

# **ZDRAVJE DELOVNO AKTIVNIH IN STAREJŠIH ODRASLIH**

## **HEALTH OF WORKING-AGE AND OLDER ADULTS**

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# **Zdravje delovno aktivnih in starejših odraslih**

## Health of working-age and older adults

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Edited by Ana Petelin



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# Oral Hygiene and the Use of Fluoride Toothpastes in Adults in Slovenia in 2019

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## Abstract

**Introduction:** We present the results of the »National Oral Health Survey of Adults in Slovenia in 2019«, which for the first time determined the level of oral health care in adults at the national level. The aim of our study was to assess the state of oral health in adults and make recommendations for its promotion. We report in detail the results and findings in relation to oral hygiene and fluoride use. **Methods:** The target population was adults aged 18–74 years. The gender- and age-representative sample comprised 3,200 adults (0.21% of the population in Slovenia). The survey was conducted using the EGOHID questionnaire. The data were weighted by gender, age and education. The results were analysed based on the number and proportion of people in the selected categories according to demographic variables (gender, age, education, living environment) and other variables (frequency of dental cleaning, etc.). The distribution of proportions between different groups (by gender, age, education and living environment) and comparisons were tested using the chi-square ( $\chi^2$ ) test and the CCP test to compare proportions between different groups. **Results:** 71% of adults brushed their teeth regularly (at least twice a day), of which 81% were women and 60% men ( $\chi^2$  test=49.879,  $p<0.001$ ; CCP test,  $p<0.001$ ). Only 59% of adults with at least primary education, 68% of adults with secondary education and 82% of adults with at least tertiary education brushed their teeth at least twice a day ( $\chi^2$  test=24.965,  $p<0.001$ ), but only compared to adults with at least tertiary education (CCP test,  $p<0.001$ ). In rural areas, where 62% of adults regularly brushed their teeth, the proportion was lower than among adults in urban (78%) or suburban areas (76%) ( $\chi^2$  test=26.466,  $p<0.001$ ; CCP test,  $p<0.004$ ). Most adults used toothpaste when brushing their teeth. Of these, 64% used toothpaste with fluoride, 14% used toothpaste without fluoride and 23% did not know whether their toothpaste contained fluoride. Dental floss was used regularly or

occasionally by 64% of adults, an interdental brush was used regularly or occasionally by 52% of adults, and a tongue scraper was used regularly or occasionally by 23% of adults. Further statistical data are included in the paper. *Discussion and conclusions:* Brushing teeth at least twice daily with fluoride toothpaste and interdental brushing and/or flossing and tongue scraping once daily are recommended as effective measures to prevent oral disease. There is also a need to raise awareness of the importance of dental hygiene among the target population in terms of age, education and living environment. The results and recommendations for improving oral health are a step towards reducing the burden of oral diseases and costs in the (dental) healthcare system.

*Keywords: oral health, adults, oral hygiene, fluorides*

## Introduction

Oral health is an integral part of general health and has a significant impact on the quality of life of individuals and society. Like other aspects of health, oral health is determined by the individual, social and physical environment (WHO, 2024).

In Slovenia, we are following the trend of establishing a system for monitoring oral health indicators. With the results of the »National Oral Health Survey of Adults in Slovenia in 2019«, the level of oral health care among adults at national level was determined for the first time. The aim of our study was to assess the state of oral health in adults and make recommendations for its promotion.

In this article, we report in detail on the results and findings in relation to oral hygiene, fluoride use and the use of (other) aids to maintain oral hygiene.

## Methods

The study was designed as a cross-sectional epidemiological survey of the Health Interview Survey (HIS) type and was conducted according to the results of a pilot verification study (Šket, 2015). The study was conducted in spring 2019 on a representative sample of the general population aged 18–74 years, which included 3,200 adults (0.21% of the population in Slovenia).

The survey was conducted using the EGOHID questionnaire (Bourgeois et al., 2008). The adults included in the study received an invitation to participate in the survey at a home address with a password to access the online questionnaire. For participants over 44 years of age, a written questionnaire was enclosed with the notification letter. Participants received a further postal reminder during the survey period.

In our study, we analysed the frequency of tooth cleaning. When analysing, we combined the categories »brushing teeth twice or several times a day« and the categories »once a day«, »several times a week«, »once a week« and »never«, as regular tooth brushing means that teeth are brushed at least twice a

day. We also asked whether respondents used toothpaste and, if so, whether it contained fluoride. We also investigated the use of other aids to maintain oral hygiene; we analysed how often adults in Slovenia use dental floss, an interdental brush and a tongue scraper.

The results were analysed based on the number and proportion of people in the selected categories according to demographic variables (gender, age, education, living environment) and other variables necessary for research or planning further interventions (frequency of tooth cleaning, etc.).

The data obtained in the study were weighted by gender, age and education, taking into account age groups of one year. The sample- and population-weighted data were analysed using the computer programme IBM SPSS Statistics for Windows, version 21.0 (IBM, 2020) and the programme R, version 3.6.0 (n.d.).

The distributions of proportions between different groups (by gender, age, education and living environment) were tested using the chi-square ( $\chi^2$ ) test and the CCP test (Column Comparison Proportion test) to compare the proportions between different groups. A confidence interval of 95% was used in both cases.

## Results

### *Frequency of Tooth Brushing*

The results showed that 71% of adults brushed their teeth regularly (at least twice a day) (Figure 1).

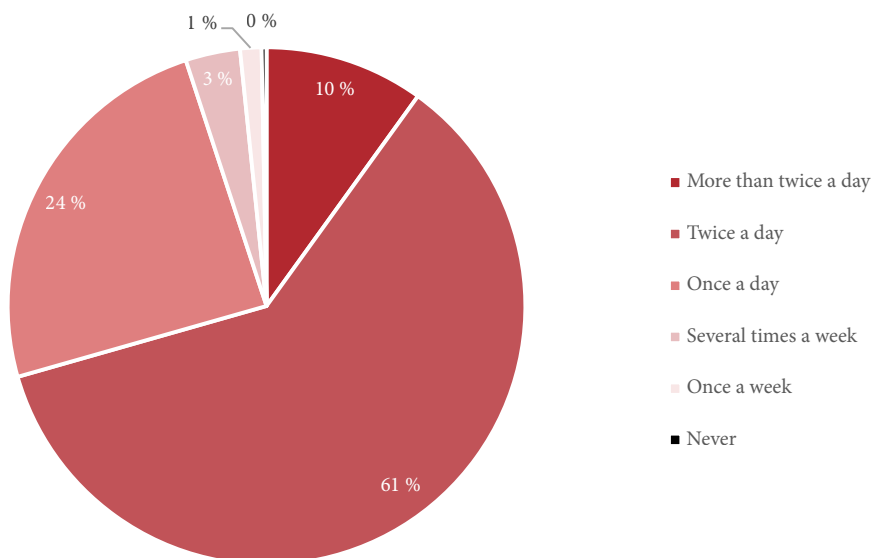


Figure 1: Proportion of adults aged 18–74 years by frequency of tooth brushing.

Broken down by gender, 81% of women and 60% of men brushed their teeth regularly (Figure 2); the differences between the proportions by gender were statistically significant ( $\chi^2$  test=49.879,  $p<0.001$ ; CCP test,  $p<0.001$ ).

In terms of age, the proportion of 25- to 34-year-olds stands out: 84% of people brushed their teeth regularly (Figure 2); the differences between the proportions by age were statistically significant ( $\chi^2$  test=17.307,  $p=0.004$ ), but only for the proportions in this age group compared to adults over 44 years of age (CCP test,  $p<0.05$ ).

It can be seen that the proportion of people who brushed their teeth regularly (at least twice a day) increased with the level of education (Figure 2). Only 59% of adults with at least primary education, 68% of adults with secondary education and 82% of adults with at least tertiary education brushed their teeth at least twice a day; the differences between the proportions according to educational level were statistically significant ( $\chi^2$  test=24.965,  $p<0.001$ ), but only in comparison to adults with at least tertiary education (CCP test,  $p<0.001$ ).

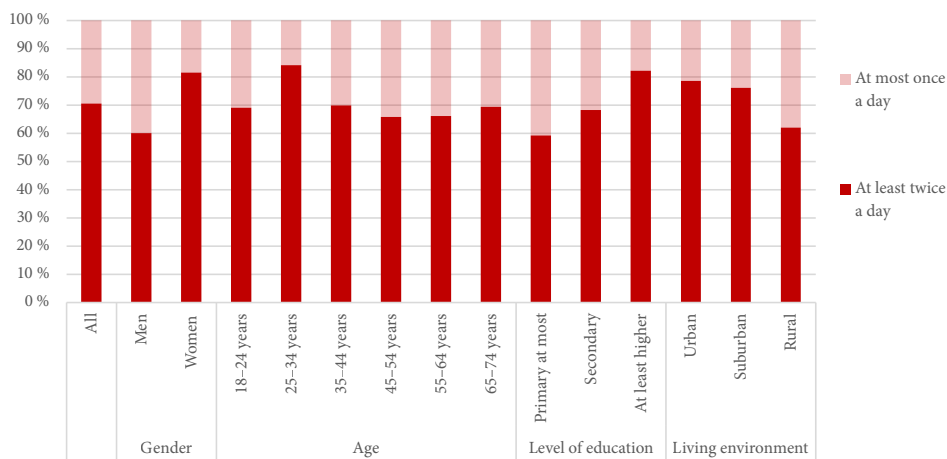
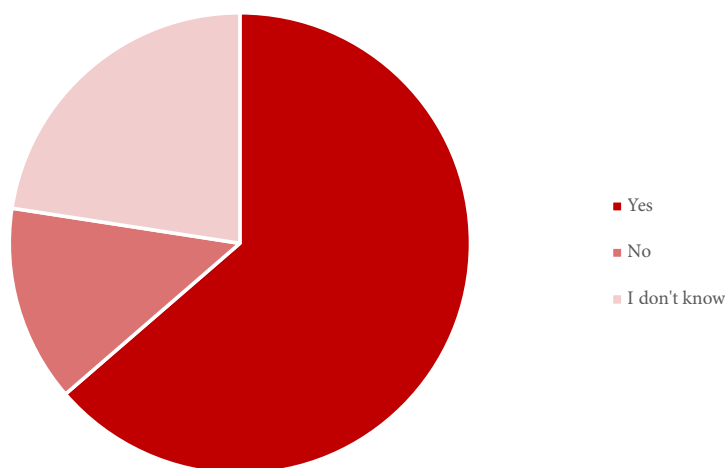


Figure 2: Proportion of adults aged 18–74 years by frequency of tooth brushing, broken down by gender, age, education and living environment.

We also analysed the frequency of tooth brushing in relation to the living environment. In rural areas, where 62% of adults regularly brush their teeth, the proportion was lower than among adults in urban (78%) or suburban areas (76%) (Figure 2); the differences between the proportions according to living environment were statistically significant ( $\chi^2$  test=26.466,  $p<0.001$ ; CCP test,  $p<0.004$ ).

### *Use of Fluoride Toothpaste*

Most adults aged 18–74 years (98%) used toothpaste when brushing their teeth. Of these, 64% used toothpaste with fluoride, 14% used toothpaste without fluoride and 23% did not know whether their toothpaste contained fluoride (Figure 3).



*Figure 3: Proportion of adults aged 18–74 years who use fluoride toothpaste.*

The use of fluoride toothpaste was higher among adults with higher education. Fluoride toothpaste was used by a greater proportion of people with at least a high school education (70%) than people with a secondary school education (63%) or primary school education or less (56%); the differences in proportions by education were statistically significant ( $\chi^2$  test=12.399,  $p=0.015$ ).

The differences between the proportions according to the use of fluoride-containing toothpaste by gender, age and living environment were not statistically significant.

### *Use of (Other) Oral Hygiene Aids*

Use of dental floss. We found that 36% of respondents did not use dental floss. The proportions of people by frequency of dental floss use, broken down by gender, education and living environment, are shown in Table 1.

The differences between the proportions by gender were statistically significant ( $\chi^2$  test=29.815,  $p<0.001$ ). By age, the proportion of those who flossed was lowest among adults aged 45 years and older at 60%, lower than among younger adults aged 44 years or less, 70% of whom flossed; the differences between the two proportions by age were statistically significant ( $\chi^2$  test=30.434,  $p=0.001$ ). The frequency of flossing was higher among people with higher levels of education (Table 1); the differences between the proportions were statistically significantly greater among people with at least higher education

Table 1: Frequency of dental floss use in adults aged 18–74 years by gender, education and living environment.

		Use of dental floss		
		Yes (regularly)	Occasionally	No
All		17%	47%	36%
Gender	Men	13%	42%	45%
	Women	21%	52%	27%
Level of education	Primary at most	9%	34%	58%
	Secondary	15%	46%	39%
	At least higher	24%	55%	20%
Living environment	Urban	19%	52%	29%
	Suburban	24%	45%	31%
	Rural	12%	44%	44%

( $\chi^2$  test=47.649,  $p<0.001$ ; CCP test,  $p<0.006$ ). Flossing also depended on the living environment (Table 1); the proportion of people in rural areas who did not floss was statistically significantly higher than those in urban or suburban areas ( $\chi^2$  test=24.116,  $p<0.001$ ; CCP test,  $p<0.018$ ).

Use of interdental brushes. Among adults aged 18–74 years, 48% of adults did not use an interdental brush. The proportions of people by frequency of interdental brush use by gender and age are shown in Table 2.

Table 2: Frequency of interdental brush use in adults aged 18–74 years by gender and age.

		Use of interdental brushes		
		Yes (regularly)	Occasionally	No
All		23%	29%	48%
Gender	Men	23%	23%	54%
	Women	23%	36%	41%
Age (years)	18–24	12%	28%	61%
	25–34	12%	28%	60%
	35–44	16%	39%	46%
	45–54	21%	29%	50%
	55–64	43%	23%	34%
	65–74	36%	23%	41%

With regard to gender, the differences between the proportions who did not use an interdental brush were statistically significantly lower in women than in men ( $\chi^2$  test=16.124,  $p<0.001$ ; CCP test,  $p<0.001$ ). In terms of age, a greater proportion of adults aged 55 years or older used an interdental brush

regularly or occasionally, just over 60% of people, than adults aged 54 years or younger, where half or even a smaller proportion of people used an interdental brush; the differences between the proportions were statistically significant ( $\chi^2$  test=68.444,  $p<0.001$ , CCP test,  $p<0.031$ ). The differences between the proportions with regard to the use of an interdental brush, education and living environment were not statistically significant.

Use of a tongue scraper. Among adults aged 18–74 years, a tongue scraper was not used by 74% of adults. The proportions of people who frequently use a tongue scraper by gender, education and living environment are shown in Table 3.

Table 3: Frequency of tongue scraper use in adults aged 18–74 years by gender, education and living environment.

		Use of a tongue scraper		
		Yes (regularly)	Occasionally	No
All		8%	18%	74%
Gender	Men	6%	16%	78%
	Women	10%	21%	70%
Level of education	Primary at most	0%	12%	88%
	Secondary	8%	20%	72%
	At least higher	10%	17%	73%
Living environment	Urban	11%	24%	65%
	Suburban	8%	16%	76%
	Rural	5%	15%	81%

The differences between the proportions of tongue scraper use by gender were not statistically significant. Regarding age, a greater proportion of younger adults aged 18 to 44 years used a tongue scraper regularly or occasionally, about one-third, compared with people aged 45 to 74 years, of whom only about one-fifth used a tongue scraper; the differences between the proportions in the different age groups were statistically significant ( $\chi^2$  test=21.866,  $p=0.016$ ). The differences between the proportions depending on the education of the persons were statistically significant ( $\chi^2$  test=12.297,  $p=0.015$ ). A higher proportion of people with a higher level of education used a tongue scraper regularly or occasionally than people with a lower level of education (CCP test,  $p<0.05$  or  $p<0.001$ ). With regard to the living environment, the differences between the proportions were statistically significant ( $\chi^2$  test=16.677,  $p=0.002$ ). A greater proportion of adults from an urban environment regularly used a tongue scraper than those from a suburban or rural environment (CCP test,  $p<0.05$ ).

## Discussion

### *Frequency of Tooth Brushing*

The results of our 2019 study show relatively poor oral hygiene among adults aged 18–74 years in Slovenia, but the percentage of adults who brush their teeth regularly is similar or even slightly higher than the results of the 2016 study (Ranfl and Oikonomidis, 2018), which showed that 64% of adults aged 25–74 years in Slovenia brush their teeth regularly (at least twice a day). The results of that study also showed that adequate oral hygiene is related to the level of education of the population. The proportion of adults who brushed their teeth regularly was lowest among those with primary education (49%) and highest among adults with at least higher education (77%). The proportion of adults who brushed their teeth regularly was higher in urban areas (71%) and lower in rural areas (56%). Compared to our study, the results of our survey also show a slightly higher proportion of people with higher education compared to people with lower education (high school or less) and of people from urban and suburban environments compared to people from rural environment.

According to a 2014 national opinion survey by Delta Dental, 31% of Americans do not brush their teeth regularly, which is comparable to the results of our survey; 29% of adults between the ages of 18 and 74 do not brush their teeth regularly.

### *Use of Fluoride Toothpaste*

It is possible that the information we received about the fluoride content of toothpaste was not reliable and that people do not know if they are using fluoride toothpaste. Nevertheless, based on the research results, we can estimate that 80% of people use fluoride toothpaste and 20% of people use toothpaste without fluoride.

### *Use of (Other) Oral Hygiene Aids*

Dental floss is used regularly or occasionally by a larger proportion of women and people with at least a higher level of education. A third of people under 45 and slightly less than half of people aged between 45 and 74 did not use dental floss. The proportion of people who did not floss was highest in rural areas, where it was statistically significantly higher than in urban or suburban areas.

According to NHANES (National Health and Nutrition Examination Survey), 2011–2014 (CDC, 2020a; CDC, 2020b), 32% of adults, 26% of men and 37% of women in the US population aged 30 years and older floss daily, and 32% of adults do not floss (Fleming et al., 2018). According to a national survey by Delta Dental (2014), 20% of Americans do not floss. The two estimates differ due to different methodological approaches. Both studies and our research results show that women floss more frequently than men. The research results are surprising because according to the most recent data (Fleming et al., 2018), as



many as 68% of American adults aged 30 years or older do not floss as recommended. In Slovenia, according to the data from our study, this figure is 83% of adults between the ages of 18 and 74.

The results of our study show that a larger proportion of women and 55–74 year olds use interdental brush. The use of interdental brush was not dependent on education or living environment. We also found that a larger proportion of women, younger adults aged 18–44 years, people with higher levels of education and people from urban areas used the tongue scraper regularly or occasionally. Prevalence studies on the use of dental care appliances are very rare, and to our knowledge there are no studies that can be compared with our studies on the use of interdental brushes and tongue scrapers.

## Conclusions

Effective measures to prevent dental disease include tooth brushing at least twice a day for at least two minutes with fluoride toothpaste, brushing once a day with interdental brushes and/or dental floss and tongue scraping once a day. It is also important to sensitise the target population to the importance of dental hygiene, depending on age, education and living environment.

The results of our study are a step towards reducing the burden of dental and oral diseases and costs in the (dental) health care system. An important challenge for the future is the continuous monitoring of oral health and the dental healthcare system in Slovenia based on oral health indicators in accordance with international recommendations, which will facilitate the planning of appropriate and effective programmes to improve oral health. We should promote activities to improve oral health and raise awareness of the importance of oral health in the lives of individuals. Oral health is an important part of general health and has been shown to contribute to a better quality of life.

The results and recommendations to improve oral health are a step towards reducing the burden of oral diseases and costs in the (dental) healthcare system.

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# Evaluation of Student Knowledge of Palliative Care

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## Abstract

**Introduction:** There has been an increase in the number of patients in palliative care due to better care for patients suffering from chronic diseases and cancer. Physiotherapists and occupational therapists are indispensable members of the palliative care team. The three-year curriculum at the Physiotherapy and Occupational Therapy Departments at university provides several courses covering basic knowledge of palliative care. The aim of this study is to establish how familiar physiotherapy and occupational therapy students are with palliative care and if they have different levels of knowledge in this area. The way in which physiotherapy and occupational therapy students gain additional knowledge of this topic and learn about palliative care will also be determined. **Methods:** 136 undergraduate occupational therapy students and 138 undergraduate physiotherapy students at the University of Applied Health Sciences in Zagreb participated in this study. All respondents filled in an online questionnaire about their knowledge of palliative care, which was created and made accessible on the Google Forms platform. **Results:** We expect that the results will provide a clear idea of the level of knowledge physiotherapy and occupational therapy students of all three years of study have about palliative care. The results of this study show similar levels of knowledge in physiotherapy and occupational therapy students. The presented results indicate a small difference between the two study groups (PT and OT), but it is not statistically significant. **Discussion and conclusion:** Results of this study could provide new ideas regarding formal and informal training of healthcare professionals, primarily physiotherapists and occupational therapists, in order to improve the quality of palliative care resulting in a higher quality of life of patients in palliative care.

**Keywords:** *students, physiotherapy, occupational therapy, palliative care.*

## Introduction

In accordance with demographic changes and the epidemiological picture of the development and occurrence of chronic incurable diseases, the number of palliative patients has been increasing. Therefore, it is necessary to provide healthcare professionals with palliative care education. In recent years, the challenges related to the provision of quality palliative care have been increasingly recognised. Empirical evidence suggests that palliative care services are not sufficiently available and only start in later stages of diseases (Centeno et al., 2016). More than half of the countries in the World Health Organization's European Region include palliative medicine education in the health studies curricula (de Araujo and de Araujo, 2018). In many European countries, palliative care education is becoming a priority, especially in more developed countries (Centeno et al., 2016). The development of palliative care is gaining momentum also in the Republic of Croatia. However, regional inequality and a lack of healthcare professionals in the field of palliative care are present.

Understanding the current level of students' palliative care knowledge and attitudes is important for the analysis of future education (Sadhu et al., 2010) and the introduction of regular palliative care courses for all healthcare professionals at universities. Attitudes and knowledge of palliative care should be at a high level in all members of the multidisciplinary team participating in palliative care, so that awareness of the importance of palliative care is accepted in society.

The role of a physiotherapist (PT) in palliative care is primarily to identify, assess and plan the treatment of the patient's functional needs and improve the patient's quality of life (Marcant and Rapin, 1993) in cooperation with other team members. Physiotherapy intervention for palliative patients is focused on respiratory exercises, therapeutic exercises to increase range of motion, strength, increase balance and coordination, walking exercises and other functional activities that are necessary in activities of daily living, physiotherapy analgesic procedures and interventions to prevent secondary complications (Wilson et al. 2017) planned according to the patient's current condition. Improving the quality of life, functional ability and independence in activities of daily living are an integral part of occupational therapy interventions (OTIs) in working with palliative patients. Occupational therapy procedures assess environmental and contextual factors (e.g. family and caregiver training, availability of certain facilities in the vicinity, social support), as well as personal factors (decreased endurance, increased anxiety) that limit the ability and satisfaction when performing the desired activities and plan an intervention in cooperation with the patient and their family. Occupational therapy interventions include functional assessment and defining rehabilitation goals, education about aids and ergonomic adaptation, training of patients and families, cooperation with team members in order to improve the patients' quality of life (Njegovan-Zvonarević, 2018).

Physiotherapists and occupational therapists in Croatia often remain unrecognised as members of the palliative team. Their role in the palliative team should be key for improving the quality of life of patients, as well as their families. Despite that, healthcare professionals, including physiotherapists and occupational therapists, may not have enough knowledge or additional training in palliative care (León Perilla and Joaquim, 2022). The aim of this study was to determine the extent of familiarity with palliative care among physiotherapy and occupational therapy students and to assess whether a statistically significant difference exists between their levels of knowledge.

## Methods

### *Participants*

The study was conducted from 1 to 30 September 2023. The respondents filled in an online questionnaire designed specifically for this study and posted on the Google Forms platform. In the introductory section of the questionnaire, they were informed about the aim and purpose of the study. The study received a positive opinion from the Ethics Committee (KL: 602-03/24-18/337; URBR: 251-379-10-24-02) on May 6, 2024 of the University of Applied Health Sciences in Zagreb. Participation in the study was voluntary and the respondents could withdraw at any time without providing an explanation. In accordance with the General Data Protection Regulation (GDPR), which came into effect on 25 May 2018, and which governs the protection of personal data of citizens of the European Union, we guarantee the anonymity of personal data and the confidentiality of the responses provided.

A total of 274 respondents participated in the study, divided into 2 groups. One group consisted of 138 undergraduate students of physiotherapy (first-, second- and third-year students, Physiotherapy group – PT group), while the other study group (Occupational therapy group – OT group) was formed of 136 undergraduate students of occupational therapy (first-, second- and third-year students). All respondents were students at the University of Applied Health Sciences in Zagreb.

The PT group consisted of 14 respondents who were first-year students (10%), 38 (28%) were second-year students, and 86 (62%) were third-year students. In the OT group, there were 58 respondents who were first-year students (43%), 24 (17%) were second-year students, and 54 (40%) were third-year students. Out of a total of 274 respondents, 72 (26%) were first-year students, 62 (23%) were second-year students, and the majority were third-year students (140 or 51%). In the PT study group (N=138), there were 36 men (26%) and 102 women (74%). In the OT study group, out of the total number of respondents (N=136), there were 10 men (7%) and 126 women (92%). Out of the total number of respondents in both study groups (PT and OT), 46 men (17%) and 228 women (83%) participated in the study. The average age of all respondents (N=274)

was 22 years. The respondents from the PT group had an average age of 23 years, while the respondents from the OT group had an average age of 21 years (Table 3).

