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Publishing in Professional Journals: A Guide for Getting Started

Patricia Gonce Morton[1]

[1] Dean Emeritus, University of Utah College of Nursing,
Salt Lake City, Utah, United States of America,
trish.morton@utah.edu

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Corresponding author:
Patricia Gonce Morton, PhD, RN, FAAN
Dean Emeritus; University of Utah College of Nursing; Editor of the *Journal of Professional Nursing*, sponsored by the American Association of College of Nursing
Salt Lake City, Utah, United Sates of America, 961 North Twin Creek Circle
Email: trish.morton@utah.edu
Phone: 1-410-908-8612

Abstract

Publishing in professional journals can be a challenging yet very rewarding professional activity. Faculty are often expected to contribute to the nursing literature but may not have the knowledge or experience to publish their work.

This article describes the critical steps for getting started with writing a manuscript and addresses choosing the topic, deciding the intended audience, picking a journal, and determining authorship.

By following a step-by-step process, faculty will have a better chance of achieving a successful publication.

INTRODUCTION

Publishing articles in nursing journals is an ideal way to disseminate new knowledge, communicate best practices, and share effective solutions to common problems. Faculty members in schools of nursing use information from journal articles to guide teaching, select students most likely to succeed, develop effective curricula, and promote faculty career success. Faculty not only apply the literature to their practice but often they are expected to contribute to the scholarship of the profession by publishing their work. In addition to the satisfaction of contributing to the knowledge base of nursing, authors glean career opportunities because of their publications. Viewed as experts on a topic, authors may be asked to complete manuscript reviews, speak at conferences, and consult on issues related to their topic. The purpose of this article is to help faculty begin the publishing process so they may contribute to the scholarship of nursing. Factors to consider when selecting a topic, determining the audience, choosing the journal, and deciding authorship are addressed. Strategies to get started with writing also are discussed.

CHOOSE A TOPIC

Deciding a topic for a manuscript is the first step in the publishing process. There are several criteria for authors to consider in the selection process. The topic must answer the “So what?” or “Who cares?” question [1]. This means the topic needs to spark the interest of the reader. Readers want to read journal articles that offer new information or a unique perspective on a familiar topic. They hope to learn facts or processes that are applicable in their role as an educator [2]. Enough detail must be described in the manuscript so that readers can replicate the authors’ ideas in their setting. If the manuscript presents a research study, a sufficient description of the steps of the research process must be presented so that readers can reproduce the study. Even if a manuscript is very well written, if it does not provide new information or a new slant on a familiar topic or does not deliver adequate detail, the manuscript will not be published. Table 1 lists topics that are appropriate for a nursing education journal.

Table 1. Topics Appropriate for Nursing Education Journals

• Recruitment and retention of faculty
• Faculty burnout and turnover
• Dealing with difficult faculty situations
• Mentorship programs for faculty
• Leadership development
• Faculty professional development
• Strategies to promote the scholarship of faculty
• Faculty practice plans
• Solutions for challenging experience
• Dealing with incivility
• Teaching innovations
• Interprofessional education methods
• Effective teaching methods
• Predictors of student success
• Strategies for recruitment and retention of students
• Dealing with difficult student situations
• Strategies to promote student success
• Coping with budget cuts
• Strategic planning
• Academic practice partnerships
• Academic community partnerships
• Trends in higher education and their impact on nursing education
• Concept analysis if the concept is related to education
• Instrument development if the instrument is related to education
• Opinion/commentary/debate about an issue

When developing the topic, authors must first create one main purpose for the manuscript and avoid straying from this focus when writing. The single clear purpose of the manuscript should be stated the same way each time it is mentioned in the manuscript [3]. Novice authors often make the mistake of having too broad of a purpose or of having multiple purposes for the manuscript. These two mistakes usually result in a manuscript that does not adequately address the topic and is at risk of being rejected by the editor.

Authors need to tell the reader clearly if the manuscript is describing a research study, a quality improvement project, an outcomes evaluation project, or a solution-focused narrative. Reviewers and editors are seeking manuscripts describing findings from research and projects that are applicable and generalizable beyond one group or a single setting. As a result, research studies with large sample sizes and ones that are multi-site are more likely to receive positive responses from reviewers [4].

