not related to the risk of T2D, but cau-

tion must be taken as to what constitutes light and moderate drinking (42). In addition, excessive intake of alcohol may not only cause loss of metabolic control, but also annihilate the favourable effects on the cardiovascular system (43).

According to a study on alcohol consumption, diabetes risk and cardiovascular disease within diabetes, men consume more alcohol than women in populations with and without diabetes (44). Also, light-to-moderate alcohol consumption decreases the incidence of diabetes in the majority of the studies, whereas heavy drinkers and binge drinkers are at increased risk of developing diabetes (44). In addition, alcohol consumption may be a risk factor of diabetic lower extremity arterial disease (LEAD) in patients with T2D Mellitus (T2DM) (45). Hence, patients with T2DM are advised to stop drinking to prevent the onset of LEAD (45).

A study on alcohol consumption and the risk of T2D revealed that relative to combined abstainers, reductions in the risk of T2D were present at all levels of alcohol intake <63 g/day, with risks increasing above this threshold, as peak risk reduction was present between 10-14 g/day at an 18% decrease in hazards (46). Also, chronic alcohol consumption strongly increased the risk of T2D by increasing insulin resistance (IR), especially in men with low T2D-GRS, highlighting the importance of refraining from drinking alcohol when making recommendations for healthy lifestyle habits to prevent diabetes (47). Furthermore, a study on occupational exposure to heavy metals, alcohol intake, and risk of T2D and prediabetes among male Chinese workers revealed that exposure to metal and heavy alcohol intake was associated with the risk of diabetes in a large cohort of male workers as there was a strong interaction between these two exposures in affecting diabetes risk. The risk of both T2D and prediabetes was significantly elevated with increasing number of standard drinks per week, years of drinking and lifetime alcohol consumption (48). Importantly, during adolescence, frequent alcohol consumption at levels reaching 5 or more drinks, 3-7 days/week, substantially increased the risk of diabetes in young adulthood; hence, heavy alcohol use during adolescence may increase the risk of diabetes in young adulthood (49).

Epilepsy: The findings from a systematic review and meta-analysis study on alcohol consumption, unprovoked seizures and epilepsy revealed that there is a strong and consistent association between alcohol consumption and epilepsy/unprovoked seizures (50). There was a dose-response relationship between the amount of alcohol consumed daily and the probability of the onset of epilepsy as individuals consuming an average of four, six, and eight drinks daily had an overall relative risk compared to non-drinkers (50). Several pathogenic mechanisms for the development of epilepsy in alcohol users were identified.

Most of the relevant studies found that a high percentage of alcohol users with epilepsy would qualify for the criteria of alcohol dependence (50). Importantly, two kinds of epileptic events are frequently related to alcohol consumption: 1) seizures triggered by alcohol withdrawal; often multiple, they occur within between 10 and 48 hours after discontinuing or reducing alcohol intake and can be followed by a delirium tremens; 2) recurring unprovoked seizures, which are usually rare, 1 or 2 yearly; the risk is increased for heavy drinkers but returns to normal for ex-drinkers (51). Seizures related to alcoholism are usually generalized tonicoclonic seizures with normal electroencephalogram (EEG) and CT-scan (51). When partial seizures are identified, they are attributed to preceding brain damage, head trauma or stroke (51).

Also, long-term alcohol intake increases the risk of epilepsy via activation of mammalian target of rapamycin (mTOR) signalling (52). Moreover, ethanol-induced mTOR activation may be dependent on the AKT-mTOR signalling pathway (52). The key molecules involved in AKT-mTOR signalling pathway may serve as potential targets in the treatment of epilepsy (52). In elderly patients, the most frequent causes of late-onset epilepsy seem to be cerebrovascular disease, head trauma and alcoholism (53). The findings from an experimental approach study on alcohol consumption and sudden unexpected death in epilepsy revealed that there is a possible association between alcohol abuse and sudden unexpected death in epilepsy (SUDEP) occurrence (54). Furthermore, the findings from a systematic review study of the risk factors associated with the onset and natural progression of epilepsy revealed that family history of epilepsy, history of febrile seizures, alcohol consumption, central nervous system (CNS) and other infections, brain trauma, head injury, perinatal stroke, preterm birth and three genetic markers are associated with the onset of epilepsy (55).