*Table 1. Distribution of respondents by gender.*

Gender	PT	OT	Total PT+OT
M	36 (26%)	10 (7%)	46 (17%)
F	102 (74%)	126 (93%)	228 (83%)
TOTAL M+F	138 (100%)	136 (100%)	274 (100%)

M – male; F – female; total M+F – combined results for male and female respondents;  
PT – physiotherapy study group; OT – occupational therapy study group; total PT+OT  
– combined result for the physiotherapy and occupational therapy groups

*Table 2. Distribution of respondents by year of study.*

Year of study	PT	OT	Total PT+OT
First year	14 (10%)	58 (43%)	72 (26%)
Second year	38 (28%)	24 (17%)	62 (23%)
Third year	86 (62%)	54 (40%)	140 (51%)
Total	138 (100%)	136 (100%)	274 (100%)

PT – physiotherapy study group; OT – occupational therapy study group; total PT+OT  
– combined results for the physiotherapy and occupational therapy study groups; First year  
– first year of study; Second year – second year of study; Third year – third year of study

*Table 3. Distribution of respondents by age.*

	N	M	SD
PT	138	23	6,28
OT	136	21	2,94
Total PT+OT	274	22	5,05

PT – physiotherapy study group; OT – occupational therapy study group; total FT+RT  
– combined results for the physiotherapy and occupational therapy groups; N – number  
of respondents; M – median; SD – standard deviation

### *Questionnaire*

The respondents filled in an online questionnaire designed for this study. The questionnaire was accessible on the Google Forms platform. In the introductory part of the questionnaire, they were informed about the aim and purpose of the study. The study received a positive opinion from the Ethics Committee of the University of Applied Health Sciences in Zagreb. The questionnaire was anonymous and the respondents could withdraw at any time while completing the questionnaire.

The questionnaire consisted of two parts. The first part consisted of a structured questionnaire on general socio-demographic characteristics con-



taining four questions: gender, age, course of study and year of study. For the second part of the questionnaire, we created the Assessment Index of Students' Palliative Care Knowledge. The questionnaire comprised eight questions. Five of the questions were related to the perceived assessment of acquired knowledge of palliative care, and three questions were related to determining current knowledge of palliative care. The first five questions were rated on a Likert scale from 1 to 5, and the results range from 5 to 25. A higher score meant a higher perceived assessment of palliative care knowledge. The three remaining questions were evaluated separately, and were added due to the assumption that they are essential for determining the respondents' current knowledge of palliative care.

### Statistical Analysis

The results of the Assessment Index of Students' Palliative Care Knowledge were processed using the statistical program IBM SPSS Statistics V23.0. The Kolmogorov–Smirnov test was used to determine normality of distribution. Differences in numerical variables between two independent groups were tested using the Mann–Whitney U test. The significance level was set at  $\alpha=0.05$ . The results of the three questions (gender, age, year of study) that were added because of the assumption that they are important for determining the respondents' current knowledge of palliative care were presented according to the percentage of answers given by the respondents.

## Results

### Results of Determining Current Knowledge of Palliative care

Table 4. The respondents' results when asked where they learned about palliative care.

Proposed responses to the question:	PT N (%)	OT N (%)
in secondary school	52 (36.96)	43 (31.62)
at university	37 (28.26)	69 (50.73)
from friends or family	34 (23.91)	17 (12.50)
through the media	10 (7.25)	4 (2.94)
through social media	1 (0.72)	3 (2.21)
other	4(2.90)	0 (0)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

When asked where they learned about palliative care, 69 respondents of the OT group (50.73%) confirmed that they learned about the existence of palliative care at university and 37 respondents of the PT group (28.26%) confirmed the same. The respondents' most common response to the question *Where did*

*you learn about palliative care?* is that they learned about the existence of palliative care in secondary school and this was the answer given by 52 respondents of the PT group, or 36.96% of them, and 43 respondents of the OT group, or (31.62%) of them (Table 4).

In the respondents' results for the question "*Which patients belong to palliative care?*", the respondents from the OT group showed greater knowledge than the respondents from the PT group. As many as 108 respondents from the OT group, or (79.41%), answered that those were patients with a chronic incurable disease. The same answer was given by only 37 respondents of the PT group, or (26.81%) of them.

In the respondents' results for the question "*Who makes up the palliative care team?*", 131 respondents (96.32%) from the OT group answered that all the specified experts (physician, specialist physicians, nurse, physiotherapist, clergyman, social worker, psychologist) belong to the palliative team, while the same statement was confirmed by only (21.74%) of PT respondents, i.e. 30 of them.

#### *Results of the Assessment Index of Students' Palliative Care Knowledge*

In the results of the perceived assessment of the respondents' palliative care knowledge for the question "*Do you know what palliative care is?*", "I do" and "I fully know" were the answers given by as many as 98 respondents from the PT group and 86 respondents from the OT group. The total score of the perceived assessment of both examined groups (PT and OT) is 4 (Table 5).

*Table 5. The respondents' answers to the question "Do you know what palliative care is?"*

<i>Proposed responses to the question:</i>	<i>PT</i>	<i>OT</i>
	<i>N (%)</i>	<i>N (%)</i>
I don't know at all	4 (2.90)	2 (1.47)
I am familiar with the term, but I don't know exactly what it is	11 (7.97)	14 (10.29)
I somewhat know the meaning of the term	25 (18.12)	34 (25)
I know the meaning of the term	57 (41.30)	73 (53.68)
I fully know the meaning of the term	41 (29.71)	13 (9.56)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

In the respondents' assessment results for the question about the necessity of including the Palliative Care course in the undergraduate study of PT and OT, 83 respondents (60.15%) of the total number of respondents of the PT group, stated that the course was necessary "to a large extent" and "to a very large extent". In the OT group, 35 respondents (25.73%) of the total number of the OT group respondents gave answers in the above two categories.

*Table 6. The respondents' results for the question "To what extent do you believe it is necessary to include the Palliative Care course in undergraduate studies?"*

Proposed responses to the question:	PT	OT
	N (%)	N (%)
not even a little	1 (0.72)	5 (3.68)
to a small extent	9 (6.25)	30 (22.05)
to an average extent	45 (32.61)	62 (48.53)
to a large extent	55 (39.86)	25 (18.38)
to a very large extent	28 (20.29)	10 (7.35)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

In the respondents' assessment results for the question about the necessity for additional palliative care training, the biggest difference in a particular category of answers is in the category "to a very large extent": 28 respondents (20.44%) from the PT group believe that additional training in their profession is necessary to a very large extent, while 13 respondents from the OT group (9.56% of them) thought the same (Table 7).

*Table 7. The respondents' results for the question "To what extent do you believe your profession needs additional palliative care training?"*

Proposed responses to the question:	PT	OT
	N (%)	N (%)
not even a little	2 (1.46)	3 (2.21)
to a small extent	10 (7.30)	20 (14.71)
to an average extent	45 (32.85)	49 (36.03)
to a large extent	52 (37.96)	51 (37.50)
to a very large extent	28 (20.44)	13 (9.56)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

The respondents' results for the question about the need for a PT/OT in the palliative team, the biggest difference in answers between the two groups is in the category "to a very large extent". In the PT group, 29 respondents (21.01%) gave this answer, while 6 respondents from the OT group (4.41%) answered the same (Table 8).

The results on whether the respondents see themselves as a PT/OT working in palliative care show that only (19.57%) of respondents from the PT group, i.e. 27 out of 138 respondents, can see themselves working in palliative care to a "large extent" and to a "very large extent". In the OT group, only 7 respondents (5.15%) out of 136 can see themselves working in palliative care "to a large extent", and not a single respondent from this study group can see themselves working in palliative care "to a very large extent" (Table 9).

*Table 8. The respondents' results for the question "To what extent do you believe a PT/OT is needed in the palliative team?"*

Proposed responses to the question:	PT	OT
	N (%)	N (%)
not even a little	1 (0.72)	7 (5.15)
to a small extent	11 (7.90)	19 (13.97)
to an average extent	48 (34.78)	49 (36.03)
to a large extent	49 (35.51)	55 (40.44)
to a very large extent	29 (21.01)	6 (4.41)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

*Table 9. The respondents' results for the question "Can you see yourself as a PT/OT working in palliative care?"*

Proposed responses to the question:	PT	OT
	N (%)	N (%)
not even a little	29 (21.01)	48 (35.29)
to a small extent	34 (24.64)	72 (52.94)
to an average extent	48 (34.78)	9 (6.62)
to a large extent	12 (8.70)	7 (5.15)
to a very large extent	15 (10.87)	0 (0)

PT – physiotherapy group; OT – occupational therapy group; N (%) – number of respondents (percentage of respondents)

*Table 10. Perceived assessment of palliative care knowledge in both study groups (PT+OT)*

Questions posed in the questionnaire:	IS	AV 1–5	SD	M
"Do you know what palliative care is?"	PT	3.87	1.02	4
	OT	3.60	0.85	4
"To what extent do you believe it is necessary to include the palliative care course in undergraduate studies?"	PT	3.70	0.91	4
	OT	3.04	0.92	3
"To what extent do you believe your profession needs additional palliative care training?"	PT	3.72	0.88	4
	OT	3.38	0.92	3
"To what extent do you believe a PT/OT is needed in the palliative team?"	PT	3.68	0.92	4
	OT	3.25	0.93	3
"Can you see yourself as a PT/OT working in palliative care?"	PT	2.64	1.22	3
	OT	1.88	0.90	2

SG – study group; PT – physiotherapy group; OT – occupational therapy group; AV 1–5 – average 1–5; SD – standard deviation; M – median

Table 10. presents the knowledge assessment index, i.e. the respondents' perceived knowledge in both study groups (PT and OT). Across the two

groups, the median, rated from 1 to 5, differs across all questions except for “*Do you know what palliative care is?*”, where the median was 4 in both groups. In the other questions, the PT group consistently had a median one point higher than the OT group. The lowest mode in both groups was observed for the question “*Can you see yourself as a PT/OT working in palliative care?*” (PT=3; OT=2).

The results of the perceived assessments of the respondents’ acquired palliative care knowledge are described by the median and the standard deviation and show the minimum and maximum points (Table 11.). The presented results indicate a small difference between the two study groups (PT and OT), but the difference is not statistically significant ( $p=0.1411$ ).

*Table 11. Results of perceived assessments of the respondents’ acquired palliative care knowledge*

Study group	Min	Max	M	SD
PT	10	25	17.51	3.69
OT	9	21	15.14	2.21

PT – physiotherapy group; OT – occupational therapy group; Min – minimum; Max – maximum; M – median; SD – standard deviation

## Discussion

Physiotherapy and occupational therapy are based on a holistic approach to patient care, including palliative care principles. Although the respondents in this study believe that they know well what palliative care is, they believe that more palliative care knowledge is necessary for physiotherapists and occupational therapists, and a smaller number of respondents from the OT group believe that palliative care should be included as a course in undergraduate studies. The results of our study show that physiotherapy students believe to a greater extent than occupational therapy students that additional training in their work is necessary and required to a very large extent (PT=20.44%, OT=9.56%).

Greater knowledge and additional palliative care training enables provision of quality care and improvement of practical competencies (Yie et al., 2023). Our study is in line with other research that emphasizes the need for additional knowledge of physiotherapists and occupational therapists in the field of palliative care, but it is not sufficiently expressed in practice (Fadare et al., 2014; Pascoe et al., 2018). In this study, a smaller number of OT group respondents can see themselves working in the field of palliative care (PT=19.57%, OT=5.15%) (Table 9). One of the reasons could be students’ discomfort when dealing with death and dying, as well as the prevailing health culture that still views death as a failure (Sadhu et al., 2010). Therefore, physiotherapists and occupational therapists may be less motivated for working in palliative care because the results of functional recovery are not as successful as in curative rehabilitation. The difference in the responses of occupational therapy students

can be supported by an Indonesian study which found that many healthcare professionals are not well prepared, have low levels of confidence in providing palliative care services, and have issues with the communication skills required for end-of-life discussions (Huriah et al., 2021).

Furthermore, some studies indicate that occupational therapy students are not clear about their role and contribution to the multidisciplinary team, palliative patients and their family members, and the community (Keesing & Rosenwax, 2011). Lack of awareness of the role of occupational therapy in palliative care is the main reason for insufficient participation in occupational therapy interventions (Pitzen, 2009). Likewise, our study has provided similar results. The rationale may be that undergraduate occupational therapy students have no experience working with palliative patients in practice, while physiotherapy students encounter chronically ill patients (neurological, rheumatological, oncological and others) to a greater extent during their studies, through clinical practice, even though they do not completely perceive them as palliative patients.

PT and OT students should have access to a basic level of palliative care knowledge. Advanced training should enable mastering the skills for this type of care, and should deepen the understanding of topics specific to this area. The reasons for the low interest in working in the field of palliative care among physiotherapy students can be explained by the more ubiquitous popularity of jobs in other areas of physiotherapy (sports physiotherapy, orthopaedic physiotherapy etc.), which include full recovery of patients after physiotherapy interventions. In palliative care, the emphasis is on reducing the impact of the disease and treatment (reducing symptoms), increasing mobility and functionality. Research highlights that the link between current, insufficient training and the perceived readiness of physiotherapists and occupational therapists to work in palliative care points to the need for optimization of teaching in this unique area (De Araujo and De Araujo, 2018).

According to Centeno et al. (2014), universities should be encouraged to adjust curricula according to demographic and social needs. In order for every country to have professional healthcare workers in a multidisciplinary team in palliative care, it is necessary to set the primary goal of basic and additional training in palliative care. With such level of education, physiotherapists and occupational therapists would respond professionally to the challenges that they face.

## Conclusions

In conclusion, we can say that the majority of physiotherapy and occupational therapy students in this study possess good knowledge of palliative care as well as positive attitudes. In spite of this, only a small number of physiotherapy and occupational therapy students can see themselves working with palliative patients to a greater extent. One of the factors that could contribute to a high-

er motivation of physiotherapy and occupational therapy students for working with palliative patients could be additional professional training through formal courses at undergraduate studies. The study programme could be enriched with informal forms of education such as professional workshops, lectures, public forums etc., which would raise the level of education of physiotherapists and occupational therapists.

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# Eating Habits in Therapeutic Community

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## *Abstract*

*Introduction:* We studied a group of men aged 21 to 34 years, who participate in a therapeutic community Skupnost Srečanje. Substance abusers face nutritional challenges, such as protein-energy malnutrition, vitamin deficiencies, exhaustion, and loss of muscle mass. *Methods:* We observed the participants' eating habits and measured body composition using a bioelectrical impedance analyser. We analysed the weekly menu and assessed dietary intake using the OPEN program. The study involved seven men aged 21 to 34 years. *Results:* Participants were classified as overweight based on their body mass index ( $26.5 \text{ kg/m}^2$ ). The percentages of body fat (19.43%) and visceral fat (4.79) were within recommended ranges, while muscle mass was higher than recommended (65.5 kg; recommended 45.1–52.9 kg), therefore they were considered to be of normal nutritional status. The dietary regime includes three main meals every five to seven hours, which is not ideal as the meals are energy-dense. Participants meet their minimum daily energy requirements of 13027 kJ (3102 kcal) compared to the recommended 13770 kJ (3,279 kcal) and adhere to nutrient guidelines. The high sodium intake (5286 mg compared to the recommended 2000 mg) is a cause for concern, mainly due to bread and processed meats. *Discussion and conclusions:* Participants strive to live healthily, but there is still much room for improvement. It is important to identify and change poor eating habits and apply this knowledge in life after the therapeutic community.

*Keywords:* eating habits, dietary regime, healthy food promotion, nutrition in therapeutic community

## Introduction

Substance addiction is well-known in society and is defined by diagnostic criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM) and the International Classification of Diseases (ICD) (Zou et al., 2017). Overcoming addiction is a complex process involving personal decisions, professional help and family support. There are many addiction treatment programmes available in Slovenia, of which we will focus on the therapeutic community Skupnost Srečanje in this article. Founded by the Italian priest Pierino Gelmini, this community serves as a therapeutic setting for substance abusers, where individuals learn to establish routines that include work, rest and healthy eating habits. The community provides three meals with specific food quantities that the participants prepare themselves (Blažič, 2007; Gelmini Pierino, 2014). Cunningham (2016) highlights nutritional issues among substance abusers, as chronic use leads to protein-energy malnutrition, vitamin deficiencies, exhaustion, and loss of muscle mass. Wiss (2019) adds that eating during abstinence is challenging due to new emotions and anxiety, often leading to overeating as a form of comfort, which explains weight gain after substance cessation. They also emphasize the importance of proper nutrition in addiction treatment, as it reduces the consumption of unhealthy food, raises awareness of healthy eating habits, and promotes recovery. Slovenian Ministry of Health (2008) warns that food is a source of energy for body functions and regeneration, but poor nutrition can increase the risk of high blood pressure, cholesterol, and blood sugar, leading to various diseases. There is limited data on nutrition in therapeutic communities, but studies have shown that incorporating culinary programs and nutritional interventions can improve the eating habits and health status of the participants (Cowan and Devine, 2012; Moore, Gray, Wiss and Parker, 2016). Skupnost Srečanje provides a basic menu with the possibility to adapt for special diets or allergies. Participants learn frugality and responsibility towards food, as they are instructed to eat everything on their plate. At the beginning of each month, the participants decide whether they would like full meals or only half portions. At the present moment, every participant receives large meal portions, with one participant following a vegetarian diet. It is important to note that in all three meals, participants have unlimited access to bread and fruit (personal testimony of the participants of Skupnost Srečanje, April 2, 2023).

## Methods

In the theoretical part, we used a descriptive method and participant observation in the therapeutic community Skupnost Srečanje in Nova Gorica. We reviewed literature on eating habits and healthy eating recommendations available in databases. The empirical part included a quantitative study with body measurements (Tanita, BC730) and analysis of the weekly menu (OPEN) to assess participants' dietary intake. Body composition measurements were taken in the morning, on an empty stomach, with 0.5 kg deducted for clothing.

We collected data on eating habits from March 5 to April 23, 2023, analysed the weekly menu, and compared energy and nutrient needs with consumed meals. Data were analysed using Microsoft Excel and IBM SPSS Statistics. To test the statistical difference in nutritional and energy values of the menus, we used the Wilcoxon signed-rank test, and Spearman's rank correlation coefficient to test the statistically significant correlation of anthropometric measurements. Seven men aged 21 to 34 years from the therapeutic community Skupnost Srečanje in Nova Gorica participated in the study.

## Results

The results of the participants' body composition measurements were presented using descriptive statistics. The average age of participants is  $24.6 \pm 5.0$  years, the average height is  $1.80 \pm 0.05$  m, and body weight is  $85.71 \pm 6.29$  kg. The body mass index (BMI) averages  $26.51 \pm 2.25$  kg/m<sup>2</sup>. The average muscle mass is  $65.47 \pm 2.80$  kg, and the percentage of body fat ranges from 13.6% to 26.0%, with an average of 19.43%. Visceral fat is on average  $4.79 \pm 2.48$ , and the average metabolic age is  $27.0 \pm 10.9$  years. The average calculated basal metabolic rate (BMR) is  $8606$  kJ  $\pm$   $374$  kJ ( $2049$  kcal  $\pm$   $89$  kcal). We analysed the statistical correlation between body composition parameters using Spearman's correlation coefficient ( $r_s$ ), shown in Figure 1. The results showed a statistically significant, strong, positive correlation ( $r_s = 0.767$ ;  $p < 0.05$ ) between BMI (kg/m<sup>2</sup>) and visceral fat. On the other hand, there was no statistically significant correlation between BMI and muscle mass ( $r_s = 0.321$ ;  $p = 0.482$ ). The Wilcoxon test results show that the energy values of the provided menu are significantly lower than the daily requirements ( $Z = -2.366$ ;  $p < 0.05$ ), meaning that the participants do not meet their daily energy needs with the provided menu. The average difference between daily requirements ( $3279$  kcal/ $13770$  kJ) and the consumed amount ( $3102$  kcal/ $13,027.4$  kJ) is minimal, indicating adequacy of energy needs. Statistically significant differences are shown between the consumed amount of protein and the provided menu ( $Z = -2.371$ ;  $p = 0.018$ ) and between the consumed amount and recommendations ( $Z = -2.366$ ;  $p = 0.018$ ), indicating that the consumed amount of protein is higher than recommended. There is also a statistically significant difference between recommendations, the provided menu, and the consumed amount of fat ( $Z = -2.366$ ;  $p = 0.018$ ), as participants did not meet the recommended fat intake. The average difference in consumed carbohydrates ( $M = 439.1$  g) and recommendations ( $M = 443.8$  g) is minimal. The consumed menus do not exceed recommendations for saturated fatty acids ( $Z = -2.366$ ;  $p < 0.05$ ), while there is no statistically significant difference between the consumed amount and recommendations for simple sugars ( $Z = -1.014$ ;  $p = 0.310$ ). Figure 3 shows the coverage of nutritional needs for each participant. The consumed dietary fibre ( $M = 37.9$  g) is higher than recommended ( $M = 30.0$  g) and the provided menu ( $M = 22.4$  g). For sodium, there is a statistically significant difference between recommendations and the provided menu ( $Z = -2.530$ ;  $p = 0.011$ ) and between recommendations and the

consumed amount ( $Z = -2.366$ ;  $p < 0.05$ ), indicating that both the consumed and provided sodium amounts exceed daily requirements. There is no statistically significant difference between recommendations and the provided menu for calcium ( $Z = -1.265$ ;  $p > 0.05$ ), although the consumed amount (1,334.1 mg) is higher than recommended (1000.0 mg). For cholesterol, both the provided menu ( $M = 360.6$  mg) and the consumed amount ( $M = 361.3$  mg) exceed recommendations ( $M = 300.0$  mg) (Figure 2).

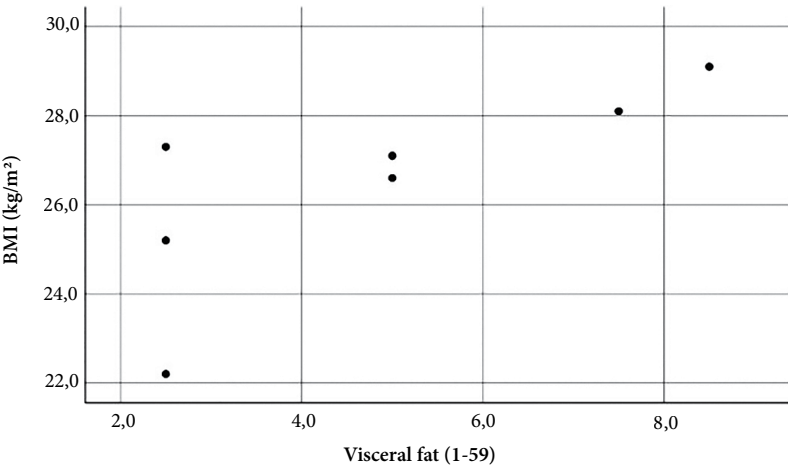


Figure 1: Scatter plot of the correlation between BMI and Visceral Fat.

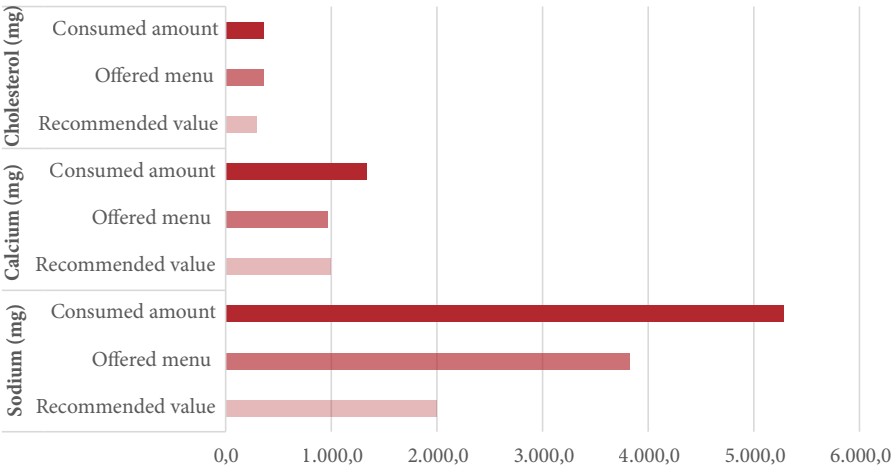


Figure 2: Average values of Sodium, Calcium, and Cholesterol.

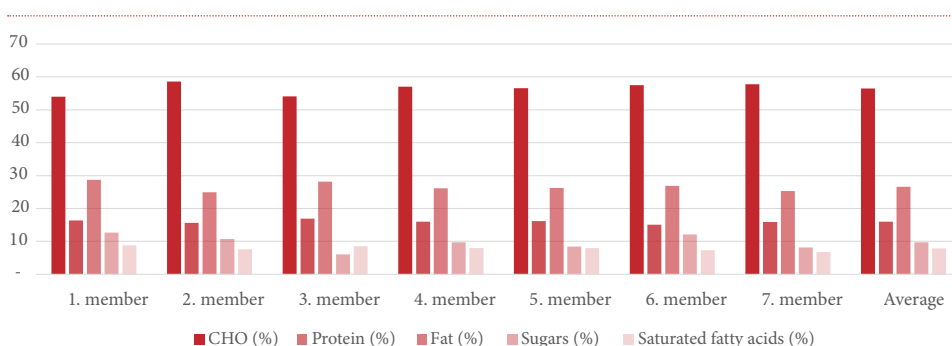


Figure 3: Energy proportions of nutrients consumed by individual participants.