Some topics do not receive favorable comments from manuscript reviewers and editors. For example, authors should not claim a manuscript is a research report when in reality it is an account of a course, workshop, program, or alumni evaluation. These evaluation topics are of great value to the authors’ institution, but of little interest to readers.

Other topics that do not receive a positive response from reviewers and editors are studies that involve a pre-test, teaching a module or course, followed by a post-test. One would expect students' scores to improve and readers find little applicable or generalizable information from such studies. Reviewers also have a negative impression of studies that examine students' perceptions of their learning or competencies rather than a true measure of them [4].

DECIDE THE INTENDED AUDIENCE

After deciding the topic for the manuscript, the next critical step in publishing for journals is to select the audience for the manuscript. Journal articles can only have one primary audience. For education-focused manuscripts, authors must determine for example, if the manuscript is intended for experienced faculty, novice faculty, research faculty, or education administrators. Other groups may benefit from reading the manuscript, but authors must focus on only one group when preparing the manuscript. Novice authors often make the mistake of trying to write for multiple audiences. When writing, authors must always keep in mind what the intended audience already understands about the topic and avoid repeating information they already know [3,5,6].

PICK A JOURNAL

Authors must find a match of their topic and intended audience with an appropriate journal before proceeding to write the manuscript. For example, some journals only publish clinically focused articles while others publish solely educational ones. Some journals are intended for staff nurse audiences whereas others aim for an audience of managers and administrators. Editors will immediately reject manuscripts that do not match the journal's purpose and intended audience.

The International Academy of Nursing Editors (INANE) offers a directory of journals on their website: https://nursingeditors.com/journals-directory/. The directory is an excellent resource to find nursing journals from around the world and includes links to author guidelines and editors. The directory is a great place to start the search for an appropriate journal.

When selecting a journal, it is essential that the targeted journal is peer-reviewed. This means the editor sends the manuscript to two or three volunteer experts in the field to review the manuscript and provide feedback to the editor and author. Nursing journals usually employ a double-blinded peer-review process which indicates reviewers' identity is not revealed to the authors and reviewers do not know the names of the authors at the time of review [3].

Authors also must determine if a topical journal or a journal with mixed topics is best for the manuscript. Editors of topical journals make decisions for the theme of the journal issue at least a year in advance. Authors who wish to publish in a topical journal need to contact the editor far in advance of the publishing date for the issue of the journal. Editors are on tight schedules and authors must fit with the editor's timeline.

Another important decision for authors is choosing to submit the manuscript to an open-access or a traditional journal. An open-access journal is one that provides readers unrestricted online access to the articles for free. Usually, costs are covered by a fee that is charged to the authors. For some journals, the authors' fee can be rather substantial. In comparison, traditional journals restrict their access and cover their costs through subscription fees or through a pay-per-article fee. Most often the authors of articles in traditional journals pay no fees to have their work published.

Some authors are concerned about a journal's impact factor when selecting a journal. The impact factor is an attempt to provide a measure of the journal's importance or rank. The impact factor is a measure of the frequency with which an article in a journal has been cited in a particular year. The impact factor is calculated based on a two-year period and involves dividing the number of times articles in the journal were cited by the number of articles that are citable in that journal. The impact factor as a measure of importance or rank has been open to criticism because it does not reflect the quality of the peer-review process or the actual quality of the articles published in the journal [7,8].

When choosing a journal, it is imperative for authors to avoid what is called “predatory journals.” A group of scientists convened in 2019 to define the term. “Predatory journals and publishers are entities that prioritize self-interest at the expense of scholarship and are characterized by false or misleading information, deviation from best editorial and publication practices, a lack of transparency, and or the use of aggressive and discriminant solicitation practices.” p.211 [9]. Often editors of these journals solicit manuscripts through poorly written emails that promise acceptance with a very rapid time from submission to publication. Although some predatory journals claim to be peer-reviewed, the short time frame from submission to publication makes the peer review process suspect [10,11].

Once the journal is selected, all authors should review the journal’s website to learn more about the journal and to make certain the journal is the right match for the proposed manuscript’s topic and audience. Next, all authors must read the author guidelines found on the journal’s website and follow them through every step of the writing and submission process. The author guidelines describe the maximal length and style of the manuscript and the required formatting of tables and figures [1,6]. The mandatory reference style used within the text of the manuscript and for the reference list also is explained in the author guidelines and must be followed. Authors should not expect the editor or publisher to convert their manuscript to the correct reference style.