Heart disease and cardiovascular health: Heavy alcohol consumption can cause high blood pressure by triggering the release of certain hormones that

cause constriction of blood vessels which adversely affect the heart (3). Furthermore, alcohol consumption has a major and complex impact on cardiovascular diseases, as both irregular and chronic heavy drinking occasions detrimentally impact most major cardiovascular disease categories, whereas light to moderate drinking has been associated with beneficial effects on ischemic heart disease and ischemic stroke (56).

Heavy drinking (more than 4 drinks per day) is associated with an increased risk of death and cardiovascular (CV) diseases (CVD) (57). Excessive alcohol intake trails behind only smoking and obesity among the three leading causes of premature deaths in the USA, as heavy alcohol use is a common cause of reversible hypertension, non-ischaemic dilated cardiomyopathy, atrial fibrillation (AF) and stroke (both ischemic and haemorrhagic) (57). Furthermore, the increased risks of heavy drinking, defined as three or more standard-sized drinks per day, are both cardiovascular (CV) and non-CV (58). CV risks include the following: (i) alcoholic cardiomyopathy (ACM), (ii) systemic hypertension, (iii) atrial arrhythmias, (iv) haemorrhagic stroke and probably ischaemic stroke (58).

In addition, alcohol consumption decreases myocardial contractility and induces arrhythmias and dilated cardiomyopathy, resulting in progressive cardiovascular dysfunction and structural damage (59). Alcohol, whether at binge doses or a high cumulative lifetime consumption, both of which should be discouraged, is clearly deleterious for the cardiovascular system, increasing the incidence of total and cardiovascular mortality, coronary and peripheral artery disease, heart failure, stroke, hypertension, dyslipidaemia and diabetes mellitus (59). A study on heavy alcohol consumption and its association with impaired endothelial function revealed that heavy alcohol consumption may be an independent risk factor of endothelial dysfunction in Japanese men (60). The findings from a cohort study on the association between alcohol consumption and risk of myocardial infarction (MI) and heart failure (HF) revealed that alcohol consumption has divergent associations with MI and HF, with an inverse association observed for MI but not HF (61). Furthermore, heavy drinking was associated with an increased HF risk in men (61). Importantly, women with moderate to heavy alcohol intake had a significantly increased risk of morbidity and total mortality compared with men in multiple subpopulations (62). Hence, control of alcohol intake should be considered for women, particularly for young women who may be susceptible to binge drinking (62).

Among East Asians, even moderate alcohol consumption can confer subclinical adverse effects on cardiac systolic functions, which was most pronounced in subjects carrying common variants in alcohol metabolizing genes (63). These findings challenge the notion of beneficial influences of less heavy ethanol consumption on the heart, especially among East Asians (63). In a study on the impact of past and current alcohol consumption patterns on progression of carotid intima-media thickness among women and men living with the human immunodeficiency virus (HIV) infection, the findings revealed that in both cohorts, 10-year heavy consumption was associated with statistically significant increases in carotid artery thickness, compared to abstinence (64). The long- term patterns of drinking at any level above abstinence were particularly significant for increases in intima-media thickness among men, with heavy consumption presenting with the greatest increase, and these findings suggest a potentially different window of risk among past and current heavy drinkers (64).

Immune system dysfunction: Drinking too much alcohol weakens the immune system, thereby making the body vulnerable to infectious diseases, such as pneumonia and tuberculosis, as alcohol causes changes in red blood cells, white blood cells and platelets (3). Furthermore, heavy alcohol consumption in association with tobacco smoke and a deficient diet causes changes in the metabolism and distribution of carcinogens; alterations in cell cycle behaviour such as cell cycle duration leading to hyperproliferation; and nutritional deficiencies, such as methyl-, vitamin E-, folate-, pyridoxal phosphate-, zinc- and selenium deficiencies and alterations of the immune system, eventually resulting in an increased susceptibility to certain virus infections such as hepatitis B virus and hepatitis C virus (65).

Moderate alcohol consumption is associated with reduced inflammation and improved responses to vaccination while chronic drinking is associated with a decreased frequency of lymphocytes and increased risk of both bacterial and viral infections (66). Furthermore, acute alcohol inhibits, and chronic alcohol accelerates inflammatory responses (67). The pro-inflammatory effects of chronic alcohol play a major role in the pathogenesis of alcoholic liver disease and pancreatitis, but also affect numerous other organs

and tissues (67). In addition to promoting proinflammatory immune responses, alcohol also impairs anti-inflammatory cytokines (67).