## Discussion

Community participants have a set schedule with breakfast at 7:30 a.m., lunch at 12:30 p.m., and dinner at 8:00 p.m., meaning that five to seven hours pass between meals. Skupaj za zdravje (2023) emphasizes that a regular eating schedule is crucial for health, as it helps overcome hunger and prevents unhealthy snacking. They recommend three main meals and two snacks a day, with intervals of three to five hours. The therapeutic community's schedule is not ideal, as the intervals between meals are too long, leading to overeating during main meals, which are energy-dense, containing excess protein and fat, but insufficient carbohydrates.

The body composition of participants showed that they have a good nutritional status, with an average BMI of 26.51 kg/m<sup>2</sup>, which classifies them as overweight according to the World Health Organisation (2021). The percentages of body fat (19.43%) and visceral fat (4.79) are within recommended ranges, while muscle mass is above average (65.47 kg). Excessive muscle mass is a sign of a physically active lifestyle and can be considered a positive indicator of health. We observed a strong, positive correlation between BMI and visceral fat and high lean mass, which suggests that BMI alone may be a good indicator of nutritional status.

The average offered menu in the community provides 9642.4 kJ (2295.8 kcal), while the amount consumed is 13027.4 kJ (3101.8 kcal), which is at the lower end of the daily energy requirements (13770.3 kJ or 3278.6 kcal).

The average percentage of energy intake was 16% for protein, 27% for fat, of which 8 % were saturated fatty acids, and 57% for carbohydrates, of which 10% were simple sugars.

Nutritional value of the participants aligns with recommendations. The consumed food exceeds the recommended values for cholesterol and sodium but meets the requirements for calcium and dietary fibre. Based on the analysed menus using the OPEN program, their nutritional value could be improved with a few changes. Adding an afternoon snack, such as nuts and fresh

fruit or crackers with herb spreads, would reduce hunger, overeating and increase fat intake. For lunch, the amount of food could be reduced by serving a smaller portion of pasta (60 g of raw pasta per person) and replacing sausages with lean meats, such as turkey and chicken, which would also lower cholesterol and sodium. Limiting the use of salt in the preparation of soups, potatoes, and sauces, would also be beneficial. Potatoes, which are served daily, could be replaced with grain-based side dishes such as buckwheat, barley, couscous and polenta.

It is necessary to consider the limitations of the bioimpedance device for determining visceral fat and calculating BMR, the small number of samples, and the constraints due to the short monitoring period.

## Conclusion

Participants in the therapeutic community Skupnost Srečanje generally meet their nutritional needs and have a good nutritional status. However, some improvements are needed to promote healthier eating habits. A meal schedule with regular intervals between meals and appropriate portion sizes is recommended. Reducing high sodium intake and ensuring a balanced intake of macronutrients are also crucial for long-term health.

Education about healthy eating habits is essential to prevent unhealthy eating behaviours after leaving the community. Further research on larger samples and longer observation periods is recommended to obtain a more comprehensive understanding of the nutritional needs of substance abusers and the impact of nutrition on addiction recovery.

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# The Importance of Cardiac Rehabilitation After a Heart Attack: Treatment of the Working and Elderly Population

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## *Abstract*

Cardiac rehabilitation (CR) is a critical component of secondary prevention for patients recovering from acute myocardial infarction and other cardiovascular events. It aims to restore the patient's functional capacity within social, familial, and work environments, promote healthy lifestyle changes, and prevent disease progression. The program emphasises the importance of a healthy lifestyle, medication management, and controlling risk factors such as hypertension, cholesterol levels, and diabetes. Patients are educated on the benefits of the Mediterranean diet, smoking cessation, and regular physical exercise. Our findings show that patients who complete the outpatient CR program report significant improvements in physical fitness, symptom reduction, and increased confidence in daily activities. These positive outcomes are crucial for the long-term maintenance of a healthy lifestyle and reducing the risk of future cardiovascular events. Continued support and development of such programs are vital for enhancing patient outcomes and quality of life.

Keywords: *rehabilitation, cardiology, heart attack, secondary prevention*

## **Introduction**

Ischaemic heart disease (IHD) is the leading cause of death worldwide. Within five years following an initial episode of myocardial infarction (MI), approximately 15 % of men and 22 % of women aged between 45 and 64, as well as 22 % of men and women over the age of 65 years, may experience another infarction, with an increased risk of morbidity and mortality (Menezes et al., 2014). Older individuals over 65 years have a higher likelihood of complications during MI and coronary revascularisation procedures compared to younger populations, which consequently leads to longer hospital stays and higher risks in

subsequent clinical procedures. In the United States, 86 % of deaths from IHD occur in individuals over the age of 65 (Menezes et al., 2014b).

The increasing incidence of IHD reflects a greater prevalence of risk factors such as type 2 diabetes, obesity, sedentary lifestyles, hypertension, and an ageing population. Research indicates that a sedentary lifestyle is a significant modifiable risk factor. More than 60 % of adults in the United States do not engage in regular physical activity, and 25 % are completely inactive. This sedentary lifestyle, combined with a hypercaloric diet, contributes to the metabolic syndrome (Menezes et al., 2014).

Cardiac rehabilitation (CR) is an individualised, multidisciplinary treatment approach for patients with IHD. CR is designed to optimise the patient's physical, psychological, and social function, aiming to slow down or even improve the progression of IHD (Servey and Stephens, 2016).

Essentially, CR begins during hospitalisation in the first phase, involving early mobilisation of stable patients to enable them to perform light daily activities. Due to increasingly shorter hospital stays, it is challenging to prepare a detailed exercise programme within a few days, so the treatment is limited to a brief explanation of the disease and motivation for continued treatment. The second phase of CR is the most crucial, which will be discussed further in the following sections. The third phase is vital as it represents a true lifestyle change that patients are encouraged to maintain over time. The quality of services provided during the second phase of CR is critical, with coronary associations offering additional support to patients (Mampuya, 2012).

CR represents a structured and supervised process of secondary prevention and rehabilitation for cardiovascular patients. While acute hospital treatment durations have decreased, rehabilitation programmes have been extended. Short-term spa programmes are being replaced by long-term outpatient rehabilitation (Jug, 2024). Numerous studies highlight the long-term effectiveness of rehabilitation, which reduces symptoms such as chest pain, dyspnea, fatigue, and the risk of recurrent MI. It has been proven that regular and appropriately prescribed physical activity extends life and reduces mortality by 20–25 %. For coronary patients, it is crucial to incorporate regular, planned, and structured physical activity into their lifestyle to improve aerobic and muscular capacity and maintain or enhance health (Vižintin Cuderman, 2017).

In foreign CR programmes, patients are referred for MI, bypass surgery, stent placement, chronic stable angina pectoris, heart failure, pacemaker implantation, and defibrillator insertion. Common components include: physical exercise, dietary counselling, behavioural counselling, smoking cessation programmes, and health monitoring of blood pressure, lipid levels, and blood sugar. The positive effects of CR include reduced mortality, decreased incidence of depression (by approximately 40 %), improved functional capacity, increased exercise tolerance, weight loss, lipid control, reduced hospitalisations, and improved quality of life (Servey and Stephens, 2016).

Studies indicate that distance from home to CR facilities is the primary reason for non-participation or dropout (Servey and Stephens, 2016). Women (due to fewer financial resources, transportation issues, and lack of social and emotional support), the elderly (despite being most in need of CR), racial and ethnic minorities are less likely to participate (Mampuya, 2012). In some larger countries, remote home-based CR has been implemented. It has been found that, compared to outpatient CR, there are no differences in effectiveness, and a higher percentage of patients complete the programme (Anderson et al., 2017).

Rehabilitation after acute myocardial infarction involves a comprehensive approach, including individual risk assessment, prescribed physical activity, education and support, and psychological assistance. The main goals of cardiac rehabilitation (Ivanuša et al., 2015) are:

- restoring the patient's functioning within social, family, and work environments;
- encouraging patients to adopt lifestyle changes and take responsibility for their health;
- preventing disease progression.

Therapeutic education is the most effective approach in cardiac rehabilitation, as it educates the patient about their condition with the aim of enabling them to take responsibility and autonomy in their own treatment and lifestyle changes. Cardiac patients need help in dealing with psychosocial and professional challenges. Psychiatric conditions such as anxiety and depression are very common after coronary events and are associated with reduced exercise capacity, fatigue, and decreased quality of life (Mampuya, 2012).

### **Overview of Cardiac Rehabilitation at Izola General Hospital**

In 2017, a new healthcare programme, »Ambulantna kardiološka rehabilitacija« (»Outpatient Cardiac Rehabilitation«) was introduced, based on the professional collaboration between the Univerzitetni klinični center Ljubljana (UKC Ljubljana) and the Zavod za zdravstveno zavarovanje Slovenije (ZZZS). The introduction of this new programme followed advancements in medicine and pharmacotherapy, particularly in the management of coronary patients. Instead of stationary treatment at a spa resort, extended outpatient rehabilitation is now required for patients following the successful completion of acute myocardial infarction treatment in the hospital (Kos, 2020). The goal in Slovenia is to establish outpatient cardiac rehabilitation in every regional hospital. Thus, between 2017 and 2020, cardiovascular rehabilitation programmes were established at UKC Maribor and the general hospitals in Izola, Celje, Ptuj, Šmarješke Toplice, and Slovenj Gradec (Jug, 2024).

## Staff Composition

To monitor, record, and account for the services performed within the new programme, ZZZS, in collaboration with the Internal Clinic of UKC Ljubljana, has defined a new list of outpatient cardiac rehabilitation services and a new calculation for planning and financing the new team, consisting of 5.30 full-time equivalents (FTEs). This includes 1.20 FTEs for a specialist doctor, 1.50 FTEs for a registered nurse or senior nurse, and 1.50 FTEs for a physiotherapist (Kos, 2020).

## Rehabilitation Process

After an examination by a specialist doctor and a stress test, candidates are invited to the outpatient cardiac rehabilitation. An initial assessment is conducted, including measurements of height, weight (to calculate BMI), and waist circumference. At the end of the rehabilitation, these measurements are repeated, with the exception of body weight which is monitored weekly.

Blood pressure management is crucial for cardiac patients. Patients are taught to measure their blood pressure at home twice daily and as needed. Blood pressure is measured before and after exercise during rehabilitation. If the blood pressure is too high or too low, or if there is nausea, chest tightness, or any other discomfort, exercise is contraindicated. Blood pressure usually drops by about 10 mmHg after physical exertion.

It is recommended that patients with myocardial infarction warm up thoroughly before exercise, starting with approximately 10 minutes of whole-body warm-up. The warm-up also aims to introduce patients to various flexibility and strength exercises they can continue at home after completing rehabilitation. To enhance motivation, we use various aids such as elastic bands, hand weights or wrist and ankle weights, sticks, and balls. Stretching and breathing exercises are also included to teach patients to perform exercises correctly on their own.

Global studies have shown that 36 visits or more are required to achieve the desired effects, equating to 12 weeks of rehabilitation, three times a week (Servey and Stephens, 2016). Patients who complete 36 sessions of cardiac rehabilitation have a 14 % lower risk of death compared to those who only complete 24 sessions, and a 47 % lower risk compared to those who only attend one session (Menezes et al., 2014). It is recommended that patients start physical exercise after a heart attack by participating in CR, which provides appropriate safety and supervision during exercise (Vižintin Cuderman, 2019).

At General hospital Izola (SBI), we also follow these global standards. Patients typically attend rehabilitation 24 or 36 times, usually three times a week, occasionally twice. The patient's heart function is monitored throughout the exercise with a monitor (Servey and Stephens, 2016). Each patient wears an elastic strap around the chest with an ECG monitor attached, which is connected to a computer via a Bluetooth system.

Research has shown greater efficacy and progress with interval training on a cycle ergometer (Mampuya, 2012). Current guidelines recommend dynamic aerobic exercise, as it effectively and safely strengthens the heart and blood vessels. Larger muscle groups are gradually activated and the exercise is performed for 30 minutes or longer, with heart rate ranging from 50 to 90 % of maximum heart rate, or until the patient can no longer speak five words in a row without becoming breathless (Vižintin Cuderman, 2019).

At SBI, we also use this form of exercise. Participants cycle for 180 to 240 seconds at higher intensity (80–90 % maximum heart rate) and 120 seconds at lower intensity (50–60 % heart rate), for a total of 45 minutes. An alternative is a combination of 20 minutes of interval training and 20 minutes of continuous exercise on a treadmill. Here, the incline and walking speed can be set for the patient and remain unchanged. The patient's progress is continuously monitored throughout rehabilitation, and the exercise load is adjusted individually. As part of cardiac rehabilitation, there are three different lectures for patients, including topics such as Healthy Eating by a dietitian, Coronary Disease by a specialist doctor, and Physical Exercise by a physiotherapist.

## Conclusions

An important emphasis is placed on secondary prevention to prevent or slow the progression of cardiovascular complications. This includes the following measures: adopting a healthy lifestyle, pharmacological treatment, and managing risk factors. Essential steps include quitting smoking and alcohol consumption, following a Mediterranean diet, maintaining a healthy body weight, and engaging in regular physical exercise. Risk factor management involves controlling blood pressure below 140/90 mmHg, lowering LDL cholesterol to less than 1.8 mmol/L, and treating diabetes. Pharmacological treatment focuses on the introduction and adjustment of medications to prevent blood clots, manage heart rhythm disturbances, heart failure, and the progression of atherosclerosis (Jug, 2017).

CR after a heart attack is crucial for the working population. Research shows that CR is an effective secondary prevention approach (Fras, 2017 and Jug, 2017). We must not overlook the psychosocial aspect, as anxiety with panic attacks (present in 60 % of people within six months post-heart attack) and depression (20 %) are common. Additionally, mood disorders and stress responses are frequently observed as these events represent a turning point for patients. Group exercises provide support for patients with similar life experiences, encouraging each other in recovery. Empowering patients to successfully cope with their illness and helping them achieve as much independence as possible is essential (Jug, 2017).

Studies confirm that cardiac rehabilitation contributes to improved physical fitness and significantly enhances the psychosocial aspects of quality of life. Cardiac rehabilitation programmes increase life satisfaction and reduce

anxiety and depression. It is important to continue supporting and developing these programmes, as they are crucial for maintaining the health and quality of life of patients who have experienced cardiovascular events (Anderson et al., 2016).

Secondary prevention within cardiac rehabilitation plays a crucial role in improving the quality of life and functional capacity of both the working and older populations. Our results show that patients are highly satisfied with the progress achieved after completing outpatient cardiac rehabilitation. In addition to noticeable improvements in physical condition, such as better fitness and symptom reduction, patients also report greater confidence in performing daily activities. These positive outcomes are key to the long-term maintenance of a healthy lifestyle and reduced risk of recurrent cardiovascular events.

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# Oral Health-related Quality of Life in the Adult Population of Slovenia in 2019

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## *Abstract*

**Introduction:** Problems with the oral cavity and/or teeth cause pain, discomfort and functional limitations of the oral cavity and/or teeth and affect quality of life. Oral health-related quality of life (OHRQoL) can assess the impact of oral health on a person's life, self-image, social interactions and work performance. **Methods:** As part of the »National Oral Health Survey of Adults in Slovenia in 2019«, indicators of OHRQoL were monitored using a questionnaire among 3,200 adults in Slovenia aged 18 to 74 years. Participants received an invitation to the online survey by post, and a written questionnaire was included in the notification letter for people over 44 years of age. The OHRQoL questions related to the frequency of eating difficulties, feelings of tension due to oral and/or dental problems, problems performing daily tasks, dental pain, painful gums/mouth sore and limitations in social interactions due to the appearance of teeth. The results were analysed using demographic data. The chi-square ( $\chi^2$ ) test and the CCP test were used to statistically analyse the differences between the categories. **Results:** 31.9% of adults occasionally or more often experienced a decrease in OHRQoL due to one or more limitations caused by oral and/or dental problems. Occasionally or more often, 27% of adults reported painful gums/mouth sore, 20% had difficulty eating and 19% felt tense due to oral and/or dental problems. 10% reported difficulties performing daily tasks and 12% reported dental pain; no differences were found between men and women. Adults over 54 years of age were more likely to have difficulties eating than younger people ( $\chi^2$  test=22.434,  $p<0.001$ ). A higher proportion of adults with less education reported limitations due to problems with the oral cavity and/or teeth. Difficulty eating was reported by 27% of adults with primary, 20% with secondary and 13% with at least tertiary education ( $\chi^2$  test=11.388,  $p=0.003$ ). 12% of adults with primary and secondary education and 6% with at least tertiary

education reported difficulties performing daily tasks ( $\chi^2$  test=6.491,  $p=0.039$ ), and dental pain was reported by 19% of adults with primary, 13% with secondary and 9% with at least tertiary education ( $\chi^2$  test=6.491,  $p=0.039$ ). Similar differences in educational status were also found for limitations in social interactions due to dental appearance. *Discussion and conclusions:* OHRQoL is related to socioeconomic factors such as age and education, but not to gender. The proportion of people who rate their OHRQoL more negatively is higher among those over 44 years of age and those with less education. The differences in OHRQoL indicate that older people and people with less education are more at risk. Understanding the socioeconomic characteristics of populations with poorer OHRQoL is crucial for appropriate public health approaches to improve the oral health of the adult population in Slovenia.

Keywords: *quality of life, oral health, oral health care*

## Introduction

Modern evidence-based references consider oral health as an integral part of general health. With their chewing, phonation and aesthetic functions, teeth contribute significantly to a better quality of life and social interaction, and their functional impairment has an impact on general health (WHO, 2003; Ranfl et al., 2017; Baiju et al., 2017; Sischo and Broder, 2011). Oral health is therefore not only the absence of disease in the oral cavity, but also enables individuals to carry out everyday activities and thus participate in interpersonal relationships (Baiju et al., 2017).

Various oral health conditions represent a major public health problem due to their prevalence and their social, economic and psychological consequences at individual and societal levels (Baiju et al., 2017; Johansson and Osterberg, 2015). These conditions cause pain and limitations in everyday tasks such as chewing, speaking and laughing, thus reducing the individual's quality of life (Paredes-Rodriguez et al., 2016).

In 1988, Locker introduced the oral health-related quality of life (OHRQoL) model, which led to the patient's perspective being incorporated into treatment (Locker, 1988). This is important because the biomedical view of health has also been developed into a biopsychosocial model in the field of oral health. OHRQoL is a concept that can be used to assess the impact of oral health on a person's daily life, i.e. self-image, social interactions, educational and occupational performance, and more (Sischo and Broder, 2011). The assessment of OHRQoL varies throughout a person's life and depends on several factors: Functional ability (chewing, speech), pain and discomfort (acute pain, chronic pain), psychological factors (satisfaction with appearance, self-image), and social factors (interpersonal relationships, communication) (Bennadi et al., 2013). People generally understand their health in a broader sense and not just as the presence or absence of disease.

The subjective assessment of OHRQoL is also important because it affects the actions individuals take with regard to their health, which in turn is reflected in their health status. Finally, the assessment of OHRQoL is also important with regard to inequalities in access to dental care (Sischo et al., 2011). Research on OHRQoL is important to identify groups at increased risk of poor oral health (Kragt et al., 2016).

## Methods

The data were collected as part of the cross-sectional survey »National Oral Health Survey of Adults in Slovenia in 2019«. A representative sample of 3,200 adults aged 18 to 74 years was included. The survey was conducted using the EGOHID questionnaire. The adults included in the study received an invitation to participate in the survey at a home address with a password to access the online questionnaire. For participants over the age of 44, a written questionnaire was enclosed with the notification letter. The survey took place in spring 2019 and participants received a further postal reminder during the survey period.

The data collected in the survey were analysed in »Microsoft Excel 2016«. The data were weighted by gender, age and education, taking into account age groups of one year. The weighted data per sample and population were analysed using the computer software »IBM SPSS Statistics for Windows«, version 21.0 (IBM, 2020).

The OHRQoL questionnaire contained nine questions on the frequency of dental problems when eating, the frequency of difficulties in performing daily tasks, the frequency of dental pain, the frequency of painful gums/mouth sore and the frequency of avoiding conversations, the frequency of avoiding social activities and the frequency of embarrassment about the appearance of teeth. Respondents could choose between five response options on a 5-point Likert scale (never, almost never, occasionally, often, very often). We defined occasionally, often and very often as the most frequent occurrence of limitations. Only people who answered all 6 questions on quality of life were included in the further analysis.

The interpretation of the results is based on the number and percentage of people in the selected categories according to demographic variables such as gender, age, education and living environment. The distributions of proportions between different categories were tested using the chi-square ( $\chi^2$ ) test and the CCP test (Column Comparison Proportion test) to compare the proportions between different groups.

## Results

After the exclusion factor, which was taken into account in the further data analysis, the final sample size was 1,164 people. There were slightly more men (50.9%), and the age group with the most participants was between 35 and 54

years old (40.3%). Most participants had at least a secondary education (58.7%) and came from urban (35.1%) and rural (42.2%) living environment.

Most of the participants had no limitations. 31.9% of adults experienced occasionally or more often impairment of OHRQoL due to at least one limitation caused by dental problems. There were differences in the prevalence of specific limitations, with the most common limitations being painful gums/mouth sore (26.9%), 19.5% had difficulty eating and 19.1% felt tense due to oral and/or dental problems. 10% reported difficulty performing daily tasks and 12.7% reported dental pain. We also found differences in the prevalence of limitations in social interactions due to the appearance of teeth: 13.2% reported that they avoided smiling or laughing, 9.1% reported that they felt embarrassed about the appearance of their teeth (or dentures), and about 5% reported that they avoided conversations or social activities due to the appearance of their teeth. The detailed data are shown in Table 1.

*Table 1: Prevalence of certain limitations that occurred occasionally or more often (N=1,164).*

	Participants with occasional or more often limitations	
	(N)	(%)
Painful gums/mouth sore	287	26.9
Difficulty eating	220	19.5
Felt tense	206	19.1
Difficulty performing daily tasks	106	10.0
Dental pain	143	12.7
Avoiding smiling/laughing	151	13.2
Avoiding conversations	56	5.0
Avoiding social activities	52	4.7
Felt embarrassed	102	9.1

We found no differences between men and women who occasionally or more often experienced limitations in their daily lives due to oral and/or dental problems. However, a slightly higher proportion of women reported feeling embarrassed occasionally or more often about the appearance of their teeth (or dentures) (women 4%, men 2%; CCP test,  $p=0.042$ ).

Regarding age, the frequency of limitations in daily life due to oral and/or dental problems increased with age. The proportion of people with more frequent limitations in daily life was highest in the 55–74 age group, then gradually decreased and was lowest in the 18–34 age group, as shown in Figure 1. In contrast, no differences were found in the avoidance of social interactions due to the appearance of the teeth in relation to the age of the participants.

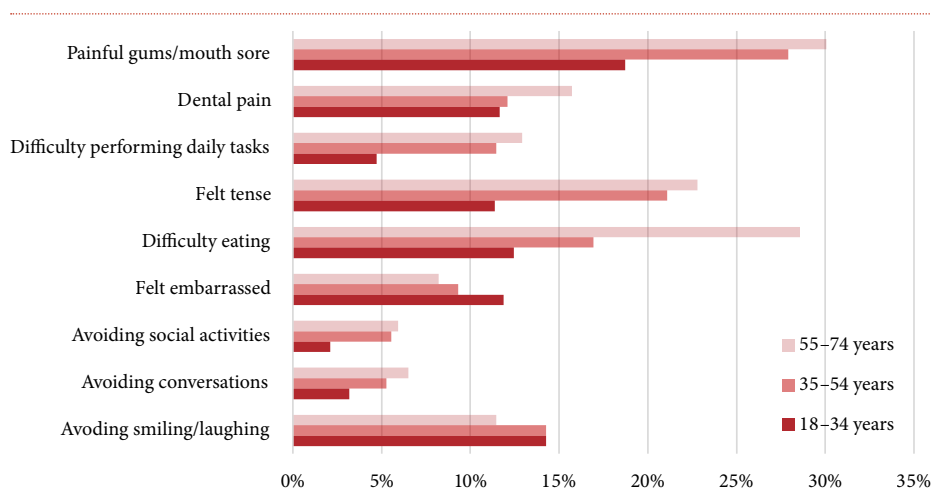


Figure 1: Proportion of adults aged 18–74 years who were occasionally or more often limited in their daily lives due to oral and/or dental problems, by age.

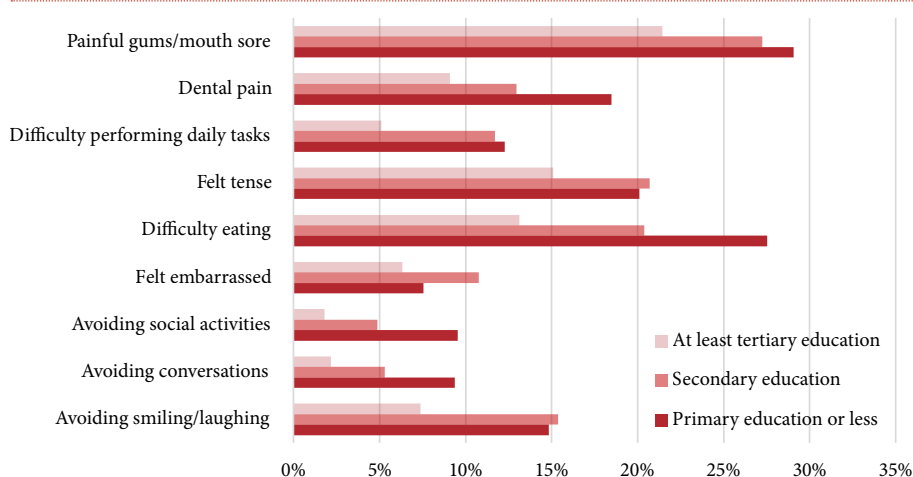


Figure 2: Proportion of adults aged 18–74 years who were occasionally or more often limited in their daily lives due to oral and/or dental problems, by education.