Some authors wonder if a query letter to the editor is needed to ascertain the editor’s interest in the topic and the appropriateness of the topic for the journal. The answer to that question varies based on the journal. Some editors welcome query letters and will inform authors if the topic is or is not of interest to the journal. Other editors are too busy and do not respond to query letters. If authors do not receive a response to their query letter, they still can send the manuscript. If authors do receive a positive response to a query letter, it in no way indicates a commitment to publish the manuscript, but merely suggests the editor is willing to consider the manuscript [3].

DETERMINE AUTHORSHIP

Deciding who should be included as an author for a manuscript is a very important decision in the publishing process. When a person is listed as an author on a manuscript, it means the person is responsible and accountable for the work [12]. Authorship on a manuscript implies credit for the work and has important implications for the authors’ academic careers. For example, authorship of manuscripts is required for promotion and tenure in most universities. As mentioned previously, authorship also may lead to other career opportunities.

An important decision to make is if the manuscript will have a single author or be authored by a team. Each approach has advantages and disadvantages. Single authors control all decisions made about the manuscript. However, sole authorship can be lonely and possibly result in a long time to complete the manuscript. A sole author may not have all the expertise needed to write the manuscript. For example, it may be necessary to include a statistician for the study and as an author of the manuscript.

When working as a member of a multi-author team, each author may only have a piece of the manuscript to write thus decreasing the workload burden and possibly the time to complete the manuscript. Writing teams have the benefit of being comprised of people with different types of expertise. For some, teamwork is more enjoyable because of the social interaction that occurs. However, members of a team may at times have to compromise on how to approach some aspects of the work. Compromise may be hard for some members of the team.

If a manuscript is going to be written by multiple authors, some essential steps must be taken before starting to write. First, when selecting members of the team, each author must have confidence in the expertise of the team members and in the integrity of the contributions of the co-authors [12]. Novice authors may ask an experienced author to join them as a co-author and guide them through the writing of a manuscript. Or, a novice author may request to join an established team and be mentored in the writing process. Novice nurse authors may consider inviting author colleagues from other disciplines such as social sciences or education since members of other disciplines may bring a helpful unique view to the topic.

The second step in forming an author team is to determine the order of authorship, the workload assigned to each author, and due dates. When assigning workload, it is important to designate one person to read and edit the entire manuscript to ensure a consistent writing style and to remove redundancies. Also, the team must decide how late team members can be before they are eliminated from a team.

The third step in constructing an author team is to select the person who will fill the role of the corresponding author. The corresponding author does not have to be the first author of the manuscript. The corresponding author is the team member who takes primary responsibility for communicating with the journal editor during the manuscript submission, peer review, and publication process [12]. All the agreed-upon information from steps two and three should be placed in a written document before any writing begins.

If there are any questions about who can and should be listed as part of the author team for a manuscript, consult the author guidelines developed by the International Committee of Medical Journal Editors (ICMJE). Their guidelines outline who has rights to authorship and who does not. According to the ICMJE, all those listed as authors should meet all four criteria for authorship, and all who meet the four criteria should be designated as authors [12]. The following are the four required criteria for authorship:

- Substantial contributions to conception and design, or acquisition of data, or analysis and interpretation of data, AND
- Drafting the article or revising it critically for important intellectual content, AND
- Final approval of the version to be published, AND
- Agreement to be accountable for all aspects of the work; ensure that questions related to the accuracy or integrity of any part of the work are investigated and resolved.

All members of the author team must approve the final manuscript, take public responsibility for the work, and have full confidence in the accuracy and integrity of the work of other author team members [12]. Neither the editor of the journal nor the publisher of the journal has the responsibility to determine who qualifies or does not qualify for authorship or to settle any authorship disputes. When consensus cannot be reached regarding authorship for a publication, the institution(s) where the work was performed should be asked to investigate. Likewise, if there are disagreements over the order of authorship for a publication, the editor and publisher do not get involved in arbitrating the decision [12]. That is why it is so important to determine who qualifies for authorship and order of authorship in advance of any writing.

When a person makes a valuable contribution to the work but does not meet all four criteria required for authorship, the person should be acknowledged using the acknowledgment format required by the journal [12]. Based on the ICMJE author guidelines, the following factors by themselves do not justify authorship [12]:

- Acquisition of funding
- Writing assistance, technical editing, language editing, and proofreading
- Supervision of the research group
- General administrative support.