Likewise, chronic alcohol exposure also interferes with the normal functioning of all aspects of the adaptive immune response, including both cell-mediated and humoral responses (67). The findings from a study on prenatal alcohol exposure and the developing immune system revealed that alcohol may have indirect effects on the immune system by increasing the risk of premature birth, which itself is a risk factor for immune-related problems (68). Animal studies suggest that alcohol exposure directly disrupts the development of the immune system (68).

Chronic alcohol abuse reduces the number of peripheral T cells, disrupts the balance between different T-cell types, influences T-cell activation, impairs T-cell functioning and promotes T-cell apoptosis (69). Likewise, chronic alcohol consumption also seems to cause the loss of peripheral B cells, while simultaneously inducing increased production of immunoglobulins (69). The levels of antibodies against liver-specific auto antigens are increased in patients with alcoholic liver disease and may promote alcohol-related liver damage (69).

Finally, chronic alcohol exposure in utero interferes with normal T-cell and B-cell development, which may increase the risk of infections during both childhood and adulthood (69). The impact of alcohol on T cells and B cells increases the risk of infections (e.g. pneumonia, HIV infection, hepatitis C virus infection and tuberculosis), impairs responses to vaccinations against such infections, exacerbates cancer risk and interferes with delayed-type hypersensitivity (69).

Liver diseases: Liver is the main organ responsible for metabolizing ethanol, and therefore the major victim of alcohol abuse (3). Ethanol and its bioactive products, acetaldehyde-acetate, fatty acid ethanol esters and ethanol-protein adducts, have been regarded as hepatotoxins that directly and indirectly exert their toxic effect on the liver (70). Importantly, alcoholic liver disease (ALD) is a leading cause of cirrhosis, liver cancer, and acute and chronic liver failure, and as such causes significant morbidity and mortality (71).

Alcohol-induced changes in the gastrointestinal tract (GIT) microbiota composition and metabolic function may contribute to the well-established link between alcohol-induced oxidative stress, intestinal hyperpermeability to luminal bacterial products and the subsequent development of alcoholic liver disease (ALD), as well as other diseases (72). In addition, clinical and preclinical data suggest that alcohol-related disorders are associated with quantitative and qualitative dysbiotic changes in the intestinal microbiota and may be associated with increased GIT inflammation, intestinal hyperpermeability, resulting in endotoxemia, systemic inflammation and tissue damage/organ pathologies including ALD (72).

Furthermore, chronic alcohol consumption promotes diethylnitrosamine-induced hepatocarcinogenesis via immune disturbances as chronic alcohol consumption exacerbates DEN-induced hepatocarcinogenesis by enhancing protumor immunity, impairing antitumor immunity and aggravating hepatic pathological injury (73).

In assessing the role of alcohol during hepatic disease, and as a carcinogen, many of the deleterious effects of alcohol can be attributed to alcohol metabolism in hepatocytes (74). In addition to the direct effects of alcohol/alcohol metabolism on hepatocyte transformation, increasing evidence indicates that other intrahepatic and systemic effects of alcohol are likely to play an equally significant role in the process of hepatic tumorigenesis (74).

Malnourishment and vitamin deficiencies: Dysfunctional drinking leads to malnourishment and vitamin deficiencies (75). Furthermore, chronic alcoholic patients are frequently deficient in one or more vitamins, and the deficiencies commonly involve folate, vitamin B6, thiamine and vitamin A (76). Although inadequate dietary intake is a major cause of vitamin deficiency, other possible mechanisms may also be involved as alcoholism can affect the absorption, storage, metabolism and activation of many vitamins (76).

Malabsorption occurs frequently in chronic alcoholics, as alcoholics may malabsorb fat, nitrogen, sodium, water, thiamine, folic acid, vitamin B12 and D-xylose (77). Malabsorption occurs due to an abnormal luminal phase of digestion as well as a diffuse functional mucosal abnormality (77). Malabsorption may, therefore, contribute to clinically significant malnutrition, diarrhoea, folate-deficiency and abnormalities in tests of xylose and vitamin B12 absorption (77). Factors producing malabsorption in alcoholics include dietary folic acid and protein deficiency, pancreatic insufficiency, abnormalities of biliary secretions and direct effects of

alcohol on the gastrointestinal tract, but many of the absorptive abnormalities are reversed when alcoholics are given a nutritious diet (77).