A higher proportion of adults with lower levels of education reported being occasionally or more often limited in their daily lives by oral and/or dental problems (Figure 2), with statistically significant differences by education level only for the following statements: difficulty eating ( $\chi^2$  test=11.388,  $p=0.003$ ); difficulty performing daily tasks ( $\chi^2$  test=8.251,  $p=0.016$ ); and dental pain ( $\chi^2$  test=6.491,  $p=0.039$ ). Similarly, adults with a higher level of education (at least upper secondary school) were less likely to report problems in social interactions than adults with a lower level of education (primary school or less). Thus, there were statistically significant differences between the proportions

of adults who reported occasionally or more often avoiding smiling or laughing ( $\chi^2$  test=9.416,  $p=0.009$ ), avoiding conversation ( $\chi^2$  test=8.877,  $p=0.012$ ) and avoiding social activities ( $\chi^2$  test=10.773,  $p=0.01$ ), while there were no statistically significant differences in whether they felt embarrassed about the appearance of their teeth (or dentures).

The survey also analysed differences in OHRQoL by living environment. The highest proportion of adults from rural areas compared to urban and suburban areas reported occasional or more often limitations in daily life due to oral and/or dental problems, but only for difficulty eating (urban 17%, suburban 15%, rural 23%), and dental pain (urban 8%, suburban 14%, rural 15%). We found no differences in the frequency of avoidance of social interactions among adults by living environment.

## Discussion

The results of the present survey show that almost one third of the adult population in Slovenia occasionally or more often experiences a reduction in quality of life due to oral and/or dental problems or avoids social contact because of these problems. A higher proportion of older people, people with lower levels of education and people from rural areas experience some limitations in their daily lives due to oral and/or dental problems, indicating inequalities in OHRQoL according to the socioeconomic status of adults.

In our study, we found no differences in daily life limitations due to oral and/or dental problems according to gender, which is consistent with the results of a study conducted in Brazil, which also showed no influence of gender on oral health-related quality of life (Zucoloto et al., 2016).

In addition to education, age is most strongly associated with differences in OHRQoL in adults. Our results are consistent with a study conducted in Brazil on the impact of OHRQoL, which showed that, in addition to pain and the presence of a chronic disease, age also has an impact on oral health-related quality of life (Zucoloto et al., 2016). On the other hand, the results of a national survey in the United States did not show a linear relationship between age and oral health-related quality of life, but adults aged 50–64 years reported the worst oral health-related quality of life (Rozier and Pahel, 2008).

Differences in the experience of limitations in daily life due to oral and/or dental problems according to educational level were also confirmed in a study of a North American sample: 62% of adults with primary education reported poor or average oral health-related quality of life, compared with 28% of adults with at least secondary education (Rozier and Pahel, 2008).

Some of the differences in oral health-related quality of life suggest that older people and those with less education are more at risk. We believe that it is worthwhile to increase oral health promotion activities in order to reduce the differences in the prevalence of oral health-related limitations in daily life in the Slovenian adult population.

## Conclusions

Oral health is an integral part of general health and has a major impact on quality of life. Almost one third of adults in Slovenia have occasional or more often limitations in daily life and occasionally or more often avoid social activities due to oral health problems. The OHRQoL is lower among older adults, adults with less education and people living in rural areas. Public dental health interventions should include oral health promotion activities for these vulnerable adults.

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# Some Aspects of the Lifestyle of Future Educators

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## *Abstract*

*Introduction:* The profession of preschool teacher is physically and mentally demanding. Physically, because they usually spend most of the day with more than 20 children in a small and relatively noisy room, where they often have to lift the children, bend down to them, hold them in suboptimal postures, etc., and mentally, because they have to perform pedagogical and administrative work, communicate with parents, coordinate with other professionals and deal effectively with stress. It is therefore important for preschool teachers to start early to adopt a healthy lifestyle, which makes an important contribution to maintaining good health. Factors that influence health often include diet, physical activity, sleep, weight stability, coping strategies, etc. Lifestyle shaping begins in childhood, but is also important in adolescence and the transition to adulthood, when future preschool teachers are at faculty. This paper therefore analyses selected aspects of the lifestyles of future Slovenian preschool teachers with the aim of examining the current situation, addressing potential gaps and identifying opportunities for appropriate support. *Methods:* 154 third-year students of Preschool Education at the Universities of Koper, Maribor and Ljubljana were included in the sample, 81 full-time and 73 part-time. A questionnaire (adapted from Maučec, 2017; Health of Slovenian Students, 2012) containing 39 questions on selected lifestyle indicators was used to collect data on students' daily migration patterns, weight maintenance, eating habits, sleep duration, avoidance of certain habits, e.g. smoking, taking painkillers, etc., time, frequency and intensity of physical activities, as well as their opinions on their knowledge and actual implementation of some aspects of a healthy lifestyle. *Results:* We found that 24% of students live within 2 km of the faculty and 10.4% live between 2 and 5 km. Others live further away. All those who live further than 2 km away travel to the faculty by bus

or car. 75.3 % of students spend more than 4 hours a day on the road. 35.7 % of students are on the road for up to 1 hour, 31.2 % are on the road for 2 hours, 33.1 % are on the road for more than 3 hours, 75 % of all students are passive in traffic. 15.6% of students sleep less than 6 hours, 24% have poor or very poor knowledge of how to deal with stress, 33.1% of students are not physically active enough to stay healthy. 15.6% of students sleep less than 6 hours, 24% have poor or very poor knowledge of how to manage stress, 33.1% of students are not physically active enough to stay healthy. The average body weight increases by almost 2 kg over three years. The difference between knowledge of healthy lifestyle indicators and the actual situation shows a non-significant negative discrepancy. *Discussion and conclusions:* We believe that the current situation reflects a lack of awareness among students of the importance of healthy lifestyles, particularly in relation to the indicators of stress management, appropriate physical activity and choosing more active modes of transportation. The discrepancy between knowledge and implementation shows that it is necessary to identify the causes of this discrepancy, develop strategies to increase motivation, include healthy lifestyle content in courses, adapt the schedules of electives at faculties to favourable dates, introduce physical activity breaks and health protocols.

Keywords: *preschool teachers, promotion methods, lifestyle indicators.*

## Introduction

In this article, we analyze various indicators of (un)healthy lifestyle habits among students training to become pre-school teachers. Working as a pre-school teacher is demanding from a health perspective, involving long hours of standing, lifting children, working in suboptimal positions (e.g., stooped posture, low chairs, etc.), which can lead to physical fatigue and stress (Cumming et al., 2021), musculoskeletal pain (Gregorc and Dolenc, 2020), and exposure to infections, as young children, who are frequently ill, can transmit these infections to educators (Linnan et al., 2017). It is therefore important for prospective educators to develop a healthy lifestyle. This is because a healthy lifestyle, which includes regular physical activity and a balanced diet, has a positive effect on an individual's general well-being (Snedden, 2019). Long-term relationships between healthy habits and quality of life are key to understanding the impact of these factors on adult health (Visser et al., 2023; Lin et al., 2023). A person's lifestyle, i.e., a set of habits, behaviours, and activities that affect health and well-being, is formed throughout life, but most intensely during adolescence, i.e., the university years (González Moreno & Molero Jurado, 2024). During this stage of life, young people are exposed to various challenges and influences that can significantly affect their habits (Tabrizi et al., 2024).

In order to effectively face the challenges, students first need knowledge about the harms of unhealthy habits and the long-term positive health effects of a healthy lifestyle in adulthood, knowledge about different techniques and

strategies to cope with stress, how long, how intense, how often and what type of physical activity affects health, etc., and then they need to put all these activities, techniques and strategies into practise to be able to integrate them into their own habits. In this work, we investigated the extent to which students already put into practise their knowledge about the importance of a healthy lifestyle for their health. We analysed students' commuting behaviour, weight control, dietary behaviour, sleep times, avoidance of certain habits, timing, frequency and intensity of physical activity, as well as their opinion on their knowledge and actual implementation of some aspects of a healthy lifestyle. The aim of the study was to analyse selected factors affecting students' health and to causally relate them to the need for possible changes and additions to the teaching process at the faculty.

Four research questions were posed: (1) How do students incorporate physical activity into their daily commuting routines? (2) What are the levels of physical (in)activity among students, and how do they manage stress and pain? (3) What are the eating habits of students during their studies, how often do they take medication, and how do they control their body weight? (4) How is the knowledge about certain aspects of a healthy lifestyle related to its implementation in practice?

## Methods

### *A Sample of Participants*

The statistical population consisted of all full-time and part-time third-year students of early childhood education at the University of Ljubljana, the University of Maribor and the University of Primorska. The number of students enrolled in the academic year 2023/24 was determined for each faculty through the Higher Education Information System (VIS), i.e. a total of 344 students enrolled in the third year of preschool education in the academic year 2023/24. All 344 were invited to participate in the survey, but 154 (44.8%) of the questionnaires were returned in full, representing the realisation of the sample. Of the 154 students who participated in the survey, 81 were full-time students and 73 were part-time students.

### *A Sample of Variables*

The questionnaire used in the survey consisted of 39 closed and semi-open questions divided into 4 sections. The first three sets were designed and adapted from Maučec (2017) and Health of Slovenian Students (2012), while the fourth set was developed by us. The first set included demographic and some personal data, namely information on the type and place of study, distance of temporary and permanent residence from the faculty attended, body mass and height (answered for all three years of study). The second group included questions on physical (in)activity, namely the number of hours they spend on average per

day, the amount of time they spend actively/passively traveling, the number of hours they sleep, the amount of time they are moderately to highly physically active per week, etc. The second group included questions on physical (in)activity, namely the number of hours they spend on average per day, the amount of time they spend active/passive, the number of hours they sleep, the amount of time they are moderately to highly physically active per week, etc. The third domain included some health indicators such as diet (number of meals per day, which meal is most often skipped, how food is prepared, etc.), smoking, use of painkillers (frequency, reasons for use, etc.). The fourth area comprised two perspectives on selected aspects of health, namely 'knowledge' and 'reality'. For the 'knowledge' perspective, they were asked on a 5-point scale (1 - strongly disagree to 5 - strongly agree) about their knowledge of the importance of healthy eating, stress management, anxiety, their knowledge of overwork, etc. (e.g. I know how to eat healthily), and for the 'reality' view they were asked on the same 5-point scale how they put the selected aspects of their health into practice (e.g. I know how to eat healthily, how to deal with stress, how to deal with anxiety, etc.). For the fourth part, which we developed ourselves, we calculated the internal reliability using Cronbach's alpha, which resulted in a high internal reliability ( $\alpha = 0.812$ ). Content validity was ensured through a literature review and the involvement of three experts who work and research in the field of healthy lifestyles in combination with exercise and are involved in the education of students.

### *The Organization and Process of Data Collection*

All students had the opportunity to complete the survey voluntarily. The questionnaire was developed using the online tool 1-ka. The survey was completed by all three authors of the paper, each at their faculty after or before the start of the course. To conduct the survey, a generated QR code was projected onto the blackboard, which the students could read and answer the questions with their cell phones, which took them an average of 6 minutes and 29 seconds.

### *Methods of Data Processing*

The data were processed with SPSS version 28.0. Various statistical methods were used to analyse the data: descriptive statistics with frequency (n) and percentage distribution (%), mean values (PV) and standard deviation (SD). The intraclass correlation coefficient (ICC) was used to determine the agreement between knowledge and implementation of some healthy lifestyle indicators. The limit of statistical significance was set at  $p \leq 0.05$ .

## **Results**

The results of the survey, which investigated the extent to which students are already implementing their knowledge about the importance of a healthy life-

style for staying healthy, are presented in a concise form in line with the re-search questions.

*How do students incorporate physical activity into their daily commuting routines? (1)*

To answer this question, several questions from the questionnaire were used and answered with the help of a cross-tabulation. To illustrate the cross-tabulations, we divided the students into 2 groups. The students who live within a radius of 2 km during their studies form the first group, the others the second. Traffic was divided into passive and active traffic. We also analyzed the time spent on traffic.

*Table 1: Showing the mode of daily migration of students according to distance from the faculty.*

		N	% Active	Mode of transport	
				Passive	
Distance from the faculty	Less than 2 km	37	24	27	10
				73% (within distance)	27% (within distance)
	More than 2 km	117	76	0	117
				0% (within distance)	100% (within distance)
Total		154	100 17,5% (with-in distance)	27	127 (82,5%)
				82,5% (within distance)	

Legend: % is calculated on the basis of the total number of students (N=154). The type of transportation (active or passive) is then calculated within the students who are up to 2 km and over 2 km away.

Table 1 shows that 37 (24 %) of students live within a radius of 2 km of the college. Of these, 10 (27%) use passive transportation to get to the college. All students who live further than 2 km away travel to the college by bus or car and only walk to the college from the parking lot or bus stop. For a more detailed analysis, we also looked at time spent in traffic and found that 35.7% of students spend up to one hour, 31.2% up to two hours and 33.1% more than three hours on the road, with 75% of all students using passive transportation, which takes almost three hours on average.

*What are the levels of physical (in)activity among students, and how do they manage stress and pain? (2)*

To answer this question, we used questions about the average number of hours per day that students sit (including hours spent on passive transportation), sleep, and are moderately to highly physically active, and calculated means and standard deviations. We analyzed the questions on stress and pain management using frequency distributions.

Table 2: Mean values of some aspects of students' physical (in)activity.

	N	M	SD
Number of hours of sitting per day (including passive transport)	154	8,4	4,3
Number of hours of sleep per day	154	7,4	1,0
Number of minutes of moderate to vigorous physical activity per week	154	206	197,9

Legend: M=mean; SD=standard deviation

Table 2 shows that students sit for an average of almost 8.5 hours a day and sleep for just over 7 hours. On average, they engage in moderate to vigorous physical activity for a good 3 hours per week (206 minutes/week).

A further analysis (frequency distribution of answers to the questions) revealed that 33.1% of students are not physically active enough to stay healthy (less than 180 minutes/week), 15.6% sleep less than 6 hours/day and 24% have poor or very poor knowledge of how to deal with stress.

*What are the eating habits of students during their studies, how often do they take medication, and how do they control their body weight? (3)*

To answer this question, we used questions about the number of meals per day, skipping meals, preparing meals, taking painkillers and weight control during their studies.

We found that 44.8% of all students eat up to 3 meals a day, and 14.9% eat 5 or more meals a day. 16.2% of students never skip a meal and 48.7% skip breakfast if they skip a meal. From Monday to Friday, 45% of students eat between 4 and 8 cooked meals. 31.8% of students never take painkillers, 23.4% take one per month. 18.2% of students take painkillers at least once a week.

Table 3: Mean values of weight change and weight maintenance during the study period.

	N	Minimum	Maximum	M	SD
Body mass 1st year (kg)	154	41	100	66,5	12,527
Body mass 2 nd year (kg)	154	42	110	67,4	13,248
Body mass 3 rd year (kg)	154	39	120	68,5	12,715

Legend: M=mean; SD=standard deviation

Table 3 shows that body mass increases by an average of 1 kg per year during the study period, which corresponds to an average increase of 2 kg over the duration of the study.

*How is the knowledge about certain aspects of a healthy lifestyle related to its implementation in practice? (4)*

To answer this question, we used two questions about student's opinion on selected aspects of a healthy lifestyle, one on 'knowledge' and one on 'implementation'. The two questions were asked on a 5-point scale (1 - strongly disa-

gree to 5 - strongly agree) and were divided into different aspects of a healthy lifestyle. An intraclass correlation coefficient (ICC) was used to determine the agreement between the ratings of the two assessors.

*Table 4: Intraclass correlation coefficient between knowledge and practice of certain aspects of a healthy lifestyle.*

Measures	ICC	95% CI		F Test			
		Lower Bound	Upper Bound	F	df1	df2	Sig
Single Measures	,369 <sup>a</sup>	,225	,498	2,172	153	153	<,001
Average Measures	,540 <sup>c</sup>	,367	,665	2,172	153	153	<,001

Legend: A two-way mixed effects model was used, where people effects are random and measures effects are fixed. The single measures ICC represents the reliability for individual ratings, while the average measures ICC represents the reliability for the average of the ratings. The 95% confidence interval (CI) indicates the range within which the true ICC value is expected to lie. The F value and associated degrees of freedom (df1, df2) provide the test statistic for assessing the significance of the ICC, with the p-value indicating the statistical significance of the results.

Table 4 shows that the results of the analysis demonstrate a moderate level of reliability of the individual estimates (ICC = 0.369, 95% CI [0.225, 0.498],  $F(153,153)=2.172$ ,  $p<0.001$ ). The statistical significance ( $p<0.001$ ) indicates that the results are reliable and not due to chance. This means that the reliability of the estimates between knowledge and implementation is moderate. In practice, this means that there is a moderate discrepancy between knowledge and implementation, which is also indicated by the more comprehensive content analysis of the other data, particularly in relation to daily transportation choices, physical inactivity, diet and weight maintenance.

### Discussion

The survey on the lifestyles of early childhood education students at three Slovenian universities revealed several important findings, which we have divided into three areas that we believe could be addressed in the future.

The first area is active transportation or daily walking. The results of our study show that 24% of students live close to the college (within a 2 km radius), which gives them the opportunity to get around actively, e.g. by walking or cycling, but 37% do not use this. Furthermore, students do not use bicycles if they live further than 2 km from the college. Considering our findings that 33.1% of students are not sufficiently physically active to maintain their health (WHO, 2022), it would make sense to promote active transportation, which was confirmed in 29 of 35 studies by Wanjau et al. (2023) that the physical activity resulting from the use of active transportation leads to additional physical activity.

The second area wish to address is ,wellbeing‘, which includes stress management, sleep, nutrition and weight maintenance. We found that students sleep on average only 7 hours, that 24% have poor or very poor knowledge of stress management, that they gain a kilogram of weight every year and that 48% skip breakfast. Wellbeing can contribute to physical and mental health (Chin et al., 2019; Francis et al., 2019), which is why we would like to highlight this area in particular.

The third area is so called »putting knowledge into practice«. Our data analysis shows that there is a positive correlation between perception of knowledge and putting healthy lifestyles into practice (Table 4). The correlation is only evident in a broader content analysis, which shows a lack of self-criticism in putting healthy lifestyles into practice. N r. They believe they are very knowledgeable about the effects of sleep on the body, but sleep 7 hours or less. They say they are not very familiar with ways to manage stress, but at the same time are very confident that their lifestyle is healthy.

## Conclusion

In conclusion, the results of the survey show that awareness and motivation for a healthy lifestyle need to be increased among early childhood education students. Faculties should play an active role in promoting healthy lifestyle habits, as future educators influence children, and thus society as a whole, through their example. By better understanding and implementing healthy lifestyles, students will be better prepared for the physical and mental challenges of their profession and will be able to provide better quality education to preschool children.

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# The Effect of Pelvic Floor Muscle Exercises on Chronic Low Back Pain

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## *Abstract*

*Introduction:* Chronic low back pain represents a major problem for the global population, as it adversely affects individuals' overall well-being, diminishes work productivity and leads to high treatment costs. Non-pharmacological treatment, including physiotherapy, is a key method for managing this type of pain condition. One of the less studied physiotherapy methods that potentially contributes to the management of chronic low back pain is pelvic floor muscle training, the effectiveness of which we evaluated through this literature review. *Methods:* In the systematic literature review, randomized controlled trials identified through the PubMed and Google Scholar databases were included. All studies, regardless of the year of publication, written in English language and meeting the inclusion criteria, were reviewed. These criteria included that the studies were randomized controlled trials, with participants being individuals with chronic lower back pain, and that the intervention involved pelvic floor muscle exercises. The quality of included studies was assessed using the PEDro scale. *Results:* Seven randomized controlled trials were included in the systematic literature review. Their methodological quality was rated as "fair" (> 4) according to the PEDro scale. The results of the studies showed that a treatment consisting of standard physiotherapy (electrotherapy, thermotherapy, ultrasound therapy, back muscle strengthening exercises) and pelvic floor muscle training significantly reduces pain and improves the functionality of people with chronic low back pain. Furthermore, this combination proved to be significantly more effective intervention than standard physiotherapy treatment alone. Nevertheless, the reduction in chronic low back pain is more pronounced when we add trunk stabilization exercises to standard treatment than when we add pelvic floor muscle exercises. *Discussion and conclusions:* The main finding of our literature review suggests that integrating pelvic floor muscle training into

standard treatment represents an effective approach for reducing pain and improving functionality in individuals with chronic low back pain. More high-quality randomized controlled trials with a broader spectrum of participants are warranted in order to support the development of more precise guidelines for physiotherapeutic approaches in individual treatment. Additionally, research investigating the long-term effects of pelvic floor muscle training on chronic low back pain would be beneficial for a better understanding of its long-term therapeutic potential.

*Keywords: low back pain, pelvic floor muscles, exercise, physiotherapy treatment*

## Introduction

Low back pain is characterized by pain, muscle tension, or stiffness localized between the 12th rib and the gluteal fold (Hayden et al., 2021) and can radiate to the lower extremities. Approximately 80% of people experience low back pain at least once in their lifetime (Wang et al., 2012). In 2% to 10% of cases, this pain can develop into chronic low back pain (CLBP), defined as pain persisting for more than three months (Alleva et al., 2016). The persistence of pain is often influenced not only by biological factors but also by psychological and social factors (Knezevic et al., 2021).

Chronic low back pain (CLBP) represents a significant social issue, impacting individual well-being and leading to high treatment costs, absenteeism or reduced productivity at work (Meucci et al., 2015). Early and effective treatment is therefore crucial. This may include invasive treatments such as surgeries and epidural steroid injections, or pharmacological approaches using non-opioid analgesics, nonsteroidal anti-inflammatory drugs, opioids, muscle relaxants, and antidepressants (Alleva et al., 2016; Hong et al., 2022; Qaseem et al., 2017). Additionally, non-pharmacological treatments are integral to managing CLBP and include patient education about their condition and coping techniques, lifestyle modifications, progressive muscle relaxation, cognitive-behavioral therapy and physiotherapy utilizing physical agents, manual therapy, and various types of exercise, including pelvic floor muscle training (PFMT) (Fernández-Rodríguez et al., 2022; Hong et al., 2022; Knezevic et al., 2021).

Pelvic floor muscles (PFM) are a group of muscles situated between the pubic bone, coccyx, and ischial tuberosities (Bi et al., 2013). These muscles are crucial for supporting pelvic organs, maintaining continence, and sexual function (Eickmeyer, 2017). They also play an important role in stabilizing the trunk and the sacroiliac joint, which, if unstable, can lead to the occurrence of CLBP (Hodges et al., 2007; Lee et al., 2016; Pel et al., 2008). Due to the numerous functions of PFM, they are becoming increasingly important in physiotherapeutic treatment. PMFT, which involves repeated contractions and relaxations of the PFM and anal sphincter, is used to enhance the strength and coordination of these muscles (Hite and Curran, 2021). These exercises have shown benefits in preventing and treating urinary incontinence (Alouini et al., 2022), im-

proving symptoms related to pelvic organ prolapse (Espino-Albela et al., 2022), and enhancing sexual function in the postpartum period (Hadizadeh-Talasaz et al., 2019). This systematic literature review aims to determine the effectiveness of PFMT in managing CLBP.

## Methods

### *Search Strategy*

The literature review included studies identified through the PubMed and Google Scholar databases, which were searched in October 2023. The search was conducted using keywords »pelvic floor« and »low back pain,« with the condition that both phrases must appear in the article title. The final search query in PubMed was: (»pelvic floor«[Title]) AND (»low back pain«[Title]) and in Google Scholar: allintitle: »pelvic floor« »low back pain«.

### *Inclusion and Exclusion Criteria*

All studies written in English that met the PICOS criteria were included, regardless of publication year (Methley et al., 2014). Studies were eligible if they involved participants with CLBP, included at least one of the experimental group receiving pelvic floor muscle exercises, and compared the effectiveness of PFMT with a control group or reported data on pain intensity before and after the intervention. Only randomized controlled trials were included. Exclusion criteria included studies involving participants with other pathologies, experimental groups receiving additional treatments besides PFMT (except for standard CLBP treatment), and studies that did not include any experimental group performing PFMT.

### *Methodological Quality*

The quality of the randomized controlled trials was assessed using the PEDro scale, which assigns a score from 0 to 10 (Maher et al., 2003). Studies scoring 9 to 10 were considered excellent, 6 to 8 were considered good, 4 to 5 were considered fair, and below 4 were considered poor quality. The average quality of the included randomized controlled trials was assessed as fair (average score: 4.28). Among these, two were of good quality, two were of fair quality, and three were classified poor quality.

## Results

When the mentioned search term was entered in the databases, a total of 40 hits were displayed, 9 in PubMed and 31 in Google Scholar. After removing 3 duplicates, the titles and abstracts of the remaining 37 articles were reviewed. 9 articles met the inclusion criteria and were fully reviewed. Subsequently, 2 studies were excluded due to inappropriate language and population criteria. The

remaining 7 studies were included in the literature review. The search and selection process is shown in Figure 1.