The authors may also want to acknowledge people who made any of the above contributions to the work.

START WRITING

Once authors complete the steps of topic selection, audience determination, journal choice, and authorship, some suddenly have trouble starting to write. These authors may experience fears of failure that immobilize them. Authors need to identify their fears and perhaps seek the guidance of a mentor, experienced author, or other members of the writing team to help them overcome their fears. Faculty need to have confidence in their experience and expertise and realize they have an important message to share with their colleagues.

Once authors find techniques to overcome their fears of writing and are ready to get started, there are some strategies that help promote progress. Some authors first create a detailed outline for the manuscript, others just start writing, while some use dictation software and imagine themselves delivering the information to a class or at a conference. Authors can try various methods but need to implement the ones that work best for them.

Other strategies for effective writing include finding a quiet place to write that is free of distractions. Also, successful authors know the time of day they are most productive and schedule their writing during those times. An avoidance strategy that faculty frequently use is to delay any writing until their "to do" list is completed. Unfortunately, for most faculty, the list never ends. Productive authors place writing times on their calendars and always stick to those times. Some authors prefer to write for just 30 minutes every day whereas others prefer to write an hour or two a few times per week. Successful authors also have trained themselves to overcome delay tactics such as taking a nap, going for a long run, or cleaning the house when they really should be using the time to write. Implementing these strategies will help any faculty member become a productive author [13].

CONCLUSIONS

Contributing to the literature that guides nursing education and practice is a responsibility of most faculty. However, the process can seem daunting and few nurses learn the process during their education. By following the publication process, one step at a time, faculty can become productive authors who make a significant impact on the education of students and ultimately, the care of patients and their families.

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Caring for patients with dementia: An exploration of the attitudes, perceptions and experiences of third year student nurses

Nursing student's perceptions and experiences of dementia

Emily Scott[1]**, Ros Kane**[2]

[1] Lincolnshire Partnership NHS Foundation Trust, Peter Hodgkinson Centre, Greetwell Road, Lincoln, LN2 5UA, England, UK, emily.scott22@nhs.net

[2] School of Health and Social Care, University of Lincoln, Brayford Pool, Lincoln, LN6 7TS, England, UK, rkane@lincoln.ac.uk

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Corresponding author:
Emily Scott, Lincolnshire Partnership NHS Foundation Trust, Peter Hodgkinson Centre, Greetwell Road, Lincoln, LN2 5UA, England, UK,
Email: emily.scott22@nhs.net
Phone: +44 01522 573533

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Abstract

Background: As the population ages, and people live longer, the prevalence of dementia is set to rise. This will increase pressure on health services, meaning nurses must be sufficiently equipped with the skills and knowledge needed to provide good quality care to this patient group. The objective was to explore how experience of caring for people with dementia influences the attitudes and perceptions of third year student nurses.

Methods: Third year student nurses enrolled onto a BSc Nursing (Adult) undergraduate pre-registration programme. Data were collected using focus group methodology and analysed using the 'Framework' method.

Results: The attitudes and perceptions of student nurses were mainly positive, but they reported observing stigmatising and negative attitudes from others, including healthcare professionals. Respondents reported a variety of experiences, both clinical and theoretical, where they had cared for people with dementia, but felt that at times these experiences were insufficient to develop their skills. The students felt their learning needs revolved around managing the complex behavioural and psychological symptoms in those suffering with dementia, which they felt, could best be accomplished through practice-based learning.

Conclusions: In this study, students reported perceived gaps in both theory and practice in their individual experience of nurse education on dementia. It highlighted the need for fundamental skills in dementia care to be taught early in their educational programme and the need for more practice-based experiences. This study provides some insight into the effects positive experiences of caring for those with dementia care can have on the attitudes of nursing students and the confidence they have in their skills and knowledge of delivering care to this client group.

INTRODUCTION

Dementia is an umbrella term used to describe a range of progressive and terminal neurological disorders [1]. Onset most commonly occurs over the age of 65 and leads to a disturbance of multiple higher cortical functions [2] causing symptomology such as memory loss, behavioural and mood changes, communication difficulties and problems with orientation [3], known as the complex behavioural and psychological symptoms of dementia, which can result in significant impairment to personal, social and occupational functioning [4]. The most prevalent type of dementia is Alzheimer's disease but there are over one hundred types with differing aetiologies [5].