Also, chronic alcohol consumption leads to deficiency of this vitamin due to dietary inadequacy, intestinal malabsorption, decreased hepatic uptake and increased body excretion, mainly via urine, and decreased concentration of serum folic acid may occur in 80.5% of alcoholics (78). The cause of elevated concentrations of homocysteine in the serum of alcohol abusers is a deficiency of vitamins involved, such as vitamin B12 and pyridoxal phosphate, as disturbance of folic acid and homocysteine metabolism in alcohol abusers can lead to serious clinical consequences such as macrocytic and megaloblastic anaemia and neurological disorders, as megaloblastic anaemia occurs in about half of alcohol abusers with chronic liver diseases (78). In turn, a high level of homocysteine in blood is associated with an increased risk of cardiovascular diseases, ashyperhomocysteinemia is an independent risk factor that favours the occurrence of acute coronary syndromes in patients with coronary heart disease (78).

The findings from a study on nutritional deficiencies in chronic alcoholics revealed that over-malnutrition is infrequent in this group of chronic alcoholics; specific vitamin deficiencies are present in a substantial proportion of patients and are more likely related to alcohol consumption (79). Importantly, among healthy, well-nourished, postmenopausal women, moderate alcohol intake may diminish vitamin B12 status (75).

Mood disorders (bipolar disorder, cyclothymic disorder and depression): Mood disorders and alcohol use are common in the general population and often occur together (80). Mood disorders, particularly bipolar disorder, act as unique risk factors for first alcohol use in the general population and show significant interactions with developmental timing (80).

The findings from a study on anxiety disorders and first alcohol use in the general population revealed that early onset anxiety disorders significantly predict first alcohol use in the general population, and this relationship appears to be related to change over time, which points to the need for developmentally appropriate and integrated prevention programs that target anxiety and alcohol use together (81).

There is also a causal linkage between alcohol use disorders and major depression, such that increasing involvement with alcohol consumption increases the risk of depression (82). Importantly, alcohol abuse, but not dependence, precedes many mood and anxiety disorders, and if the primary disorder does in fact play a causative or contributing role in the development of the subsequent disorder, this role can best be described as "temporally distal" (83).

The findings from a comparative study on the burden of cyclothymia on alcohol dependence revealed that CT traits in alcohol dependents seems to influence whether subjects engage earlier in pathological alcohol use and present particular alcohol-related problems, in particular Cloninger type II alcoholism phenotype (84).

Osteoporosis and bone malformation: Chronic alcohol consumption, particularly during adolescence and young adulthood, can dramatically affect bone health, and it may increase the risk of developing osteoporosis, with a loss of bone mass, later in life (85). Likewise, alcohol consumption is a risk factor for osteoporosis based on frequent findings of low bone mass, decreased bone formation rate and increased fracture incidence in alcoholics (85).

Alcohol has been shown to reduce bone formation in healthy humans and animals and to decrease proliferation of cultured osteoblastic cells (85). Secondary causes of osteoporosis include hypercortisolism, hyperthyroidism, hyperparathyroidism, alcohol abuse and immobilization (86). Importantly, heavy alcohol consumption is generally associated with decreased bone mineral density (BMD), impaired bone quality and increased fracture risk (87). Bone remodelling is the principal mechanism for maintaining a healthy skeleton in adults, and dysfunction in bone remodelling can lead to bone loss and/or decreased bone quality (87). Decrease in bone mass and strength following alcohol consumption is mainly due to bone remodelling imbalance, with a predominant decrease in bone formation (88). However, recent studies have shown new mechanisms by which alcohol may act on bone remodelling, including osteocyte apoptosis, oxidative stress, and Wnt signalling pathway modulation (88).

The findings from a study on the effect of chronic alcohol consumption on the longitudinal growth of the tibia and bone quality parameters in young rats under an experimental setup revealed that chronic consumption of alcohol affected the bones of young rats, making them weaker and osteopenic (89). In addition, long bones were shorter, suggesting interference with growth (89).