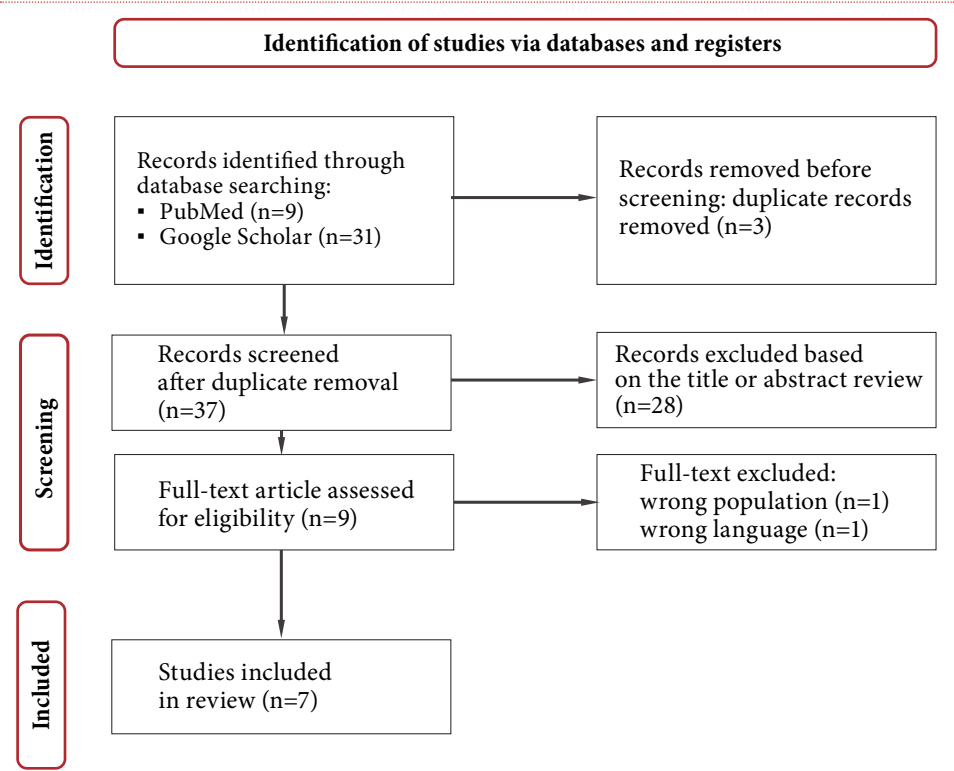


Figure 1: Searching and selecting studies for inclusion in the literature review.

Table 1 outlines the basic characteristics of seven studies that investigated the effect of PFMT on CLBP. The studies found that combining PFMT with standard physiotherapy treatment resulted in better outcomes for managing CLBP compared to standard physiotherapy alone, which typically includes ultrasound therapy, transcutaneous electrical nerve stimulation, thermotherapy, infrared light therapy, shortwave diathermy, and various exercises for strengthening flexors, extensors, and trunk stabilizers (Bhatnagar and Sahu, 2017; Bi et al., 2013; Dsingh and Kaur, 2020; Ghaderi et al., 2016; Kumar et al., 2015; Mohseni-Bandpei et al., 2011; Rathi, 2013). Adding PFMT to standard treatment improved initial and final pain scores and functionality in most included studies (Bhatnagar and Sahu, 2017; Bi et al., 2013; Dsingh and Kaur, 2020; Ghaderi et al., 2016; Kumar et al., 2015; Rathi, 2013). It also increased the endurance and strength of PFM (Ghaderi et al., 2016; Mohseni-Bandpei et al., 2011) and abdominal muscles (Ghaderi et al., 2016; Kumar et al., 2015). However, the combination of standard treatment with trunk stabilization exercises was found to be more effective in reducing CLBP than combining standard treatment with PFMT (Kumar et al., 2015).

Table 1: Overview of included studies.

Study	Participants	Pelvic floor muscle exercise program	Main findings
Mohseni-Bandpei et al., 2011	20 subjects with chronic low back pain (age = 20-50 years)	8-week progressive program (6x/day) Contraction: 5-10 s Rest: 4 s Cycles: 4-10	Pelvic floor muscle exercise group* showed greater improvement in endurance and strength of pelvic floor muscles than standard treatment group ( $p < 0.001$ ); pain and functionality improved the same in both groups ( $p < 0.01$ )
Bhatnagar and Sahu, 2017	30 subjects with chronic low back pain (age = 25-50 years)	6-week progressive program Contraction: 6 s Rest: 6 s Cycles: 25-100, 5/min	Pelvic floor muscle exercise group* showed greater improvement in pain and functionality than standard treatment group ( $p < 0.05$ )
Kumar et al., 2015	30 subjects with postpartum chronic low back pain (age = 25-35 years)	4-week program (5x/week) Contraction: 3-5 s Rest: no information Cycles: no information	Trunk stabilization exercise group showed greater improvement in pain ( $p < 0.001$ ), functionality ( $p < 0.05$ ) and abdominal muscle endurance ( $p < 0.05$ ) than pelvic floor muscle exercise group*
Dsingh and Kaur, 2020	27 subjects with sitting jobs and chronic low back pain (age = 18-45 years)	5-week progressive program (3x/week) Contraction: 6 s Rest: 6 s Cycles: 5/min, 30 min	Pelvic floor muscle exercise group* and postural control exercise group showed greater improvement in pain and functionality than standard treatment group
Bi et al., 2013	47 subjects with chronic low back pain (age = 18-60 years)	24-week progressive program (3x/week) Contraction: 6 s Rest: 6 s Cycles: 25-100, 5/min	Pelvic floor muscle exercise group* showed greater improvement in pain ( $p = 0.045$ ) and functionality ( $p = 0.034$ ) than standard treatment group; strength and endurance of the trunk muscles improved the same in both groups
Ghaderi et al., 2016	60 subjects with urinary incontinence and chronic low back pain (age = 45-60 years)	12-week program (3x/week) Contraction: 30% max voluntary contraction Rest: no information Cycles: no information	Pelvic floor muscle exercise group* showed greater improvement in strength and endurance of the trunk stabilization muscles than standard treatment group ( $p < 0.05$ ); pain and functionality improved the same in both groups
Rathi, 2013	30 subjects with chronic low back pain (age = 20-40 years)	4-week progressive program (5x/week, 3x/day) Contraction: 5s or more Rest: 5 s or less Cycles: 10	Pelvic floor muscle exercise group* showed greater improvement in pain and functionality than standard treatment group ( $p < 0.05$ )

\* Pelvic floor muscle exercise group also received standard treatment

## Discussion

Through a systematic literature review, we aimed to determine the effectiveness of PFMT in individuals dealing with CLBP. The main finding of our systematic review was that PFMT significantly reduces CLBP. However, it was found that physiotherapy treatment combined with PFMT was not significantly more effective than standard physiotherapy treatment in all studies. Additionally, there were no significant differences observed in the method of execution or duration of PFMT that would impact the effectiveness of treatment for patients with CLBP.

The interventions in the included studies examined varying durations of PFM contractions, rest periods, and the overall length of the intervention. Regardless of the duration of PFM contraction or rest periods between them, all studies have consistently shown a significant reduction in CLBP. However, there is no consensus on the optimal length for such interventions – in the studies analysed, the intervention period ranged from 4 to 24 weeks, with all studies reporting pain reduction outcomes. In previous research where pelvic floor exercises were used to treat urinary incontinence, interventions typically lasted around 12 weeks, which was sufficient to improve PFM strength (McLean et al., 2013).

PFMT has been proven effective when integrated with other interventions. In most of the reviewed studies (Bhatnagar and Sahu, 2017; Bi et al., 2013; Dsingh and Kaur, 2020; Ghaderi et al., 2016; Mohseni-Bandpei et al., 2011; Rathi, 2013), PFMT was used in combination with back or abdominal muscle strengthening exercises, except in one study (Kumar et al., 2015) where PFMT was applied without other exercise interventions. Combining PFMT with core muscle strengthening exercises is reasonable to include in physiotherapeutic treatment of individuals with CLBP (Sapsford and Hodges, 2001) due to the indispensable connection between core muscles (especially the multifidus and transverse abdominal muscles) and PFM. The concurrent activation of these muscle groups enhances intra-abdominal pressure (Rathi, 2013). This increase in pressure facilitates improved segmental stability, which is essential for mitigating pain and functional impairment in individuals with CLBP (Kim and Lee, 2013). This could explain how PFMT impacts CLBP. There is still no consensus on whether PFM strengthening alone affects CLBP or if the pain reduction is a result of the strengthened core muscles that are simultaneously trained with PFM (Bernard et al., 2021).

In this systematic literature review, several limitations need to be considered. The interventions were relatively short-term. The included studies involved a small number of participants, and it is also worth noting the generally lower quality of the research.

## Conclusion

PFMT is a physiotherapy method used to address various conditions, including urinary incontinence, symptoms associated with pelvic organ prolapse, and sexual function in the postpartum period. It is also gaining importance in the management of CLBP. The main finding of our literature review is that combining PFMT with standard treatment is an effective approach to reducing pain and improving functionality in individuals with CLBP. Additionally, in most of the studies, standard treatment augmented with PFMT was found to be more effective than standard treatment alone. In the future, more high-quality randomized controlled trials with a larger number of participants are needed on the topic of PFMT to contribute to the establishment of clearer guidelines for the physiotherapeutic management of individuals with CLBP. It



would also be beneficial to conduct studies that observe the long-term effects of PFMT on CLBP.

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# The Use of Artificial Intelligence in the Field of Health for Working-age Adults and Older Adults

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## *Abstract*

*Introduction and purpose:* Artificial intelligence (AI) brings numerous positive effects that extend to various aspects of human life. It can be understood as a “machine system” that, for a set of goals defined by humans, can make forecasts, formulate recommendations, or take decisions in real or virtual environments with varying degrees of autonomy. It pushes the boundaries both in technological capabilities and in the manner in which it is used, also in healthcare. It is crucial to perceive AI not as a substitute for human work, but as a tool that can help employees achieve more favourable work outcomes, improve cost-effectiveness, and better understand complex medical data. The implementation of AI in healthcare services requires a critical assessment of the ethical and legal aspects of its use. The purpose of the research is to identify the opportunities and significance of using artificial intelligence in the field of healthcare for working-age adults and older adults. *Content presentation:* The demands for improvement and higher quality of healthcare services are increasing. Automated solutions are vital in order to achieve this goal, and artificial intelligence can play a significant role. Development is focused on building models based on extensive databases of successfully solved healthcare cases. A prerequisite for the introduction of new technologies is the transformation of traditional clinical information systems with limited data analysis capabilities. This includes digitalisation of data from various levels of healthcare, enabling a machine-readable electronic health record. Research indicates that the use of AI in healthcare is becoming increasingly common, with applications ranging from screening and triage to clinical risk prediction and faster, more accurate diagnoses. Using time analysis of a patient’s health issues, genetics, and lifestyle, AI can recommend a personalized treatment plan, including appropriate medication and high-quality care. AI can also function as a

virtual healthcare assistant, providing patients with relevant information about their condition and thereby improving their engagement in their treatment plan. AI can also aid in the development of more effective drugs with fewer side effects. The use of modern information technology is also defined by telemedicine applications, which include remote healthcare consultations, diagnostics, and treatment. Advantages include integrated patient care regardless of their physical location, availability of patient data for expert consultations, and the possibility of remote notification of changes in health status in chronic diseases. AI can also simplify administrative tasks in healthcare institutions, and in this way contribute to speed, efficiency, and cost reduction, resulting in overall financial benefits to the healthcare system. Priorities to be addressed in the future include education, research and exploiting the potential of AI at all levels of study in healthcare, and creating opportunities to build on knowledge. Leaders should build organisational structures that enable healthcare staff to be involved in all phases of AI, from development to implementation. *Conclusions:* Developing skills in new technologies in healthcare requires new knowledge and building trust in AI. While this technology improves workplaces and processes, it is important to ensure that the humanity of the work environment and the relationship with patients of different generations is not diminished.

*Keywords: healthcare, development of new technologies, education, quality of life*

## Introduction

Artificial intelligence (AI) has entered our lives. Should we stop its development in fear of the “new master” of the future? In reality, we humans have largely set our own limits and created our own worries with regard to the environment, the individual and society as a whole. We only need to use the new tools offered by technology to develop our potential and to retain a real measure of humanity and reason while taking responsibility.

Researcher Neher (2023) and her colleagues have defined artificial intelligence (AI) as a “machine system” that can make predictions, recommendations or decisions in real or virtual environments for a set of human-defined goals. AI’s capability brings many positive impacts to humanity in various fields: improving education, optimising business processes, advancing agriculture and environmental protection, responding faster to natural disasters, integrating renewable energy, global communication, financial security, medicine (Villani, 2018).

In the field of healthcare, AI has great potential. Healthcare systems around the world are facing demographic changes, new technologies, increased patient expectations and healthcare workforce shortages. These factors are in turn contributing to the difficulty of balancing growing healthcare needs with limited financial and other resources (Posnett, 2022; Logar Čuček, 2023). The

changes call for reforms and awareness-raising on the concept of value-based healthcare (VHBC) (Etges et al., 2022).

It is thus important to understand where new technology can increase the efficiency of health services with the aim of saving lives and improving quality of life (Reddy et al., 2019; Gopal et al, 2019; Chen and Decary, 2020). Reddy and colleagues (2019) state that AI has made great progress with the development of network algorithms called deep neural networks, natural language processing, computer vision and robotics. The use of these techniques has already been actively implemented in healthcare services. It should be stressed, though that at present AI cannot fully replace employees in the provision of healthcare services. However, AI can be utilised to support the prediction, detection and management of health conditions (Harwich and Laycock, 2018). The two authors cited above also state that “these applications are key to reducing the strain on the healthcare system, improving the quality of care and patient outcomes, while at the same time reducing costs” (Harwich and Laycock, 2018, p. 9).

In order to fully reap the benefits of AI in healthcare, it is vital to be aware of the main barriers to implementing this technology. These are mainly data access issues, data quality and the certification of AI algorithms (Harwich and Laycock, 2018). This means collecting large volumes of the right types of data in the right formats, increasing their quality, and ensuring secure access to them (Gopal, 2019). The recommendations for data collection state that for most healthcare related AI strategies, what matters are large volumes of data, their digitisation and machine readability, and the quality of the data, determined by the quality of the extraction, analysis and further use. It is important that all AI-related data is collected in one place (Chen and Decary, 2020).

For the use of AI in healthcare, in addition to providing experience on the usefulness of the new technology, it is also important to formally educate staff on AI to help with their basic understanding and reduce fear of the new technology (He et al, 2019; Abdullah and Fakieh, 2020; Salah-Pico and Yang, 2022; Chen and Decary, 2020). It is key to the adoption of AI as a support for problem solving and identifying solutions (Nancy, 2019; Ronquillo et al., 2021), but it cannot replace the poor usability of AI systems, which make tools difficult to use and place additional burdens on employees (Reddy et al., 2019). The trust of healthcare staff in the reliability of AI is also enhanced by the transparency and interpretation of the results provided by the new tools (Veale, 2018). Data security must be ensured or, in other words, standards should be developed to assess safety and effectiveness of AI (Shah et al., 2019; He et al, 2019; Pedro, 2020; Salas-Pico and Yang, 2022).

This article briefly describes the mechanisms that enable AI systems to generate clinically meaningful outcomes; and then presents how AI can be applied in the field of health of working-age and older adults.



## **Integrating Artificial Intelligence Into Healthcare Delivery – A Vision for Service Transformation**

### *How AI Works*

Artificial Intelligence (AI) in healthcare does not work by itself, but on the basis of an ever-growing volume of data. They can only be addressed by AI-based processing (Laukka et al., 2022). Given this data, AI-enabled devices are mainly divided into two categories (Jiang et al., 2017). The first includes machine learning (ML) techniques that analyse structured data: imaging, genetic and electrophysiological data. In healthcare applications, ML procedures attempt to cluster patient characteristics or infer the likelihood of disease outcomes (Darcy et al., 2016; Cato et al., 2020). The second category includes natural language processing methods that extract information from unstructured data, i.e., clinical records, peer-reviewed and scientific medical journals, to complement structured medical data. Natural language processing techniques attempt to convert text into machine-readable structured data that can then be analysed using AI machine learning techniques (Jiang et al., 2017).

There are three types of AI techniques that are used in medical applications. The classical machine learning (ML) technique builds algorithms to analyse data that include patient “characteristics”, e.g. age, gender, clinical symptoms, etc., sometimes including health outcomes as disease indicators, patient survival times and quantitative disease levels, e.g. tumour size. More recent deep learning techniques address multi-layer neural networks; they are used for speech recognition, image recognition, text understanding, etc. Natural language processing (NLP) methods help to convert unstructured narrative text into structured, machine-readable text to enable information extraction (Jiang et al., 2017; He et al., 2019). Depending on the desire to incorporate results, ML algorithms can be divided into two categories, namely supervised and unsupervised learning (Jiang et al., 2017). AI also raises concern, mainly due to its ability to modify its behaviour and act autonomously with minimal human input; however, it is currently still unable to operate without human supervision (Zlatanova and Veljković, 2023), and most importantly, it lacks a subjective essence (Ferrarelli, 2023).

### *Promoting and Maintaining Health, Prevention*

The ageing population, the need for specialised care and more care programmes, the emergence of chronic diseases and lifestyle-related health problems, the demands for active involvement of patients in their treatment and more convenient care options, and value-added services dictate the need for new strategies in healthcare: prevention, diagnosis and optimal care (Gopal et al., 2019). AI could be used to identify individuals or groups predisposed to certain diseases and provide them with timely and effective treatment. For instance, in the elderly, AI could be used to identify cognitive decline due to neu-



rodegeneration, which is distinct from the expected memory impairment common in the elderly (Zlatanova, 2023). Wearable devices, smartphones, etc., are one of the options to maintain health, already perceived as medical devices that can monitor health-related information, for example by measuring vital signs, physical fitness, dietary calories, exercise (Giordano et al., 2021). With the use of AI, the large amount of data obtained can be analysed (similarities and differences) to enable the planning of diets, breaking of bad habits for instance in diabetes maintenance or even prevention. By detecting the signs of vision loss as a consequence of diabetes, timely treatment of the underlying disease and its consequences could be provided (Zlatanova, 2023). At the same time, individuals with certain health problems that eventually develop into complications could be identified (Necher et al., 2023). It can be concluded that the collection of a large amount of data and its analysis using AI support allows for timely diagnosis and subsequent treatment; this approach can also act as a preventive measure, as by abandoning certain lifestyle habits, potential health problems can be avoided. However, it is to the detriment of the individual and the health system that this data remains isolated and often untapped (lack data accessibility and sometimes questionable quality, lack of incentives), rather than being integrated within existing processes (Gopal et al., 2019).

#### *Quality Clinical Diagnosis, Decision-Making and Personalised Patient Care*

Using AI, all healthcare professionals and patients can easily access state-of-the-art diagnostics, treatments, development of therapies tailored to the needs of the individual (Shah et al., 2019). In the future, AI tools will be refined, software will be upgraded and databases will be improved (Watson, 2024).

The types of diseases that AI communities are most concerned with are cancer, diseases of the nervous system and cardiovascular diseases. This selection is not surprising as all three diseases are major causes of death. Accurate and early diagnoses can be achieved with AI support, enabling improvements in the analysis processes of structured data and unstructured records; the latter requiring conversion into a machine-readable electronic medical record (Jiang et al., 2017; Topol, 2019). AI algorithms can help reduce potential human cognitive biases to aid clinical decision making through accurate diagnosis (Dilsizian and Siegel, 2014; Giordano, et al., 2021; Brown et al., 2023). Indeed, research has shown a synergistic effect: when physician and AI work together, better outcomes are achieved (He et al., 2019). Especially in the diagnostic phase and later on, AI also contributes to clinical decisions by processing written information, which, together with patient data and the processing of existing professional and scientific medical literature, helps in the diagnosis and recommendations on treatment options (Hernandez et al., 2017; Giordano et al., 2021).

At the same time, AI supports the implementation of personalised patient care and monitoring (Chen and Decary, 2020). The digitisation of medical

records, the proliferation of smartphones and fitness monitoring are enabling access to digital technologies and, at the same time, the use of AI for patient monitoring, for instance patient sleep patterns, blood pressure, heart rate, etc. can be obtained in ways that have not been available before (Reddy et al., 2019). The virtual use of the listed assistants can also help in communicating health status, especially for elderly people outside the hospital setting, use of medication, analysis of patients' health status (Seibert et al., 2021). By obtaining patient information and analysing data, AI can also help reduce queues in emergency clinics (Yousefi et al., 2018). The potential of generative AI support in health and patient care for healthcare diagnoses, planning goals and interventions should also be mentioned. However, it has been shown that AI is still not specific enough and requires human critical reflection and verification (Gosak et al., 2024).

The use of robots in patient care, especially for the elderly, has become a major focus, helping to reduce health risks. Robots can be used to remind the elderly to perform regular activities, take medication, and guide them in their environment (Reddy et al., 2019).

However powerful AI techniques may be, the process of patient care begins and ends with clinical activities (Jiang et al., 2017). A similar conclusion was reached by researchers Laukka et al. (2022) in interviews conducted with nurse managers and developers of digital services. The interviewees felt that specialised healthcare will have several positive implications for work, services and organisation.

#### *Potential Roles of AI in Clinical Settings and a Look to the Future*

The application of AI in clinical settings does not take place only in oncology, cardiology and neurology, but also in other areas of healthcare (He et al., 2019). AI technology can aid triage or screening by selecting priority radiographs based on the most probable disease (Tang et al., 2018). It can help in identifying risks to eyesight, differentiating between patients who urgently need face-to-face examination and those who are not at risk (triage), diagnosing disease, quantifying vascular stenosis in cardiac imaging (Pelcyger, 2017; De Fauw et al., 2018; Kermany et al., 2018; Giordano et al., 2021; Brown et al., 2023). In the future, AI technologies will be most rapidly applied in the fields of radiology, ophthalmology, dermatology and pathology, mainly due to their powerful imaging and visual components with the possibility of automated analysis. However, according to some researchers (He et al., 2019), internal medicine and surgery will be somewhat later entrants into the AI world; the former because it requires the integration of different types of data and the latter because of the procedural components.

The integration of AI into the clinical setting will require the alignment of healthcare workers and developers regarding the goals. The future will also

require staff to be cross-trained with all colleagues at different levels of competence (He et al., 2019).

## Conclusions

Successful integration of AI into health systems relies on digitised and analysed data collected in an AI-related database. It is in healthcare that the adoption of digital innovation is at its lowest level compared to other sectors. It will be necessary to move beyond the capture of paper-based patient data, which limits the effectiveness of treatment in several respects: information analysis, productivity and the efficient use of resources to carry out higher-value tasks. Data digitalisation will make it possible to use these resources more efficiently and to gain deeper insights into patients' health and care. Only once digitisation has been implemented will it be possible to carry out the processes that are the domain of AI. Interoperability will need to be established in healthcare systems to enable the exchange, integration and retrieval of health information. This does not allow unhindered access to patient data, but rather patient-centred treatment, which will reduce inefficient healthcare services and thus the cost of treatment. Older people should also be involved in the formulation of recommendations for the future development of AI technologies in the context of ensuring human rights. The need to empower them through access to information and communication technology and digital literacy will need to be highlighted, as will the need to ensure the safe use of AI in law and in technology.

Artificial intelligence will remain and go beyond its current stage of development: in the future, AI tools will be refined and improved as software and the databases it uses evolve. Humans will be able to reach beyond their limitations; they will work hand in hand with new tools to find solutions to – so far - unsolvable problems; and they will contribute, together with AI, to the advancement of humanity. In the future, AI will surely evolve into a so-called super-intelligence, which, according to researcher Gams, will help us to “live long and well as a human technological civilisation”.

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# The Influence of Night Work on the Eating Habits of Workers

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## *Abstract*

*Introduction:* Certain professions require constant readiness and shift work, so night shifts are inevitable and necessary. Such work is often very stressful and requires a great deal of concentration from the employees. Performing night work causes employees to change day to night, which leads to many changes in the body and can worsen the quality and standard of life. Working at night can increase the risk of many health problems and conditions due to a changed sleep rhythm and a changed diet. *Methods:* In the article, we were interested in the connection between performing night work and workers' nutrition during the night shift. For searching, we used the PubMed database using the keywords „eating at work at night“, „nutrition at the workplace“, and „night work nutrition“ for scientific literature published in the period from 2018 to 2023. As search criteria, we considered accessibility of the full text of the article and searching for articles in English. *Results:* With proper nutrition and adequate nutrition at the workplace, we can influence productivity, reduce fatigue, and improve concentration at the workplace, enabling us to perform tasks more successfully and with high quality. The active working population is a group at risk in terms of eating habits at the workplace. In the research, we found that workers who work in shifts, especially night shifts have a disordered eating rhythm, low intake of fruits and vegetables, high-energy intake of inadequate nutrients, and too high a proportion of sugar and salt in the diet. Research articles also describe hormonal disturbances, increased subjective hunger, stomach problems, and increased sleepiness in shift workers. It turns out that it would be very good to introduce and adopt new healthy eating habits in the work environment. *Discussion and conclusions:* Fulfillment of conditions such as a balanced diet, sufficient amount of sleep, concern about mental state, and sufficient amount of physical activity are some of the key factors in ensuring good



concentration and sufficient amount of energy for work. Proper nutrition at the workplace during the shifts and in night shifts, when the employee is doing his work, also has a great impact on the well-being and health of the workers. In this area, it would be necessary to carry out some more research into the connection between night and shift work and its impact on the quality of life of workers. In such types of training, it is good to implement multidisciplinary cooperation of experts from major fields of work, such as the fields of nutrition, exercise, and medicine.