Around 1 in 79 people (around 850,000) are currently living with dementia in the United Kingdom (UK) [6]. Worldwide this figure is estimated at around 47.5 million [7]. As a consequence of the ageing population [8, 9], the epidemiology of dementia is forecast to rise at a rate often described as the impending "*dementia epidemic*". It is important to pay attention to the impact this epidemic is likely to have on healthcare services and professionals. Individuals with dementia are thought to occupy over twenty five percent (25%) of general hospital beds and are more likely to be admitted to hospital with avoidable and preventable conditions such as dehydration and pressure sores [10, 11]. Admissions to hospital environments are characterised by longer stays, the increased likeliness of readmission and higher mortality rates than their counterparts [10].

Nurse education programmes in the UK are governed and validated by the Nursing and Midwifery Council (NMC). The NMC [12] states that all registered nurses play a key role in improving and maintaining the physical and mental health and wellbeing of people who come into their care, including patients with long-term conditions such as dementia.

BACKGROUND

A scoping review of the literature revealed little research on the attitudes, perceptions and experiences of student nurses in relation to caring for those with dementia. Most studies identified were conducted outside of the UK showing the issues raised within this research are of international significance.

Ecclestone et al. [13], uncovered a lack of knowledge of dementia amongst student nurses, including limited understanding of the life course of dementia and a failing to recognise that its progression is terminal, and the physical decline associated with this. Those with a basic knowledge of dementia attributed this to portrayals of the disease in the media or personal experiences of the disease, which may lead to unhelpful perceptions [14]. Kimzey et al. [14] showed how the thought of caring for someone with dementia could lead to fear and apprehension among student nurses. These anxieties are thought to be more prominent when patients exhibit the complex behavioural and psychological symptoms such as restlessness, agitation or aggression which students feel they do not have the skills to manage [15]. Baillie et al. [16] reported feelings of unpreparedness among students for the reality of caring for patients with dementia which they found intense and extremely "mentally draining". More senior student nurses and those who have received pre-course exposure to caring for those with dementia, such as in a familial and/or vocational setting, tend to report more positive attitudes and perceptions towards patients coupled with an inherent confidence in caring [16, 17]. Those with no pre-course exposure to dementia found that opportunities to care of patients with dementia during their training improved their knowledge of dementia significantly [13, 14, 18]. This is only the case if the placements are enriched with learning experiences and student nurses feel that they are supported to develop their skills and knowledge [15, 18].

The exploration and analysis of the impact of positive experiences of caring for patients with dementia on the attitudes and perceptions of student nurses is an important step in informing the specific content (and its timing) of nursing curricula. It has the potential to increase awareness that some students have had no previous contact with those suffering from dementia, which may affect their confidence and practical experiences [16]. It is vital that nurse curricula adequately prepare students to care for people with dementia, including how to implement person-centred principles and deal with challenging behaviours; knowledge students will heavily rely upon in clinical placement [15, 17].

METHODS

Design

The study falls into the interpretivist paradigm as the research has a sole focus on the subjective and unique views of the student nurses [19, 20]. The study was inspired by previous quantitative research exploring the attitudes and knowledge of dementia [21, 22]. The themes from these studies were used to inform the topic guide for the current study.

Settings and Participants

The sampling frame for the study was third year student nurses enrolled onto a BSc (Hons) Nursing (Adult) undergraduate pre-registration programme at a UK university (n = 191). Third year student nurses were identified as the target population as they are at a crucial part in their nurse training where they are on the cusp of gaining their registration which allows them to embark on a career where they will be faced with the predicted "dementia epidemic". Caring for patients with dementia will be a prominent aspect of their role and they will be required to practice independently and implement the skills and knowledge they have developed during their training.

A purposive sampling method [23] was adopted to ensure all participants were towards the end of their adult nursing degree. The students were invited to take part in the study on a voluntary basis and were asked to respond to an email invitation distributed to the cohort via the university's internal mailing system.

Data collection

Two focus groups were conducted (one with three participants and one with four). Each focus group explored their attitudes, perceptions and experiences of dementia. The focus groups were conducted with neutral and open questions to encourage discussion [24] (Figure 1).