The findings from a study on voluntary chronic heavy alcohol consumption in male rhesus macaques revealed that voluntary chronic heavy alcohol consumption reduces cancellous bone formation in lumbar vertebra by decreasing osteoblast-lined bone perimeter, a response associated with an increase in bone marrow adiposity (90).

Pancreatitis: Overconsumption of alcohol can lead to pancreatitis, a painful inflammation of the pancreas that often requires hospitalization (91). Chronic abuse of alcohol, but not occasional alcoholic intoxication, also causes pancreatic damage (92).

Alcohol is metabolized by the pancreas via both oxidative and non-oxidative metabolites; hence, alcohol and its metabolites produce changes in the acinar cells, which may promote premature intracellular digestive enzyme activation, thereby predisposing the gland to autodigestive injury (93). Pancreatic stellate cells (PSCs) are activated directly by alcohol and its metabolites and also by cytokines and growth factors released during alcohol-induced pancreatic necroinflammation (93). Activated PSCs are the key cells responsible for producing the fibrosis of alcoholic chronic pancreatitis (93).

The findings from a study on the impact of alcohol consumption on pancreatic diseases revealed that high alcohol intake was associated with a higher risk of pancreatitis (around 2.5%-3% among heavy drinkers and 1.3% among non-drinkers) (94). Furthermore, about 70.5% of pancreatitis cases are due to chronic heavy alcohol consumption, and although this incidence rate differs between countries, it is clear that the risk of developing pancreatitis increases with increasing doses of alcohol and the average of alcohol consumption (94).

Ulcers and gastrointestinal problems: Heavy drinking can cause problems with the digestive system, such as acid reflux, heartburn and inflammation of the stomach lining, known as gastritis (3). When alcohol is consumed, the alcoholic beverage first passes through the various segments of the gastrointestinal (GI) tract (95). Accordingly, alcohol may interfere with the structure as well as the function of GI-tract segments. For instance, alcohol can impair the function of the muscles separating the oesophagus from the stomach, thereby favouring the occurrence of heartburn (95). Alcohol-induced damage to the mucosal lining of the oesophagus also increases the risk of oesophageal cancer (95). In the stomach, alcohol interferes with gastric acid secretion and with the activity of the muscles surrounding the stomach (95). Similarly, alcohol may impair muscle movement in the small and large intestines, contributing to diarrhoea frequently observed in alcoholics (95). Moreover, alcohol inhibits the absorption of nutrients in the small intestine and increases the transport of toxins across the intestinal walls, effects that may contribute to the development of alcohol-related damage to the liver and other organs (95).

In addition, excessive alcohol consumption (even a single episode) can result in duodenal erosions and bleeding, and mucosal injury in the upper jejunum (96). An increased prevalence for bacterial overgrowth in the small intestine may contribute to functional and/or morphological abnormalities of this part of the gut and also to non-specific abdominal complaints in alcoholics (96). The mucosal damage caused by alcohol increases the permeability of the gut to macromolecules and this facilitates the translocation of endotoxin and other bacterial toxins from the gut lumen to the portal blood, thereby increasing the liver's exposure to these toxins and, consequently, the risk of liver injury (96).

Examples of more pronounced organ injury which can occur even following a single episode of heavy drinking are tears in the mucosa at the junction of the oesophagus and the stomach (Mallory-Weiss lesion) and haemorrhagic erosions in the stomach and/or the duodenum which may lead to massive bleeding (97). In the small intestine, alcohol abuse interferes with the absorption of glucose, amino acids, lipids, water, sodium and vitamins (especially thiamine and folic acid), as this inhibition of absorption of nutrients may contribute to nutritional deficiencies frequently observed in alcoholics (97).

Acute alcohol ingestion can also damage the mucosa in the upper region of the small intestine and may lead to the disruption of the tips of the villi (97). Various diseases of the GIT, including tumours, may be related to excessive alcohol intake and the relationship between alcohol abuse and hepatic and pancreatic damage is well established (98). Importantly, alcohol-induced changes in the GIT microbiota composition and metabolic function may contribute to the well-established link between alcohol-induced oxidative stress, intestinal hyperpermeability to luminal bacterial products and the subsequent development of alcoholic liver disease (ALD), as well as other diseases (72).