*Keywords: eating at work at night, nutrition at the workplace, night work nutrition.*

## Introduction

Certain professions require employees to work night shifts, which are essential for maintaining uninterrupted services 24/7. Shift work involves working outside of the regular daytime schedule, including late evenings, early mornings, and overnight hours. Approximately 20% of the global workforce is engaged in some form of shift work, which can be quite demanding and requires exceptional concentration from employees. Working night shifts can disrupt the body's natural rhythm and lead to various health issues, impacting overall quality of life. One of the primary challenges of shift work is managing a healthy diet and lifestyle alongside irregular eating and sleeping patterns. Shift workers are at a higher risk for health problems, dietary imbalances, obesity, disrupted sleep and eating patterns, and other related health issues. Night work is defined in Article 150. (ZDR-1, 2013). It is the type of work done between 11 p.m. and 6 a.m. the next day. If the working schedule specifies a night shift, eight continuous hours between 10 pm and 7 am on the following day are considered night work. Article 151. The ZDR-1 (2013) defines the rights of workers who perform night work or work at night. Employees who work night shifts are entitled to special protections, including extended holiday entitlement, proper nutrition during work hours, and skilled supervision of the work or production process. If a personal physician determines that a night shift worker's health may deteriorate, the employer must assign them suitable daytime work. Night work is limited to one week unless the employee gives written consent to work nights for a longer period. If the employee does not have organized transportation to and from work, the employer may not assign him to night work (Data, 2024).

## Methods

In our research, we focused on examining the relationship between night shift work and the dietary habits of workers. Our approach involved a descriptive method, which included a critical review of literature obtained from the PubMed database using specific keywords such as „eating at work at night,“ „nutrition at the workplace,“ and „night work nutrition.“ We specifically sought scientific literature published between 2018 and 2023, with a focus on freely ac-



cessible full-text articles in English. Data collection occurred between January and March 2024, resulting in a qualitative analysis of 9 articles.

## Results

Studies conducted by Cunha et al., (2020) have demonstrated that non-shift workers exhibit poorer glucose tolerance after evening meals, which can disrupt the endogenous circadian cycle at night. Various factors, including sleep restriction, reduced brain glucose utilization, and insulin resistance, may contribute to abnormal glucose metabolism. The findings of the study suggest that night-time food consumption may not be metabolically optimal. This is particularly pertinent for shift workers, as elevated triglyceride levels pose a significant risk for ischemic heart disease. The study also noted heightened triglyceride levels following the consumption of a high-fat meal at 5:00 and 6:00 am, indicating a potential link to increased triglyceride concentrations in the bloodstream of shift workers. Furthermore, the type and frequency of meals consumed by night workers appear to be more influenced by habit and time availability than by appetite. Nonetheless, it is essential to establish better nutritional choices by taking into account metabolic considerations, personal habits, and individual preferences. Quian et al., (2022) have indicated that the timing of meals can significantly impact mood levels related to depression and anxiety, particularly during simulated night work. A recent cross-sectional study involving 502,494 individuals revealed that an unhealthy diet is associated with poorer sleep quality and overall mental well-being. Many individuals have reported consuming poor-quality diets characterized by high-carbohydrate meals.

A systematic review by authors Clark et al., (2023) incorporated studies on total energy intake and dietary patterns associated with day work, shift work, and rotating shift work revealed that individuals in the rotating shift workers group recorded a higher average 24-hour energy intake. Rotating shift workers tended to have irregular and more frequent meals, engage in more snacking or eating at night, consume lower amounts of core foods, and have a higher intake of discretionary foods. This pattern was associated with an increased risk of cardiometabolic conditions among rotating shift workers.

This study by authors Gupta et al., (2020) examined the effects of consuming a meal during a simulated night shift on driving performance. It was observed that driving performance was impaired from 01:30 to 07:30, particularly for those who consumed a meal compared to those who had a snack or didn't eat at all during the night. Those who consumed a meal showed significant impairment during their commute home, indicating that reducing food intake during the night shift could potentially improve safety. Additionally, participants who consumed a snack did not report feeling excessively full throughout the night shift, suggesting that consuming a snack could be a viable option for satisfying hunger during the night shift. The study also revealed an increase in subjective sleepiness during the night shift, with the highest levels reported at

04:00. Notably, participants who consumed a meal during the night shift experienced greater sleepiness compared to those who had a snack. The findings suggest that opting for a snack during the night shift may be more beneficial for post-shift driving performance than consuming larger meals. Furthermore, the study demonstrated that consuming either one or three low-glycemic index meals during the night shift did not negatively impact glucose regulation, unlike fasting. Conversely, providing high-glycemic-index meals during the night shift led to an anticipated increase in glucose levels. In summary, the results indicate that choosing low-glycemic index meals, regardless of frequency, could be a favorable option over fasting during night shifts, promoting better glucose regulation.

The aim of the study by Garrido et al., (2021) was to examine the connection between circadian disruption, eating patterns, sleep behaviors, and dyslipidemia indicators in night shift workers. The study employed a randomized, double-blind, crossover-controlled clinical trial and involved 36 overweight female nurses working fixed night shifts (12 x 36 hours). The average age of the participants was 39.4 years, and their average nighttime sleep duration was 5.76 hours.

The findings revealed a correlation between reduced nighttime sleep duration and increased levels of very-low-density lipoprotein cholesterol (VLDL-C) by 2.75 mg/dL and triacylglycerides by 3.62 mg/dL. Conversely, each additional hour of sleep was associated with a 3.06 mg/dL increase in high-density lipoprotein cholesterol (HDL-C) levels. In summary, insufficient nighttime sleep and high social jet lag were identified as risk factors for dyslipidemia, while being a late chronotype and having a longer interval between the last meal and sleep onset were deemed protective factors against dyslipidemia.

Chronic circadian disruption, such as occurs during rotating shift work, and insufficient sleep are each independently associated with poor health outcomes, including obesity and glucose intolerance. This is the thesis of authors McHill et al., (2022), in a 32-day in-laboratory study, examined seventeen healthy young adults to evenly distribute sleep, wakefulness, and energy intake throughout all phases of the circadian cycle. Our carefully controlled conditions allowed us to measure subjective hunger, appetite, and food preference, indicating that other factors may contribute to the negative health effects associated with shift work. Table 1 contains comprehensive overviews of the studies used, including their research objectives, methodologies, and results.

Table 1: Overview of studies.

Author(s) and year	Aim of research	Methodology	Results
Cunha et al., 2020	This study aimed to compare the acute effect of a high-protein/moderate carbohydrate versus low-protein/high-carbohydrate meal served at night on the postprandial metabolic response of male night workers.	controlled, randomized, crossover clinical trial	A night meal with a higher percentage of protein and a lower percentage of carbohydrates led to minor postprandial glucose levels during the night shift but exerted no effect on the metabolic response of the following meal.
Saulle et al., 2018	The aim was to conduct a systematic review of the literature and to assess the relationship between night shift and overweight and obesity among health professionals.	systematic review of the literature	The meta-analysis did not produce significant results on the prevalence of obesity in the population of nurses
McHill et al., 2022	To uncover the impact of hunger, dietary preferences, and physiological appetitive hormones, studied healthy individuals	randomized, crossover clinical trial	The findings of the study are decreases in most measured outcomes of subjective hunger, appetite, and food preference in our highly controlled conditions likely suggest that other mechanisms promote the observed adverse health consequences of shift work.
Garrido et al., 2021	This study aimed to evaluate the relationship between proxy for circadian disruption, eating habits, sleep characteristics, and dyslipidemic parameters.	randomized, double-blind, crossover-controlled clinical trial	The short duration of nighttime sleep and high social jetlag are risk factors for dyslipidemia, whereas the late type and the longer time interval between the last meal and sleep onset appear to be protective factors for dyslipidemia.
Sooriyaarachchi et al., 2023	This study focuses on the qualitative aspects of this intervention, aiming to explore the experiences and perceptions of shift workers who participated in the trial.	randomized controlled clinical trial with qualitative interviews	Participants experienced weight loss by replacing their dinner with the MR. This study offers valuable insights for tailoring future workplace-based dietary interventions for this vulnerable population.

Author(s) and year	Aim of research	Methodology	Results
Suyoto et al., 2023	This study evaluated the effect of fasting compared with the consumption of meals with different combinations of glycemic index and frequency (1 or 3 times) during the night shift on continuous glucose monitoring metrics	randomized cross-over trial	High meal GI but not higher meal frequency during the night shift increased in female night shift workers. Results for 1 low-GI meal during the night shift were not different from a glucose profile after no meal.
Qian et al., 2022	Shift workers often experience a misalignment between the central circadian clock and daily environmental/behavioral cycles, and circadian misalignment can negatively affect mood and emotional well-being in non-shift workers and shift workers	parallel-design randomized clinical trial	These findings offer a proof-of-concept demonstration of an evidence-based meal timing intervention that may prevent mood vulnerability in shift work settings.
Gupta et al., 2020	This study investigated the relationship between food intake during the night shift and simulated driving performance post-shift.	Laboratory study and underwent four simulated night shifts.	Driver safety during the simulated commute home is greater following the night shift if a snack, rather than a meal, is consumed during the shift.
Clark et al., 2023	This review investigates how rotating shift work schedules affect dietary energy intake and dietary patterns compared with regular day and fixed shift schedules. In addition, intraperson energy intake and dietary pattern comparisons within rotating shift schedules were investigated.	Systematic Review and Meta-Analysis	This review highlights that dietary intake in rotational shift workers is potentially higher in calories and features different eating patterns as a consequence of rotating shift work schedules.

Working irregular hours, such as in-shift work, presents distinct challenges for maintaining a healthy lifestyle due to disruptions in eating and sleeping patterns. Studies have shown that shift workers face an increased risk of dietary imbalances and health issues, including obesity. Even with similar daily energy intake as those who work regular hours, shift workers are 23% more likely to become obese. Being overweight or obese is associated with various chronic conditions and metabolic complications. (Sooriyaarachchi et al., 2023).

Shift work may have a significant impact on the health of the worker and has been connected to unhealthy lifestyles. Saulle et al., (2018) are authors that suggest more high-quality studies with a larger number of participants should be conducted to determine if there is a real link between exposure to night shifts and weight gain or obesity.

## Discussion

Shift work presents a great challenge in ensuring regular and healthy eating. During the nighttime shift, the use of caffeine and snacks is more frequent, and it is very difficult for the human body to adapt to such a rhythm of work. Shift work is an important risk factor for obesity, sleep disorders, high blood pressure, and cardiovascular diseases. The longer the shift work lasts, the greater the risks. Inadequate nutrition (improper eating habits, excessive consumption of sugar, frequent unhealthy snacks), lack of sleep, low physical activity, negative emotions, and increased stress pose greater health risks. The related body weight increases the risk of various cardiovascular diseases, diabetes, diseases of the musculoskeletal system, and cancer. Obesity is associated with various functional limitations: limited mobility and flexibility, low endurance, and a greater number of acquired injuries when performing strenuous tasks. All these negative health factors are interconnected and intertwined and cause problems for shift workers in all areas of life (Drenovec and Vošner, 2023). Research suggests that consuming low-glycemic index meals, regardless of frequency, may be a beneficial option for managing glucose levels during night shifts, potentially supporting improved glucose regulation (Suyoto et al., 2023). Studies have shown that getting an insufficient amount of nighttime sleep and experiencing high social jet lag can increase the risk of dyslipidemia. On the other hand, being a “night owl” and having a longer time gap between the last meal and bedtime seem to have protective effects against dyslipidemia (Garrido et al., 2021). We have drawn the following conclusions from our review of the articles. In certain professions, night shifts are an unavoidable reality. Working at night can lead to an increased risk of numerous health issues, including obesity and diabetes. Night workers often experience difficulties with insomnia, reduced concentration and cognitive abilities, digestive problems, and challenges in managing their personal lives due to differing work and rest schedules from their loved ones. The dietary habits of shift workers typically involve excessive fat consumption and insufficient fiber, fruits, and vegetables. In addition to sleep, physical activity, and mental well-being, maintaining a balanced diet is crucial for a healthy lifestyle (Kranjc, 2022). Hence, it is crucial to give careful consideration to the arrangement of shift schedules, ensuring that the physiological, psychological, and social needs of employees are duly acknowledged. Further research is required to formulate strategies tailored to the needs of shift workers, as well-designed measures can mitigate the adverse impacts of shift work (Lavrič and Štukovnik, 2021). According to the research, driver safety during the simulated commute home is improved following the night shift when a snack, rather than a meal, is consumed during the shift (Gupta et al., 2020). The findings offer a proof-of-concept demonstration of an evidence-based meal timing intervention that may prevent mood vulnerability in shift work settings. Future studies are required to establish if changes in meal timing can prevent mood vulnerability in night workers (Quian et al., 2022).

## Conclusion

Shift work entails following a schedule that divides the day into equal parts or multiple shifts, which can be either fixed or variable. All types of shift work disrupt the body's natural circadian rhythm, leading to health issues, particularly sleep disturbances. Furthermore, shift work often results in lifestyle changes, such as irregular schedules, increased alcohol consumption, smoking, reduced physical activity, and an unhealthy diet. Research suggests that it also adversely affects mental health. However, with support from employers and access to appropriate services, workers can address these challenges and make positive changes in their lives. Further research is needed to develop effective strategies tailored to the specific needs of shift workers, as these measures could help alleviate the negative impact of shift work.

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# The Role of Medical Screening in Physiotherapy

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## *Abstract*

*Introduction:* In some European countries, patients have the right to self-referral or examination without referral from a doctor to a triage physiotherapist, who has additional expertise and is capable of advanced clinical reasoning. A triage physical therapist must be trained in a timely manner to identify signs and symptoms of a serious illness other than neuromusculoskeletal disorders. The screening process allows the physiotherapist to detect warning signs – red flags that require additional medical attention. The reason for doubt and referral to a specialist doctor may also be an unexpected outcome or unresponsiveness of symptoms to physiotherapeutic treatment. *Methods:* A descriptive literature search method in the PubMed and CINAHL databases between November 2023 and March 2024 was conducted. The review included open access of randomized controlled trials and systematic reviews published since 2018. We searched using the search string of keywords or their combinations in English: direct access, physiotherapy, red flags. *Results:* The review included 12 studies investigating the effects and implications of self-referral options or access to physiotherapy without referral to a doctor. The authors mostly report a decrease in the number of referrals to specialist doctors, a decrease in drug consumption, an improvement in the patient's satisfaction with medical care, and thus a reduction in treatment costs. *Discussion and conclusions:* A physical therapist has a responsible task in the process of ensuring the patient's basic right to appropriate, safe, and quality treatment. Physiotherapeutic treatment is based on a physiotherapeutic examination, which must exclude as clearly as possible the presence of serious illnesses or detect individuals in whom serious illnesses have not yet been detected. The screening process helps physiotherapists determine the degree of doubt about whether the patient in question is suitable for physiotherapeutic treatment and choose the most effective physiotherapeutic procedure.

*Keywords:* screening, red flags, physiotherapy, physiotherapeutic diagnosis

## Introduction

### *Musculoskeletal Conditions*

Musculoskeletal pain problems including osteoarthritis, low back pain, shoulder pain and neck pain in ageing population are leading causes for disability globally (Murray et al., 2010). This group of diseases is characterized by persistent pain, and limited functional and psycho-social abilities. Musculoskeletal (MSK) disease is second most common cause for primary care visits and work absenteeism in Slovenia (Ministrstvo za zdravje, 2023). Evidence shows that they often relapse and become long-term conditions (Dunn et al., 2006). As such, they are a growing challenge for primary care and a huge economic burden of the healthcare system worldwide. In Slovenia, they represent 5 % of all healthcare costs which is 0,4 % of gross domestic product (GDP) between 2016 - 2018 (Sedlak et al., 2021).

### *Direct Access*

Traditionally patients with MSK conditions are referred by general practitioners (GP) to physiotherapists which usually results in a delay in care. Recently, in some countries a new healthcare pathway to access physiotherapy services as the first contact was developed. Direct access (DA) to physiotherapy is an organizational model, where patients have the possibility to self refer, to directly seek physiotherapist and is available and well accepted in several countries including the Netherlands, United Kingdom, Australia, Brazil and most of USA (Piscitelli et al., 2018). However, there are variations in how direct access service is being utilized in practice (National association of primary care, 2015).

The professional workforce delivering first contact in DA healthcare model are physiotherapists with extended skills who assess and manage patients with MSK conditions (Ojha et al., 2014). Direct access increases the professional responsibility of physiotherapists and requires additional knowledge (Vignaud et al., 2023). The essential part of the physiotherapeutic assessment at first contact is to make sure that the patient is an appropriate candidate for physical therapy (Finucane et al., 2020).

Evidence shows that the effects of DA are promising: reduction of workload for GP, reduction in costs for the patient and the healthcare system, and improvement in healthcare indicators e.g. quality of life and disability (Ojha et al., 2014).

### *Medical Screening*

As an essential part of this process, the therapist should screen for medical diseases and detect signs and symptoms of a non-MSK disease or a disease

which can mimic a MSK dysfunction (Goodman et al., 2018). Detecting warning signs - red flags requires therapists' vigilance and advanced clinical reasoning skills. Considering evidence supporting red flags and the patients individual profile the therapist determines his level of concern and decides on clinical action. The patient can be treated, treated and referred or only referred (Finucane et al., 2020).

Historically, red flags were used to define serious pathologies, but it is still not clear which red flags should be considered. There is a lack of evidence which red flags are informative, especially when used in isolation (Finucane et al., 2020).

Furthermore, the need for screening also create factors such as visceral pain mechanism, side effects of medication and comorbidities. Even without direct access, screening is necessary if the patient is unresponsive on treatment, the therapist experienced an unexpected outcome or the patient might not report symptoms or concern because of fear or discomfort (Goodman et al., 2018).

The aim of this study was to investigate the effects and impact of self-referral options and access to physiotherapy without referral from a doctor on patients, physiotherapists and healthcare system.

## Methods

A literature search in the PubMed and CINAHL databases between November 2023 and March 2024 was conducted to identify studies evaluating direct access services in physiotherapy primary care settings. The review included open access to full texts of randomized controlled trials and qualitative studies published since 2018. We searched using the search string of keywords or their combinations in English language, "direct access", "physiotherapy", "red flags". To be eligible for inclusion, studies had to evaluate primary care, and direct access services to physiotherapy for adults with musculoskeletal conditions in terms of clinical outcomes (pain, functional disability) and/or socio-economic factors (patient satisfaction, healthcare costs). We excluded texts in other languages than English, letters, protocols and studies that were not fully available.

This review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-analysis (PRISMA) 2020 statement (Page, et al., 2021).

## Results

The review was done by a physiotherapist who attained recognized education qualification including medical screening which meets the educational requirements for first contact practitioners.

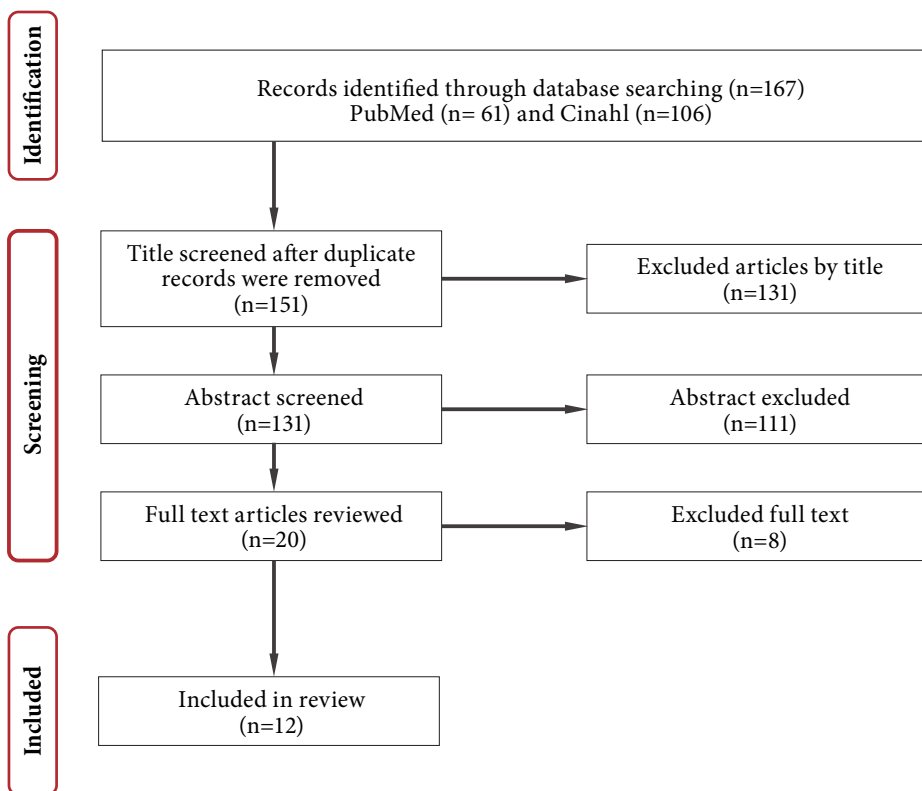


Figure 1: PRISMA flow diagram.

A total of 167 articles were initially retrieved through the literature research in PubMed and CINAHL databases. After duplicates had been removed 151 titles were screened. Subsequently, 151 abstracts of articles were assessed for eligibility of which 20 articles were selected for full text review. Twelve articles were subjected to analysis in this study. The main reason for exclusion were articles evaluating conditions in healthcare systems where the direct access service to physiotherapy has not yet been implemented in their healthcare system. The flow diagram of literature search is outlined in figure 1.

With the exception of two randomized controlled studies, three included studies were qualitative by design and seven were systematic reviews. They all investigated community in primary care settings, and direct access to physiotherapist-led service for MSK conditions. Characteristics of the 12 studies are presented in Table 2.

Table 2: Characteristics of included studies.

First author (year)	Study design	Aims of the study	Findings
Gallotti et al. (2023)	Systematic review	To compare the effectiveness, safety, and the accuracy of DA compared to the physician-led model of care for the management of patients with musculoskeletal disorders.	DA had a high referral accuracy and a reduction in the rate of return visits; DA is a safe, less expensive, reliable triage and management model of care that results in higher levels of satisfaction for patients compared to the traditional medical model.
Downie et al. (2019)	Qualitative study	To evaluate the DA service presenting the first 2 years of data.	Referrals to orthopedics were substantially reduced; the extended scope physiotherapists asked for a GP review in 1% of patients.
Alshareef et al. (2023)	Qualitative study	To identify factors associated with patients' decisions to access physical therapy through self-referral or provider-referral.	Self-referral patients were aware that their plan benefits included reduced cost for self-referral and felt confident in selecting DA, they also had negative beliefs about the effectiveness of pharmacological treatments and surgery, and previously had positive direct or indirect experiences with physical therapy.
Babatunde et al. (2020)	Systematic review	To synthesize evidence regarding outcomes of DA; to describe current models of DA; to determine characteristics of the patients using DA.	Lower health care utilization (imaging procedures, medication prescriptions), lower off-work time; Regarding outcomes there was not a large difference between DA or GP-led care; Patients were younger, slightly more educated and with better socio-economic status.
Piscitelli et al. (2018)	Systematic review	To explore the evidence regarding feasibility, costs, safety and patient satisfaction in DA compared to other organizational healthcare models.	DA showed less physiotherapy treatments, visits to physicians, imaging performed and drug consumption, patients were more satisfied with DA service.
Harvey-Sullivan et al. (2024)	Systematic review	To explore the impact of DA and self-referral pathway on inequalities in healthcare use.	Self-referral pathways risk widening inequalities in healthcare use.
Cattrysse et al. (2024)	Systematic review	To identify, appraise, and synthesize existing literature to assess the impact of DA for patients presenting with various MSK disorders with focus on outcomes from the perspectives of the patient, the provider, and society.	From the patients' perspective there was no effect on pain, but they described better quality of life and functioning. Providers detected higher treatment compliance. There was a reduced waiting time, lower health costs.
Ho-Henriksen et al. (2022)	Randomized controlled pragmatic trial	To determine whether physiotherapists as primary assessors in primary care are cost-effective alternative compared to GP-led care.	Findings suggest that physiotherapists-led care might reduce healthcare costs, it seems to lead to fewer physician consultations and radiography.

First author (year)	Study design	Aims of the study	Findings
Igwesi-Chido-be et al. (2021)	Qualitative study	To understand the experiences of patients, GPs, physiotherapist and clinical commissioners on DA.	DA is acceptable to all health-care professionals and patients, but there is necessary to ensure effective communication among health-care professionals and patients and to clarify the scope of physiotherapists. DA can free GPs to focus on more complex health conditions.
Gagnon et al. (2020)	Randomized controlled trial	To evaluate the effects of DA on clinical outcomes in patients with MSK disorders compared to those in the usual care group.	Patients with MSK disorders in DA had better clinical outcomes (lower levels of pain), had fewer return visits to usual care service.
Hon et al. (2021)	Systematic review and meta-analyses	To compare evidence regarding costs and clinical outcomes between direct access and physician-first systems in US civilian health services.	DA to physical therapy is more cost-effective, the results show fewer visits than physician-first access and patients described greater functional improvement.
Demont et al. (2019)	Systematic review	To appraise the evidence of the impact of DA in terms of efficacy, health care costs, patients' satisfaction and compliance.	DA to physiotherapy seems a promising model to improve efficiency of care and reduce costs.

## Discussion

The purpose of this study was to investigate whether physiotherapy profession could contribute to decreasing the burden of chronic MSK conditions on health care system. Physical therapists are one of the healthcare professionals that are most assessed for managing pain and disability related to MSK conditions (Alsharref et al., 2023).