Topic Guide for Focus Groups:

Discussion Points:

"I would like to explore the different attitudes towards and perceptions of dementia"

- Can you tell me how you think individuals with dementia are regarded in general?
- What do you feel are the anticipated responses to dementia in the hospital setting?
- How do you feel about working with individuals with dementia?
- What skills do you feel would be essential when caring for people who have dementia?
    - *Do you feel sufficiently equipped with these skills?*

"I would like to explore the different experiences we have had of caring for those with dementia"

- Can we talk about those experiences?
- Can we talk about the experiences you have had of caring for those with dementia as a student nurse?
- Can we talk about the experiences you have had of caring for those with dementia outside of your role as a student nurse?
- Can we talk about the educational experiences you have received regarding dementia?
- Do you feel your attitudes and perceptions of dementia have changed following these experiences?
- Do you wish to gain more experience of caring for those with dementia?

Figure 1: Topic Guide for Focus Groups

The researchers chose to conduct focus groups over individual interviews as it was a more flexible and economic method as a large amount of data can be collected from a sample in a relatively small time [25]. The chosen format and the selection of a homogenous sample was to try to ensure that the participants felt comfortable expressing their views as they were surrounded by a group of individuals with similar backgrounds and experiences [20]. The focus groups were moderated by the lead researcher who has a similar academic profile as the participants and has familiarity with their programme of study. This was thought to address the power imbalance of the focus group and remove any potential bias. The focus groups were audio recorded and transcribed verbatim.

One factor that may have contributed to the low response rate for the study was that the student nurses were in the final year of their studies and may not have had time at their disposal to take part in research due to the pressures of academic study and undertaking clinical placements. Those who volunteered may have had a specific interest in dementia or may have extensive experience of caring for this client group. All students that volunteered for the study were female, which may be a possible limitation of the study, but may account for gender differences within the nursing profession.

Data analysis

Data were analysed using the framework method, originally developed by Ritchie and Spencer [26]. This method is a form of content analysis, aiming to identify, analyse and report patterns in qualitative data [27]. This technique was chosen as its systematic nature provides a clear audit trail from raw data to final themes [28]. The data were analysed at group level, allowing for the identification of themes and common interactions that represented the whole sample population. The framework model incorporates five key steps to sort data into themes in preparation for interpretative analysis [28, 29]:

Transcription and familiarisation: The audio-recordings were transcribed as word-processed documents. Time was spent becoming familiar with the data and generating initial ideas and subjects of interest.

Indexing/Coding: The transcripts were annotated with initial thoughts and interpretation. A "code" was then assigned to describe what the researcher interpreted in the passage as important.

Developing a working analytical framework: Similar codes were then arranged into categories creating initial themes and subthemes. Each code was given a brief description. The analytical framework was comprised of the four themes detailed in the results section.

Charting data into the framework matrix: A matrix was constructed to chart the data. The data were summarised by category from each transcript, including reference to interesting or illustrative quotations.

Interpreting the data: The matrices were then used to write the results section of the paper.

Ethical approval

Ethical approval was obtained from the host institution. Data obtained from the study were treated confidentially and anonymously. Prior to commencing the study, an information sheet was developed and distributed to potential participants detailing the aim and objective of the study. The students were informed their participation was voluntary and those who expressed an interest were asked to sign a consent form prior to taking part.

RESULTS

Attitudes and perceptions of dementia

The students recognised that stigmatising attitudes towards people with dementia are still present in society and subsequently in healthcare settings. It was thought that individuals with dementia are "*segregated and avoided*" in society and people "*thought they were different*". It was perceived that disclosing a diagnosis of dementia does not evoke the same reaction and empathy as a diagnosis of other health conditions such as cancer. With conditions such as dementia, it was thought people "*step back*" and avoid confronting the situation, which the student nurses felt leads to discrimination and social isolation.

> *"With dementia… they don't know how to handle it and they don't know how to deal with it so it's like I don't want to say the wrong thing, I don't want to upset you, I'll just step away."*

> *"As soon as it came out that my mum had dementia her friends just went by the way side and it ended up quite a lonely and difficult time for her because people weren't tolerant of her."*

In healthcare settings, patients with dementia can sometimes be labelled by healthcare professionals as "*challenging*" and "*hard work*" which the students felt created a single homogenous identity, which was thought, "*builds a stigma on the wards*". The term dementia was described as a "*label*" which often evokes an anticipated negative response from healthcare professionals in the hospital setting and patients are often "*judged*" even before they are received by the appropriate care team. Patients with dementia are often described as a "problem", "burden" or "*bother*" which the student nurses felt was mainly attributed to the management of the complex behavioural symptoms associated with the disease, such as "*wandering*".