Clinical and preclinical data suggest that alcohol-related disorders are associated with quantitative and qualitative dysbiotic changes in the intestinal microbiota and may be associated with increased GIT inflammation, intestinal hyperpermeability resulting in endotoxemia, systemic inflammation and tissue damage/organ pathologies including ALD (72).

The findings from a study on the effect of chronic alcohol consumption on gut bacteria composition revealed that daily alcohol consumption for 10 weeks alters colonic mucosa-associated bacterial microbiota composition in rats (99). This data showed for the first time that daily alcohol consumption can affect colonic microbiome composition and suggests that dysbiosis may be an important mechanism of alcohol-induced endotoxemia (99).

Conclusions

Heavy consumption of alcohol causes many health problems to the drinker and the society at large. As a major public health problem, 5.1% of the global burden of morbidity and injuries are attributable to alcohol usage alone. This study has shown that chronic alcohol use is either a single or joint risk factor for Alzheimer's disease and dementia, arthritis, brain malfunction, cancers (oropharynx, larynx, oesophagus, liver, colon, rectum and the breast), chronic obstructive pulmonary disease (COPD), diabetes, epilepsy, heart disease and cardiovascular diseases, immune system dysfunction, malnourishment and vitamin deficiencies, mood disorders, bipolar disorder and depression, osteoporosis and bone malformation, pancreatitis, ulcer and gastrointestinal problems, and may also be a risk factor for Crohn's disease. These findings are background information. Hence, more and precise long-term cohort studies are necessary for a better understanding of the occurrences and epidemiology of noncommunicable diseases that result from chronic alcohol use.

Generally, it is strongly recommended that any form of alcohol consumption should be stopped. If this is not possible, the level of alcohol consumption should be reduced to the barest minimum to prevent any form of alcohol-related diseases.

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KRONIČNA UPOTREBA ALKOHOLA I POPRATNE NEZARAZNE BOLESTI

Sažetak

Uvod. Prekomjeran i kroničan unos alkohola predstavlja učestalo, kontinuirano i ustrajno konzumiranje alkoholnih pića tijekom dužeg razdoblja. Prekomjerna konzumacija alkohola uzrokuje brojne zdravstvene probleme pojedincu, ali i cijelome društvu, te se više od 5,1 % globalnog moraliteta i bolesti pripisuje isključivo konzumaciji alkohola.

Cilj. Svrha je ovog istraživanja sustavnim pregledom literature i detaljnim opisom pojava prepoznati nezarazne bolesti koje se vežu uz kroničnu konzumaciju alkohola.

Metode. Sustavni pregled literature kojim se utvrdilo koje su nezarazne bolesti povezane s konzumacijom alkohola proveden je upotrebom Googlea, Medlinea i baza podataka velikih međunarodnih zdravstvenih organizacija. Ključne riječi upotrijebljene pri pretraživanju bile su alkoholizam i kronična konzumacija alkohola. Te se pojmove povezalo s pojavama i rizikom od nezaraznih bolesti. Istraživanja uključena u ovaj pregled obuhvaćaju klinička ispitivanja, metaanalize, kontrolirana klinička ispitivanja sa slučajnim uzorkom te pregledne članke.

Rezultati. Istraživanje je pokazalo da kronična konzumacija alkohola predstavlja jedan od čimbenika rizika za Alzheimerovu bolest i demenciju, artritis, nepravilnu moždanu funkciju, rak (najčešće rak ždrijela, jednjaka, jetre, debelog crijeva, rektuma i dojke), kroničnu opstruktivnu bolest pluća, dijabetes, epilepsiju, bolesti srca i kardiovaskularne bolesti, disfunkciju imunološkog sustava, pothranjenost i nedostatak vitamina, poremećaje raspoloženja, bipolarni poremećaj i depresiju, osteoporozu i deformaciju kosti, upalu gušterače te čireve i gastrointestinalne probleme.

Zaključak. Ovi uvidi predstavljaju pozadinski sadržaj jer upućuju na određene nezarazne bolesti povezane s kroničnom konzumacijom alkohola, stoga je potrebno više preciznih dugoročnih kohortnih istraživanja kako bi se bolje razumjelo pojave i epidemiologiju nezaraznih bolesti koje su posljedica kronične konzumacije alkohola.

Ključne riječi: obrazac, kronično, konzumacija alkohola, nezarazne bolesti

Author Guidelines

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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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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.

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