In almost half of EU countries and most of the US patients can use direct access to physiotherapy services, which is also known as self-referral directly to a first contact practitioner without seeing a GP (Demont et al., 2019; Babatunde et al., 2020; Ho-Henriksson et al., 2022; Harvey-Sullivan et al., 2024). Several studies have suggested positive effects of DA model of care on cost-effectiveness, clinical outcomes (e.g. patient's satisfaction, pain intensity, quality of life) and safety. Direct access is less expensive in terms of medication and imaging procedures use and due to fewer visits, it reduces waiting and off-work time (Piscitelli et al., 2018; Babatunde et al., 2020; Hon et al., 2020; Ho-Henriksson et al., 2022; Gallotti et al., 2023; Cattrysse et al., 2024). However, Cattrysse et al. (2024) reported that DA did not reduce pain intensity compared to Gagnon et al. (2020) who reported a significantly decrease in pain intensity. There is evidence that DA contributes to improving clinical outcomes such as quality of life, disability and patient satisfaction (Piscitelli et al., 2018; Cattrysse et al., 2024). Furthermore, DA is promising approach to decrease GPs work load, since some studies suggest reduced physician consultations (Downie et al., 2019), fewer referrals to orthopedics and return visits (Gagnon et al., 2020; Gallotti et al., 2023).

However, the existing evidence should be interpreted with caution when ensuring effective implementation of DA into practice (Igawesi-Chadobe et al., 2021). The DA model of care tends to cause inequality in health care use, suggesting that it depends on age, gender, ethnicity, and education level of the patients. White, younger, educated women, from less deprived backgrounds tend more likely to self-refer (Harvey-Sullivan et al., 2024). Additionally, Igawesi-Chidobe et al. (2021) reports poor public awareness about DA pathway and the scope of physiotherapy which indicates that there is a need to improve multidisciplinary communication, patient awareness, and public health literacy.

A systematic review by Lin et al. (2018) identifies eleven recommendations for best care for MSK disorders from high-quality clinical practice guidelines as follows: care should be patient-centered, practitioners should screen patients for serious pathology and red flags, physical assessment for spinal pain should include neurological screening test and the patient progress evaluated with validated measures. Furthermore, they recommend patient education, addressing physical activity in patient management, discouraging radiological imaging unless serious diseases are detected and manual therapy in combination with other approaches should be therapists' first choice strategy to manage patients with MSK disorders.

Direct access model is safe (Gallotti et al., 2023) and shows rare risk for adverse effects in the whole physiotherapy practice not just related to MSK conditions (Piscitelli et al., 2018).

Regardless of all the benefits of DA a lot of countries in Europe including Slovenia still do not adopt this model. Nevertheless, the physiotherapists community in Slovenia is increasing its role and competence and offer postgraduate program. In addition, some physiotherapists have already achieved international musculoskeletal certification acquiring advanced knowledge and skills following the International Federation of Orthopedic Manipulative Physical Therapy standards. Existing evidence from a cross-sectional study by Souter et al. (2019) suggests that post-professional specialization is a mainstay for developing advanced clinical, decision making, and reasoning skills level.

According to our knowledge, this is the first study in Slovenia that reports the importance of screening for red flags and serious diseases in physiotherapy management of MSK disorders and furthermore, suggests how physiotherapists can contribute to health care efficiency and utilization.

This review has some limitations. First, the research was performed only in two databases, and some relevant article may not have been included. Second, most of the included studies were conducted in countries (e.g. United Kingdom, USA) where DA is already adopted and screening process is an essential part of each physiotherapy assessment. However, their health care systems were initially facing same problems as in Slovenia.

## Conclusion

Activity and participation limitations caused by chronic MSK conditions can aggravate other diseases, cause poor mental health and reduce quality of life which is why the need for better-targeted care and improved efficiency in the management of MSK conditions is growing. There is evidence which support that healthcare system could benefit from physiotherapists with advanced knowledge and skills including screening for red flags or serious diseases. The results of this study suggest that it is time to rethink the role of Slovenian physiotherapists and to design high quality studies to promote their profession and as such to ensure patients basic right to appropriate, safe, and quality treatment.

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# Bullying and Mobbing in Nursing: A Descriptive-Interpretative Analysis

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## *Abstract*

*Introduction:* The shortage of healthcare staff in Slovenia has been a topic of debate for many years, which is being intensified by the ageing of the population. Healthcare organisations are facing a shortage of nurses and other nursing staff. The challenge is further compounded by an unsupportive environment, often with bullying present. Negative acts of bullying have a wide range of negative consequences for the victim and those around them. Colleagues who witness bullying or mobbing may also suffer because they may be unable or unwilling to defend the victim against the attacker. Staff turnover brings not only financial problems to an organization but also a reduction in the quality of work and negative outcomes for those entering the health system. The aim of this research is to gain an in-depth insight into the experience of workplace bullying in nursing, and how nurses respond to negative acts of bullying. *Methods:* Qualitative descriptive interpretive methods were employed to collect data from nine nurses across all levels of healthcare through semi-structured interviews. The data was then processed using thematic analysis of qualitative data. *Results:* During the in-depth interview, the interviewees provided detailed accounts of their personal experiences with bullying and shared their perspectives on the issue. Five themes emerged from the data analysis: (1) causes of bullying, (2) experiences of bullying in the workplace, (3) characteristics of both perpetrators and victims, (4) strategies for responding to and coping with bullying, and (5) consequences of bullying. *Discussion and conclusions:* To improve conditions in healthcare and reduce bullying, organisations need to make changes such as explicitly respecting zero-tolerance policies, educating staff, and investing in strengthening relationships within teams.

Key words: *nurses; perpetrator; victim; relationships; mobbing*

## Introduction

Terms, such as intimidation, bullying and mobbing are often used interchangeably in the workplace. Intimidation involves actions designed to instil fear and undermine confidence. Bullying consists of repeated acts of intimidation, such as persistent criticism or exclusion, targeting an individual over an extended period, making it difficult for the victim to defend themselves. (Einarsen idr., 2020; Johnson, 2021). Mobbing is a form of psychological harassment characterized by frequent, systematic incidence occurring at least weekly for extend time period ( Difazio et al., 2019; Einarsen et al., 2020; Johnson, 2021).

Nursing have some of the highest levels of workplace bullying and mobbing (International Council of Nurses, 2017; Johnson, 2018). A 2020 pilot study found that, 35.4% of Slovenian nurses experience some sort of intimidation, bullying or mobbing (Plos et al., 2022). Such negative behaviours affect victims, their families, colleagues but and healthcare organization. Indirectly affecting everyone interacting with the healthcare system. It leads to a decline in nursing care quality, increased professional errors, longer patient hospital stays, and higher rates of falls and mortality. (Al-Ghabeesh in Qattom, 2019; Anusiewicz idr., 2020; International Council of Nurses, 2017; Kozakova idr., 2018; Stergiannis, 2019). Additionally, bullying contributes to higher staff turnover, increased sick leave and decreased work productivity (Bloom, 2019). Slovenia has faced severe shortage of nurses for many years, primarily due to poor working conditions and negative organisational climate. Nurses often avoid workplaces with inadequate conditions, lack of support, and frequent bullying (Maze, 2020). According to Slovenia's Employment Relations Act, employers must implement measures to prevent all forms of workplace violence (ZDR-1, 2013).

### *Purpose and Objectives*

This study aimed to understand how nurses perceive bullying in the workplace by investigating their personal experiences and dynamics of such incidents. Additionally, the study examined the characteristics of perpetrators and victims of bullying in nursing. Understanding how nursing staff respond to bullying incidents was another critical aspect of this research. Finally, it investigated the perceived causes of workplace bullying among healthcare workers.

## Materials and Methods

### *Study Design*

The study used a qualitative, descriptive-interpretive method to examine the thoughts, behaviour and understanding of individuals (Smythe, 2012). This method was chosen due to its relevance to the research objectives and its effectiveness in analysing complex nursing experiences. It is adaptable, and allows for practical conclusions to be drawn whilst maintaining methodological integrity (Elliott and Timulak, 2021; Thompson Burdine et. al., 2021).

### *Participants*

Participants were recruited via healthcare professional groups in social networks for accessibility and relevance. Respondents received information on the study's purpose, objectives, and process. Using purposive sampling, the study selected nurses who had experienced workplace bullying within the past 12 months. Ten nurses met the criteria and agreed to participate. Before the study, all participants provided written consent covering the study's purpose, process, risks, benefits, confidentiality, interview duration, and the option to withdraw or skip questions, ensuring informed and voluntary participation per ethical standards. One interview was excluded due to inappropriate content. This left nine participants with an average age of 34 years (range: 26-48). Of these, eight were registered nurses and one was a secondary nurse. Four worked in primary healthcare, two in secondary, and three in tertiary care.

### *Data Collection*

Data were collected in December 2023 using in-depth, semi-structured interviews in Slovene, conducted via Zoom, lasting up to 35 minutes each, without third-party presence until data saturation was reached. The interviews explored workplace bullying, including perpetrator and victim characteristics, triggers, and impacts. The researcher prepared guiding questions in advance and asked follow-up questions during the interview (Creswell in Creswell, 2017).

### *Data Analysis*

Thematic analysis was used to analyse the data, examining patterns and differences (Kiger in Varpio, 2020). Texts were transcribed and read multiple times to understand bullying among nurses. Themes and sub-themes were identified through open coding, determined through author discussions, with line-by-line coding. To ensure trustworthiness, criteria of credibility, transferability, reliability, and confirmability were applied (Bryman, 2016).

## **Results**

Data analysis identified five themes: (1) causes of bullying, (2) experiences of bullying in the workplace, (3) characteristics of both perpetrators and victims, (4) strategies for responding to and coping with bullying, and (5) consequences of bullying.

### *Causes of Bullying*

Respondents consistently cited the organizational environment, characterized by low morale and poor working conditions, as a major risk factor for bullying. They noted that poor management, unclear responsibilities, and rigid hierarchies contribute to a bullying atmosphere. Effective management in communication, relationship-building, and work quality is crucial. Bullying tends to

occur where intimidation is tolerated and reports are ignored or mishandled. Two interviewees noted that complaints about bullying are often dismissed.

Nothing gets resolved in a way that calms the situation or prevents it from happening again. Whether it will happen again to other employees or not, that seems less important (dmst-48).

When asked about trigger for intimidation, all nine interviewees cited, that it was related to the nature of the work and the organisation's inadequate performance.

Bullying can occur when victims point highlight organizational issues, during stressful periods, or due to understaffing. Two participants cited understaffing as the primary cause. Most interviewees suggested that bullying occurs because of the nurse's role as a *link between the patient and the doctor*.

Most believe intimidation often stems from the aggressor's personal frustration or disrespect for nurses. They note that bullying is less common in environments where management regularly address complaints, fosters positive staff relations, and where unit managers are professionally qualified.

### *Experiences of Bullying in the Workplace*

Interviewees reported that bullying among nursing is relatively common, *quite normal*. Two described it as a *constant* aspect of the profession, to which witnesses typically do not respond. All nine interviewees found bullying to be an unnecessary source of stress and many of them cannot respond in a controlled manner. Most interviewees experienced bullying during work process, with attacks often being personal nature. The perpetrator aimed to discriminate, humiliate or undermined the victim's autonomy and responsibilities. Four interviewees described threats related to the victim's employment and career, while two reported experiencing discrimination related to their use of parental rights. In one case, the interviewee's supervisor assigned a low performance rating, hindering her promotion due to her maternity leave throughout the year. In the second case, the assault occurred when interviewee tells supervisor about pregnancy.

What really shocked me was when I got pregnant and went to announce it to supervisor; she literally called me a "chicken," questioning why I got pregnant and complaining that there were already so few staff in the department ... I just lowered my head and quietly went working ... Then the supervisor came up to me, started shouting at me in front of colleagues and patients, saying that if I always kept my head down and stayed silent, I would never take care of my children (sms-33).

Interviewee also reported being indirectly coerced into working nights after returning from maternity leave, as department leader scheduled her primarily

for afternoons, limiting her time with her young children. She was also threatened with termination for frequent childcare absences and faced repeated unannounced home visit to check on her.

The most frequent form of bullying reported was verbal abuse including insults, intimidation, and threats of violence, in one instance even death threats. Non-verbal acts were also noted, including two cases where perpetrators intruded into the victim's personal space. One interviewee described a particularly traumatic event involving the forwarding of a patient's sick note, which was mishandled by a colleague as instructed by physician.

He stopped me in the middle of the corridor, at the entrance to the health centre... entered my personal space... and he said, 'that sick note didn't go through'. And I said, 'I did my job'. My voice was shaking because I was really, really afraid of him. And he basically pointed fingers towards me as if he was going to smack me ... maybe he stopped himself a centimetre from smacking me in the forehead. And he said, "it's your fault for not having checked" (dm-sp-34).

#### *Characteristics of Both Perpetrators and Victims*

Interviewees agree that health workers, especially nurses, are the most frequent perpetrators, using their authority and support from those in higher positions. Perpetrators were described as manipulative, superior, and seeking to impress others. Interviewees believed they use bullying as a defense mechanism when feeling threatened. Large part of them noted that perpetrators often lack empathy and professional competence, and may bully due to dissatisfaction or perceived personal failures.

Well, they seem insecure and have problems they don't outwardly show. When you think about it... They don't express their issues in other ways or talk about them. It seems they display them in this manner. (dmst-32).

The interviewees described victims as non-conflicted, submissive, and helpful individuals who are more likely to be bullied. They described that victims are targeted for highlighting irregularities and are typically in subordinate positions, such as new employees. Many believe that victims may stand out due to their appearance, personal traits, or age. Two interviewees noted that younger nurses handle bullying more effectively and view hierarchy differently than older generations. A larger part of the interviewees indicated that individuals who are more sovereign in their speech and have strong communication skills are more resistant to bullying.

### *Strategies for Responding to and Coping with Bullying*

Interviewees consistently seek support from trusted colleagues, friends, and family when dealing with bullying. Most try to stop the attacks through conscious, controlled behaviour. Additionally, large part of respondents actively addresses the bullying by setting boundaries with the perpetrator, viewing this as a learnable skill. Two participants found speaking with a supervisor effective, while two others successfully confronted the perpetrator. Besides direct confrontation, seven respondents manage bullying by avoiding conflicts or adjusting their priorities.

Four interviewees moved from workplaces with frequent bullying to those with less. They cited a sense of mission, good colleague relationships, proximity to home, and financial considerations as reasons for staying in their previous jobs.

A significant factor was the salary. I had a relatively high salary in the intensive care unit, which contributed to my decision to stay (dm-sp-32).

### *Consequences of Bullying*

Interviewees reported that workplace negatively affects both their professional and private lives. Most of them feel less satisfied with their work, which can lead to doubts about their career choice. Additionally, reporting bullying is rare due to the belief that it worsens the situation.

They report that bullying decreases their performance by impairing concentration, prolonging task completion, increasing fear of mistakes, and reducing self-confidence. Interviewees discuss their tendency to ruminate on past events.

It affects job satisfaction. Because, well, it impacts you that day and also leaves some consequences for a few days afterwards when you keep thinking about it. You can't just leave it and say, "Oh, it's nothing." (dm-sp-26).

Most individuals reported stress-related symptoms both physically mentally. They expressed fear of returning to work and facing the perpetrator. Bullying effects included prolonged insomnia, persistent rumination, and physical symptoms such as stomach pain, loss of appetite, and diarrhoea.

Interviewees suggest that bullying can be reduced through organizational-level interventions, such as establishing clear reporting channels and enforcing zero tolerance policies. They emphasize the need for fostering good colleague relations, clear communication and effective staff management. Education on effective communication, types of bullying and actionable steps is considered crucial. One interviewee suggests including practical exercises in



training, while two others stress the importance of personal action, including anonymous discussions and *self-development*.

## Discussion

The study aimed to explore nurses' experiences with workplace bullying, focusing on the perpetrator's characteristics, causes of bullying, and the victims' responses. Similar to other researchers, we found that tolerance of bullying and poor leadership foster conditions that allow bullying to thrive in organisations (Anusiewicz et al., 2020; Hartin et al., 2020; Shorey and Wong, 2021). Nurses may view their superiors as incompetent at addressing bullying, which leads to acceptance of such behaviour (Bloom, 2019; Hartin et al., 2020). They feel stuck in a system that is lenient towards perpetrators (Shorey in Wong, 2021). Bullying frequently stems from the perpetrators' egocentrism and immaturity (Shorey and Wong, 2021; Yosep et al., 2022). As per Shorey in Wong (2021) power imbalances, ineffective leadership, employee differences and high-stress environments contribute to bullying. This problem is notably prevalent in health-care settings, where bullying can be seen as a leadership approach (Edmonson in Zelonka, 2019).

According to Bloom (2019) qualitative study, generational differences affect the prevalence of bullying. Younger generations of nurses often communicate more directly and assertively, whereas older generations tend to be submissive.

The study found that work-related bullying is the most common form experienced by nurses, aligning with Johnson (2021). Lateral violence is often reported in nursing (Bambi idr., 2018; Johnson, 2018; Krakar, 2021)). A pilot study in Slovenia conducted in Slovenia (Plos et al., 2022), also indicated that majority of nurses viewed colleagues as the primary perpetrators, consistent with our findings.

Nurses often see bullying as part of the job and refrain from reporting due to the fear of further attacks (Rosi idr., 2020; Shorey in Wong, 2021). As in present study, Shorey in Wong, (2021) emphasize social support as an important coping mechanism.

Bullying negatively impacts on quality of life, and can cause short- and long-term disorders, such as anxiety, stress, depression, and psychosomatic issues (Anusiewicz idr., 2020; Shorey in Wong, 2021; Zulkarnain idr., 2023). It may also lead to diminished self-confidence and increased self-doubt, affecting decision-making and patients care quality (Mammen et. al., 2018; Mammen et al., 2023). Nurses find bullying distracts them, reducing concentration and productivity (Anusiewicz idr., 2020; Shorey in Wong, 2021). Many nurses continue working despite bullying because positive experiences and relationships outweigh the negative, a conclusion also found in Bloom's research (Bloom, 2019). Addressing bullying and mobbing in healthcare requires organizational action. Nurses advocate that for leadership to promote effective com-

munication, enforce rules, and provide education on identifying, preventing and managing bullying (Shorey in Wong, 2021).

## Conclusion

Bullying is a common source of stress in nursing. It is primarily caused by inadequate management and acceptance of bullying behaviours, including mobbing by organisational leaders. Nurses often experience bullying by colleagues and other healthcare professionals, though is less common from patients, their families, or external partners. Perpetrators are often described as arrogant and driven by a need to assert power and status, frequently misusing their positions. Nurses may respond to bullying either actively or passively but often continue to work despite it due to their commitment to social support and the sense of mission in their roles. Bullying negatively affects nurses' personal lives and health, sometimes causing them to question their career choice. It can also harm healthcare performance, leading to longer patient treatment and hospitalization, increased errors, falls and mortality rates.

With ageing population and growing healthcare needs for older adults, there will be an increased demand for qualified nurses in the coming years. To prevent nurse attrition, organisations must create a supportive work environment by reducing workplace bullying. Implementing training communication, handling bullying and stress, and other organizational strategies can improve the workplace climate.

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# Self-assessment of the Oral Health of Adults in Slovenia in 2019

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## Abstract

**Introduction:** Self-assessment of oral health is a subjective but important indicator of an individual's oral health. The aim of the study was to determine the level of self-assessed oral health in Slovenia. **Methods:** The »National Oral Health Survey of Adults in Slovenia in 2019« was conducted on a sample of 3,200 adult residents of Slovenia aged between 18 and 74 years. Participants received an invitation to participate in the online survey by post, and a written questionnaire was enclosed with the notification letter for people over 44 years of age. The self-assessment of oral health was evaluated using the question: »How do you rate your oral health?«, possible answers were: »Very good«, »Good«, »Fair«, »Poor«, »Very poor«. The extreme categories were combined for the statistical analysis. The data were analysed according to demographic data. We tested the distributions of proportions between different groups (by gender, age, education and living environment) using the chi-square test and the Column Comparison Proportion (CCP) test to compare proportions between different groups. **Results:** 60% of respondents rated their oral health positively, 12% of whom rated it as »very good«. 8% of respondents rated their oral health as »poor« or »very poor«. 62% of women rated their oral health positively, compared to 57% of men. Conversely, the proportion of those who rated their oral health negatively was higher among men than women (10% compared to 6%); the difference is statistically significant (CCP test,  $p=0.021$ ). The proportion of people who rated their oral health negatively was lowest among adults with the highest level of education (8% of adults with at least primary education, 10% of adults with secondary education and 4% of adults with at least tertiary education). **Discussion and conclusions:** Self-assessed oral health is related to socioeconomic factors such as gender, education and living environment. The level of oral health of Slovenian adults, based on self-assessment, is not high. A significant

proportion of adults in Slovenia rate their oral health negatively, which is a major problem. Given the observed prevalence of negative self-assessment of oral health, it can be estimated that in addition to the more than 117,000 people who rate their oral health negatively, there are also more than 480,000 who rate their oral health as »fair«. It can be assumed that they occasionally have problems with their oral health. The proportion of people who rate their oral health negatively is higher among men, people over the age of 44, people with a lower level of education (mainly primary education) and people living in rural areas. These groups can be considered particularly vulnerable in terms of oral health. Adequate oral health care plays a key role in maintaining and strengthening oral health. Inadequate frequency of tooth brushing and irregular visits to the dentist lead to the development of oral diseases, pain, discomfort and ultimately tooth loss with all its consequences. These are also the groups on which preventive measures should be focused in the future.

*Keywords: oral health, oral health self-assessment, dental health surveys, oral hygiene, oral health care*

## Introduction

Oral health is an integral part of general health and has a significant impact on an individual's quality of life. The World Health Organization (WHO) defines oral health as the state of the mouth, teeth and orofacial structures that enables individuals to perform essential functions such as eating, breathing and speaking, and encompasses psychosocial dimensions such as self-confidence, well-being and the ability to socialise and work without pain, discomfort and embarrassment (WHO, 2024). This definition indirectly reflects the broader definition of health, which includes physical, mental and social well-being. The understanding and approach to oral health has evolved over time. In the past, oral health was seen as a separate and independent aspect from general health, with diseases of the oral cavity primarily associated with impaired chewing function. Today, however, oral health is seen as an inseparable part of general health, with the psychological and social dimension increasingly recognised.

Individuals assess their health on the basis of their culture, their perception of health, but also on the basis of their experiences, expectations and the environment in which they live and work (Jylhä, 2009). Although self-rated health is essentially a subjective judgement, research shows that it also reflects objective health status, making it a very suitable indicator for measuring health at a global level (Wu et al., 2003). In addition, this indicator serves as a good predictor of future health outcomes and hospitalisations in patients with heart failure (Benyamini et al., 2004; Farkas et al., 2009). Self-assessment of oral health is a similar indicator that focuses on and summarises a person's subjective level of oral health. It has an independent effect from the self-assessment of general health, and both self-assessments independently influence

a person's life satisfaction and self-esteem (Benyamini et al., 2004). The data show that the self-assessment of oral health reflects the clinical condition of the oral cavity. Known clinical factors related to oral cavity diseases (such as the DMFT index or orthodontic irregularities) influence the self-assessment of oral health. In addition, self-assessment is also associated with more subjective phenomena such as temporomandibular joint problems (Kojima et al., 2013).

By using the self-assessment of oral health indicator, epidemiological research can easily obtain data on the level of oral health in the population. This enables the adaptation of existing or the development of new public health measures targeting the most disadvantaged population groups. In addition, such an indicator can serve as a benchmark for population-level interventions and for monitoring treatment outcomes (Lawal, 2015).

## Methods

In 2019, we conducted a nationwide study on the oral health of adults based on a representative sample stratified by gender and age. The sample, consisting of around 3,200 adults aged 19 to 74 years, was compiled by the Statistical Office of the Republic of Slovenia (SURS) using simple random sampling from the Central Population Register. The study was designed as a cross-sectional study and used the EGOHID questionnaire, which contained both demographic information and a self-assessment of oral health. The adults included in the study received an invitation to participate in the survey at a home address with a password to access the online questionnaire. For participants over the age of 44, a written questionnaire was enclosed with the notification letter. The survey took place in spring 2019 and participants received a further postal reminder during the survey period.

Participants were asked: »How do you rate your oral health?« and could choose between the following answers: »Very good«, »Good«, »Fair«, »Poor« or »Very poor«. Due to the relatively low proportion of people in the worst category, we summarised the categories based on the respondents' self-assessed values in order to achieve a clearer presentation.

The data were weighted according to gender, age and education. Statistical analysis using the computer software »IBM SPSS Statistics for Windows«, version 21.0 (IBM, 2020), allowed us to analyse the baseline data on the prevalence of the different oral health assessments across socioeconomic and demographic indicators. We tested the distributions of proportions between different groups (by gender, age, education and living environment) using the chi-square ( $\chi^2$ ) test and the Column Comparison Proportion (CCP) test to compare proportions between different groups. A confidence interval of 95% was used in both cases.



## Results

The final sample of respondents who answered the question on self-rated oral health was N=1153, with women slightly outnumbering men (56% vs. 44%). The proportion of adults aged 18 to 74 who rated their oral health positively was 59.8%, while the proportion of people who rated their oral health as poor was 7.8% (Figure 1). This means that more than 117,000 Slovenians had problems with their oral health.

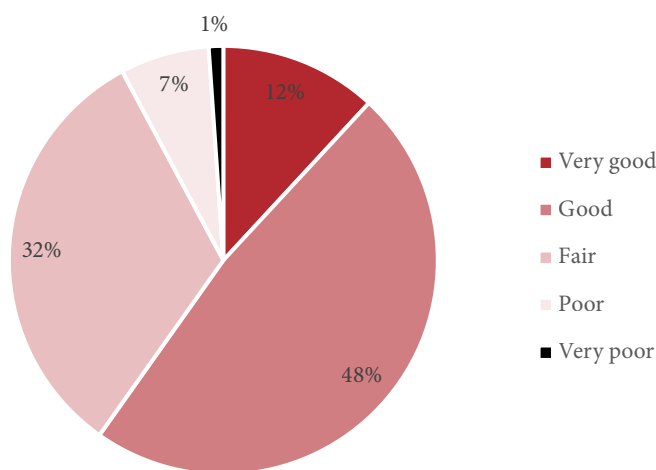


Figure 1: Proportion of adults aged 18–74 years by self-rated oral health.

The self-assessment of oral health was better among women: the proportion of women who rated their oral health positively (very good and good) was 62.4%, compared to 57.4% of men. Among women, 31.9% rated their oral health as moderate and 5.7% as poor or very poor. Among men, 32.8% rated their oral health as moderate, and 9.8% as poor or very poor. The difference in the proportion of poorly rated oral health by gender was statistically significant (CCP test,  $p=0.021$ ).

As far as age is concerned, the positive self-assessment of oral health decreases with increasing age. The proportion of people who rated their oral health as good or very good was highest in the youngest group (18–24 years) at 69.1% and gradually decreased to 49.9% in the 65–74 age group. The difference between younger (18–34 years) and older (55–74 years) age groups was statistically significant ( $\chi^2$  test=25.64,  $p=0.01$ ; CCP test,  $p<0.001$ ). It is noteworthy that the proportion of those who rated their oral health as moderate increased with age (Figure 2).

The self-assessment of oral health also varied depending on the level of education. For people with a basic level of education, the proportion of people who self-rated their oral health as good was 49.8%, compared to 71.0% for people with at least a higher level of education. The differences between the groups were statistically significant ( $\chi^2$  test=21.41,  $p=0.001$ , test CCP,  $p<0.001$ ).



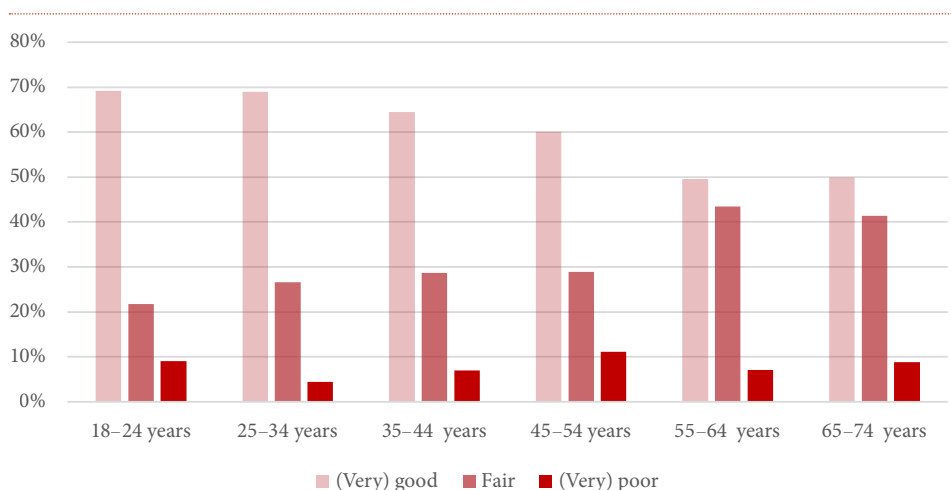


Figure 2: Proportion of adults aged 18–74 years by self-rated oral health by age.

As the level of education increased, the proportion of people who rated their oral health as moderate gradually decreased (Figure 3), compared with 4% in the group of people with tertiary education; the difference was statistically significant (test CCP,  $p=0.007$ ).



Figure 3: Proportion of adults aged 18–74 years by self-rated oral health by education level.

Residents in urban environments rated their oral health positively in 67.4% of cases, while this proportion was 63.1% in suburban areas and 52.8% in rural environments. The differences were statistically significant ( $\chi^2$  test=19.48,  $p=0.001$ ). Conversely, the proportion of people with poor self-rated oral health was highest in rural environments (10.4%), followed by suburban environments (7.7%) and lowest in urban environments (4.5%).

## Discussion

The collected results show that the level of oral health as determined by the residents through self-assessment is not high. A significant proportion of the Slovenian population rated their oral health as poor or very poor. This trend was more pronounced among men, older people, people with a lower level of education and people living in rural environments. Interestingly, this is consistent with the findings on general self-rated health, which suggest a link between general health behaviours and self-perceived oral health (Vinko, 2018). Maintaining and improving oral health is closely linked to individual care practises. Regular tooth brushing, at least twice a day with a toothpaste containing the recommended fluoride concentration (1450 ppm), plays a crucial role in maintaining oral health (Ranfl et al., 2015).

The Scandinavian countries, which traditionally place great emphasis on good oral health, report a relatively high prevalence of a positive self-assessment of oral health. In a Swedish study of adults aged 16–74 years, the prevalence of good self-rated oral health was 75%, with self-rated oral health in younger respondents being similar to our study, but significantly better in older groups (Molarius et al., 2014). Among older adults (65–74 years) in Brazil, the prevalence of poor self-rated oral health (moderate, poor, very poor) was 46.6%, slightly lower than in Slovenia. In another Brazilian study of adults aged 20–59 years, the prevalence of poor oral health (moderate, poor, very poor) was 33.2%, which is better than the results of the study of older adults and similar to our results (Luchi et al., 2013). It is noteworthy that in this study, the proportion of poor self-assessment increased with age, with higher rates observed in women (Luchi et al., 2013). The results showed that self-rated oral health in younger and middle-aged groups is comparable to that of other countries, but is worse in older adults.

On the one hand, self-assessment of oral health is a summarising measure that provides information on how patients perceive their oral health and its overall level. At the same time, however, these results also reveal existing inequalities in oral health. Despite the numerous determinants that influence oral health, we cannot ignore the importance of personal care, adequate tooth brushing and (preventive) check-ups. Proper self-care plays a crucial role in maintaining oral health. Irregular or inadequate tooth brushing leads to dental caries and inflammation of the periodontal tissues, causing pain, discomfort and difficulty eating, communicating and participating in social activities. Untreated conditions can eventually lead to tooth loss, further complicating daily life. These problems have a direct impact on the functions that make up oral health. Individuals with problems require a certain level of dental care, which may vary geographically or financially. Given the link between self-assessment of oral health and clinical indicators, it makes sense to include self-assessment in the design and planning of health programmes (Atala-Acevedo et al., 2023). Monitoring oral health through self-assessment can also serve as a measure of

access to dental care, while trends over time allow an assessment of the effectiveness of interventions to improve and strengthen oral health.

## Conclusions

As the results on self-rated oral health show, there are some particularly vulnerable groups: Men, older people, people with a lower level of education and people from rural environments as well as people with a lower socioeconomic status. This fact should be taken into account when developing and designing materials to promote oral health in the future. Existing materials and activities should be adapted accordingly in order to achieve greater success with the target groups.

## Acknowledgements

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# Smoking habits of older adults in Slovenia – analysis of Quitline calls

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## *Abstract*

*Introduction:* Older smokers have a higher risk of serious health complications and death. Quitting smoking in old age has many benefits, but older adults are often overlooked. Literature published in the last five years cites various percentages of older smokers worldwide, between 8 to 12 % of people over the age of 65. World No Tobacco Day 2023 states that cessation interventions should also target older smokers. An analysis of 10 European countries showed that changes in legislation did not reduce the prevalence of smoking among people over 65 years of age. *Methods:* A qualitative content analysis of secondary sources was used. The data were obtained from the recorded summaries of calls to the Slovenian telephone line for smoking cessation (Quitline) in 2022. A purposeful sample of the records of anonymous telephone conversations with people over 60 years of age was used. *Results:* 43 older adults contacted Quitline in one year and two main themes have been identified: factors that facilitate smoking (theme 1) and factors that facilitate non-smoking (theme 2). Caller average age was 67 years, smoking for more than 45 years, 20 cigarettes a day. They all had at least one experience of quitting. They mostly relapsed due to stressful life changes. Smoking is perpetuated through boredom or lack of activity. In several callers, counsellors detected signs that may point to psychiatric health problems. Older adults often smoke while drinking coffee. Women prefer to smoke alone. Many of them still smoke indoors. The most frequently mentioned health problems were: arterial hypertension, old myocardial infarction, shortness of breath, cough, COPD, asthma, diabetes. Health and saving money were the most common motivational factors for quitting. They often wanted quick quitting solutions. *Discussion and conclusions:* Less than a half of older smokers know smoking is harmful. They believe quitting would not improve their health and passive smoking is not harmful to others. A lower education level indicates less knowledge.

The main factors in maintaining smoking are addiction and loneliness. When an older smoker calls Quitline, it is crucial to work on their loneliness. We advise directing older adults to assistance programs in their local environment. Everyone who comes in contact with older smokers should be able to identify their specific needs and be able to provide appropriate help. Quitline should always be offered as one of the options.

Keywords: *older adults, smoking, cessation, Quitline*

## Introduction

Smoking in old age is a public health problem. Older smokers are more susceptible to a more severe course of disease and have a higher risk of serious complications and death. There are many benefits to quitting smoking at any age, but older smokers are often overlooked. Newer tobacco and nicotine products may mislead them despite their long-term effects still being uncertain (Yao et al., 2021). Research shows that 8-12 % of people over the age of 65 still smoke, more likely to be male than female. World No Tobacco Day 2023 highlighted the need to focus cessation interventions on older smokers, as health risks only increase with longer smoking duration. An analysis of 10 European countries showed that changes in tobacco legislation reduced the prevalence of smoking in the age group of 50-64 years, but not in those over 65 (Stival et al., 2022, Yao et al., 2021, Satre et al., 2020, Viana et al., 2019, Jamal et al., 2018.).

A large Chinese prospective cohort study demonstrated a statistically significant reduction in the risk of death from all cancers, stroke, and cardiovascular disease when older smokers quit smoking (Lam et al., 2007).

Focus groups of older people in the USA revealed they use newer nicotine products to abandon traditional cigarettes and as an alternative way to avoid smoking restrictions. Their beliefs about the safety of e-cigarettes were incorrect. The promotion of e-cigarettes was seen as a way of renormalizing smoking and immediate action is needed regarding the advertising of alternative nicotine products at the global level. At the moment this encourages dual use and does not contribute to reducing nicotine addiction (Cataldo et al., 2015).

In England they examined how older smokers were treated in primary health care. They found that smokers older than 75 years were less likely to report deciding to quit or asking their GP for help. Primary care physicians addressed the smoking problem equally in all age groups, but those over 70 were more likely not to receive advice about nicotine replacement therapy (NRT) or other forms of cessation assistance (Jordan et al., 2017).

The Slovenian National Institute of Public Health (NIJZ, 2022) reports more than 50 % of smokers wish to quit. Many of them cannot succeed on their own. In Slovenia, they can choose between group and individual counselling at our Health Promotion Centers in Community Health Centers (insurance covered). Prescription drugs or over-the-counter NRT can be used in the form of

patches, oral sprays or chewing gum. The cost of NRT is comparable to the cost of nicotine products.

Telephone counselling lines are also available to help users quit smoking in accordance with World Health Organization (WHO) guidelines and recommendations. The first such line was established in 1982 in Australia, followed by other English-speaking countries in the following decade. 53 countries have an active quitline today. (WHO, 2014). Quitlines use three main approaches: motivational interviewing, cognitive behavioral therapy, and acceptance and commitment therapy (Liau, 2022).

Counsellors on the line come from various areas of expertise, mostly psychology and medicine. Students in their final years are encouraged to participate. Before allowed to answer calls, they receive training in theoretical content (harmfulness of smoking, addiction treatment, and counselling techniques) and conducting telephone consultations. Callers receive information about the benefits of not smoking, available quitting methods, tips on quitting, and support in maintaining abstinence. The telephone number, 080 27 77, is published on packaging of tobacco and nicotine products. The line operates every day between 7:00 a.m. and 10:00 a.m. and between 5:00 p.m. and 8:00 p.m. (NIJZ, 2022).

The aim of this article was to describe habits of older people regarding the use of tobacco and nicotine products as reported during calls to the Slovenian quitline. The purpose of the research was to lay the foundations for planning specific and effective interventions for the age group over 65 through understanding the smoking habits of older adults.

## Methods

A qualitative content analysis of secondary sources was used. Calls are not recorded due to maintaining complete anonymity, so the data for the analysis was obtained from manually recorded reports of all Quitline calls as written by counselors in 2022. According to the Act on Data Collections in the Field of Health Care, NIJZ is authorized to collect data through administrative databases and research and the callers were not asked for their permission.

### *Sampling*

In 2022, 27 counsellors logged a total of 799 phone calls. There were 385 serious sessions that were carried out to the end, and 59 calls where otherwise serious counselling sessions ended prematurely. 371 calls were made by daily or occasional smokers seeking help to quit. More callers were male. Their average age was 34.5 years, and most calls were recorded on weekday afternoons. The fewest calls were made on Saturday mornings.

A purposive sample of 43 call reports was used, as subjectively recorded by counsellors who spoke with a person older than 60 years at least once. The chosen age limit was 60 years or higher, due to this age being one of the retire-

ment conditions in Slovenia (valid for women). Calls where the actual age in years was not given were included when callers stated to be retired/older.

### Content Analysis

The reports, recorded manually on paper in the first months of 2022, and later in the form of a Microsoft Excel sheet, were transcribed into a uniform format and combined into one file. Using deductive coding as proposed by Mayring (2014), we identified two main themes: factors that facilitate smoking and factors that facilitate non-smoking.

### Results

The identified themes were further divided into categories shown in Picture 1.

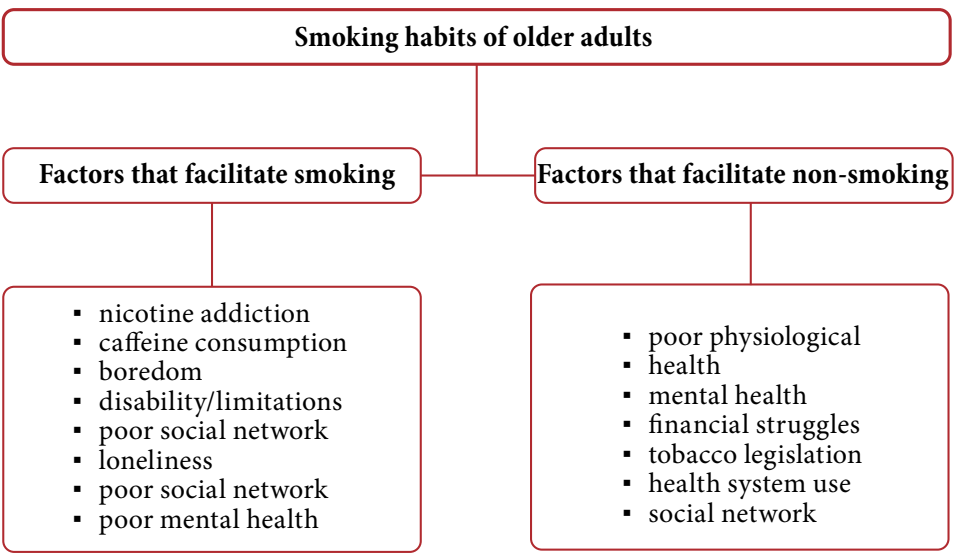


Figure 1: Themes and categories.

Quantitative data connected to callers' tobacco use are summarised in Table 1.

Table 1: Quitline caller data.

Quitline calls with older smokers	N	MIN	MAX
Number of calls/year	43 (23 male)	0 (March)	7 (Sep - Oct)
Age average (years)	67,1	60	89
Average smoking duration (years)	45,37	1	50
Average use of cigarettes per day	20,09	1,5	40



### *Theme 1: Factors That Facilitate Smoking*

All callers were regular smokers, except one who could maintain abstinence for 2 consecutive days. One call was made on day 10 after quitting to report progress and one call of an ex-smoker on behalf of their family. All were classic cigarettes users, no one indicated they might be using newer nicotine products. Two male callers did ask for information on those.

Most have been smoking for decades, only one started smoking 1 and a half years ago after retirement. All but one had at least one experience of quitting. While only three callers shared information on how they first started smoking, it is interesting that both male callers stated they became smokers while in the army. Considering the social norms in the 20<sup>th</sup> century we can assume most of them started smoking out of curiosity and a desire to be accepted by their social circle since smoking was much more socially acceptable and accessible in the past.

*"She started smoking because of the 'trend'"* Female, 60, a smoker for 40 years

*"He started in the army..."* Male, 60, a smoker for 40 years

Among the reasons for relapsing callers most often cited some kind of stressful event or major life change: retirement, loss of a family member, relationship problems. Only one caller stated that the attempt to quit was a result of change in tobacco legislation. The reports of relapsing after a single cigarette are of particular concern, as well as receiving advice from a health professional that sudden cessation is bad for health.

*"Started again 2 years ago when her husband died."* Female, 60, a smoker for 45 years

*"... but then she smoked a cigarette at a New Year's party and the story repeated itself..."* Female, 60, a smoker for 40 years

*"In the past, she stopped smoking for 18 days because she didn't have money, and then the doctor advised her that sudden quitting was bad, so she started again."* Female, 66, a smoker for 50 years

*"He quit 2 or 3 times in the past, but gained weight, which tempted him back to smoking... He read an interview with a doctor who warned about quitting and weight gain, which is now worrying him..."* Male, 75, a smoker for 59 years

Among the current reasons for smoking callers most often mentioned boredom or too much free time. It is a worrying fact that loneliness, anxiety and stress are so often cited as reasons for continuing the habit.

*"In the spring and summer, he has enough work in the garden, but in the winter he smokes out of boredom."* Male, 63, a smoker for 30 years

*"[smokes] whenever he has a free hand."* Male, 64, a smoker for 50 years

*"He has been retired for 1 year and now smokes even more than in the past."* Male, 60, a smoker for 40 years

*"Her need for cigarettes is strongest in the morning ... but smokes more in the evening - mainly because she is much busier during the day."* Female, 71, a smoker for 30 years

Older adults very often smoke while drinking coffee, indicating a strong coffee-cigarette connection. Despite raising awareness about the dangers of secondhand smoke, many still smoke indoors. No greater tendency towards preferring morning or evening hours was observed, the frequency of smoking depended more on having other activities. No one explicitly stated they smoked at night which would indicate a very strong addiction. Women preferred to smoke alone rather than while having company, which may indicate they are well aware of the decreasing social acceptability of smoking. We can also assume that since the proportion of smokers in their age group is usually lower than among younger generations, they no longer have many smoking peers.

*"If he drinks coffee in a pub, 3 cigarettes, otherwise 1."* Male, 64 years old, a smoker for 50 years

*"He walks a lot, but that he often rushes back home after a walk to light a cigarette."* Male, 75, a smoker for 59 years

*"When at home she smokes the most, but when she's in company she doesn't smoke as much."* Female, 62, a smoker for 44 years

*"Only smokes outside, doesn't smoke if visiting someone."* Female, 60, a smoker for 40 years

Five callers openly stated they were facing mental health problems and were being treated by a psychiatrist, mostly as outpatients. Some have also been hospitalised at least once. Several callers who did not confirm any mental health problems might be at risk of suffering from a mental health problem as noted by the counsellors.

*"She says she is often depressed."* Female, 72, a smoker for 40 years

*"Then she starts explaining how her neighbour destroys her plants and throws things at her door... She says once the police intervened, but blamed her for being a danger to the children of this neighbour... she also turned up the music on the radio, which was so loud that I couldn't hear her and she couldn't hear me either..."* Female, 63, a smoker for 1.5 years

*"He's been in a wheelchair for three years. Says he's nervous and that's why he smokes... Suddenly he starts talking about other things. I turn the conversation back to smoking - he doesn't answer, says he's afraid to say it out loud. Because it is very difficult for him being disabled, I advise him to get psychological help, but he does not see the point."* Male, no information on age, a smoker for 45 years

*"Asking about e-cigarettes, their price, why I don't know the price of e-cigarettes and where to buy them, who I am, am I even a doctor, where do I work, why don't I want to give personal information, that anonymous people are evil,*

*madmen, murderers. Why do we sell cigarettes, allow prostitution...*" Male, no information on age, no information on smoking duration

*"It is very difficult to speak with him, he forgets the questions or the purpose of him calling. He says he smokes 15 cigarettes a day, is a widower. In the background, the television is on. He cannot explain why he called our phone number and shows obvious signs of dementia."* Male, 89, no information on smoking duration

*"She's alone during the week, she doesn't have any friends, lately she's completely out of willpower... I ask about suicidal thoughts, she denies them..."* Female, 71, a smoker for 30 years

### *Theme 2: Factors That Facilitate Non-Smoking*

The most common physiological health problems were: cardiovascular diseases (arterial hypertension, old myocardial infarction, ...), lung diseases (difficulty breathing, cough, COPD, asthma), diabetes. In 7 cases, the counsellors on the phone referred the caller to their GP, in 2 cases to a psychiatrist and in 2 cases to a psychologist. In most cases they were advised to call other helplines for psychological support or given numbers of Health Promotion Centers.

*"He is also a cardiac patient and is noticing breathing problems."* Male, 72, a smoker for 20 years

*"He says he had a heart attack a while ago while smoking and drinking coffee."* Male, 70, a smoker for 50 years

*"In the past he stopped smoking for a year due to health problems, now again for the same reason (elevated blood pressure, coughing, heart)."* Male, no information on age, a non-smoker for 10 days at time of call

*"Says that she also has quite a few health problems - diabetes, elevated blood pressure, knee problems ..."* Female, 71 years old, a smoker for 30 years

*"...[when he smokes] it is suffocating him, also has other health problems."* Male, 64, a smoker for 48 years

Health was the most common motivational factor for quitting smoking, and right after it, saving money. Only a few indicated that others had encouraged them to quit.

*"Her main motivation is health - a pulmologist advised her to stop smoking, and due to her low pension, she is motivated by the money she could save."* Female, no information on age

*"He also calculated how much he spent on cigarettes over the years and decided to put 100 € away every month".* Male, no information on age, smoked for 45 years, non-smoker for 10 days at the time of call

*"Besides health, her main motivation is saving money (she mentions that she has exactly 6 € until pension, and had to decide whether to buy bread or cigarettes)."* Female, 71, a smoker for 30 years

*"The nurse told him to stop smoking"* Male, no information on age, a smoker for 50 years

Older smokers mostly showed a high level of motivation, but with a great variety of techniques they deemed acceptable. They often wanted quick fixes - medication or NRT. Despite the frequent mention of loneliness, there was little interest in group workshops.

*"Wants to stop smoking right away, but he is not ready to change anything... Asked me about IQOS and NRT."* Male, a smoker for 30 years

*"I try to motivate him for different activities, but nothing convinces him .... At the end, he asks for advice on medication ..."* Male, 72, a smoker for 20 years

*"I tell him about the workshops in Heath Promotion Centres but he keeps asking what I think about acupuncture..."* Male, 74, no information on smoking duration

*"She wants to stop completely on September 1, 2022... Suitable for proactive counselling, but she couldn't decide on it so quickly."* Female, 72, no information on smoking duration

*"I advise her to talk to a psychiatrist about quitting and to set a date by which she would reduce the number of cigarettes ... I also tell her about other options but she is not interested."* Female, no information on age, no information on smoking duration

## Discussion

It is a worrying fact that up to 18 % of residents of nursing homes still smoke. Only a good half of them (56 %) know that smoking is harmful. 44 % of nursing homes smokers believe that quitting smoking would not improve their health. 48 % also believe that inhaling their cigarette smoke will not harm a non-smoker (Carosella et al., 2002). A lower level of education means they know less about the harmful effects of smoking (Rutten et al., 2008). These data show that the attitudes of older adults towards smoking are often incorrect and they need to be continuously reminded of the benefits of non-smoking.

In our study, in addition to nicotine addiction loneliness emerged as a predominant phenomenon that promotes smoking. Belgian qualitative research describes loneliness as an elusive, intangible phenomenon. Older adults had difficulty describing feelings of loneliness. It was seen as a normal part of the aging process, defined by loss, limitation and lack of meaning. They described experiences of feeling out of touch with the world and feeling isolated in a literally and figuratively shrinking world. Loneliness has been described as a feeling of being unable to change one's situation, feeling deep sadness and a lack of self-worth in one's environment (Pageau et al., 2022).

It is very important to anticipate loneliness well before old age. Those at risk need to be actively sought out because the ones we don't see are most likely the most isolated. Quitline is a good starting point for empowering an old-

er person to deal with their loneliness. It is good practice to direct older smokers to all available forms of help in their local environment. The anonymity of Quitline does not allow for monitoring the success of the interventions used, but similar counselling can be carried out by all professionals working with older adults. Due to the frequent contact of older adults with the healthcare system these are mostly health workers. They should identify older smokers, motivate them to quit and direct them to various assistance programs. When it is clear that health problems of older adults can be attributed to smoking, it is necessary to address it at every visit. Smokers who have never thought of quitting are extremely rare, but even their attitudes can be changed with compelling arguments.

When considering financial or social hardship, it makes sense to strengthen co-operation between health and social care systems and non-governmental organisations. Reducing living costs by quitting smoking can greatly improve quality of life. Financial problems increase stress which in turn reduces the motivation to quit (Siahpush et al., 2003).

The key to reducing the prevalence of older smokers is a strong and effective interdisciplinary co-operation of all who work with this population, which should be well co-ordinated at all levels. All participants should have a good knowledge of the availability of quitting interventions in Slovenia and specific needs of the individual older smoker.

## Conclusions

Older smokers have different needs than other age groups. Everyone who works with older smokers should be able to identify these needs and provide appropriate help to enable abstinence as soon as possible. Quitline should always be one of the options offered to an older person who still smokes.

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