Changes to attitudes and perceptions of dementia

The student nurses felt that an increase in publicity on dementia has led to a better understanding and awareness of the disease, which may contribute to a reduction in stigmatising attitudes. Generally, it was thought attitudes towards those with dementia are now more empathic as opposed to discriminatory. The student nurses felt that dementia is now thought to be "*more accepted as a disease whereas before I think it was much more of just something that happens when you get older*". Some students admitted that previously they did not take dementia as seriously as other health conditions, but this perception has changed since commencing their nurse education.

> *"I didn't actually take it as seriously. So, you look at cancer, heart failure, other diseases, straight away you hear those words and you're shocked whereas dementia… you're not as shocked by it… I think since being a nurse it made me realise that it is a very serious disease and that it should be taken a lot more seriously."*

Student nurses with pre-course exposure to dementia felt their attitudes had not changed since commencing the course but it was not discussed whether their training had a significant impact on their knowledge and skills in caring for this client group. Those with no pre-course exposure to dementia disclosed fearful attitudes towards the disease and were concerned about the complex behavioural symptoms of the disease.

> *"When I first got told I was going on an elderly complex needs ward, which was going to have loads of dementia patients, I was really scared and really worried and I really didn't want go on it."*

Fearful attitudes in some cases led the student nurses becoming avoidant of individuals with dementia. However, with hindsight, when the students were exposed to patients with dementia in clinical practice, they described how they enjoyed working with them. The students felt these experiences gave them the opportunity to develop a more rounded understanding of the disease, which in turn led to a change in their attitudes and perceptions. It was perceived by the students that without this exposure, their attitudes and perceptions would not have changed as significantly.

> *"Definitely [referring to attitude change] but only because I had a placement where I saw a lot of dementia patients, I had a lot of exposure. I don't think it would have changed as much if I hadn't had that placement."*

> *"If it wasn't for the fact I'd been exposed to, like precisely to that area, then it wouldn't have changed my opinion quite as much."*

Experiences of dementia

The student nurses recalled being exposed to dementia on at least one, if not all, clinical placements, which they found surprising as they expressed that they "*didn't know the expanse of dementia*", or "*didn't realise how prevalent it was in healthcare*" and "*didn't realise how much as adult nurses we encounter it*". The students also found the types of settings where they were exposed to dementia surprising.

> *"I've been quite surprised how much you do see it [dementia] as well and you know sort of on all the different wards so you think you're on like a renal ward... but then they've also got [patients suffering from] dementia."*

The students felt some aspects of both the theoretical and practical components of their nurse education were insufficient.

> *"I think for this adult nursing course and for what we do get exposed to out in the hospital, we don't cover enough about dementia... I think given how many people are being recognised and diagnosed with dementia, that the course should probably accommodate a bit more about that."*

The student nurses felt theoretical components of their nurse education were heavily based on the pathophysiology of dementia, which they recognised as important, but commented, "*You don't see that, you see the behaviour that's coming as a result of it*". It was perceived that "*more emphasis needs to be put on the behaviours and the types of behaviours you might see, examples of it in practice, what people did to deal with it*". The students felt this would create a "*baseline*" of fundamental skills on how to manage certain behaviours and situations they may encounter in practice.

Despite this, the students felt "*there's only a certain amount of stuff you can learn in a classroom*" and that caring for those with dementia should primarily be practice-based learning or "*learning on the job*".

> *"I don't think you can really understand dementia unless you're working with the patients."*

> *"You can't teach somebody how to deal with someone with challenging behaviours who's got dementia."*

The student nurses felt a mandatory placement in a specialised dementia setting would be "*beneficial*" and would be a way to be "*fully exposed to an environment like that and thrown in the deep end*" to facilitate the development of new skills.

The students felt that exposure to dementia, both theoretically and practically, should occur earlier on in the course. Those with no pre-course exposure to dementia found that in some cases they were not exposed to patients with dementia in clinical practice until their third year, which they found "*daunting*". Some students had to supplement their learning with self-directed study to overcome this. The students felt that an early exposure to dementia theoretically would give them a more rounded understanding of the disease and would make them more prepared for working in the clinical environment.

Quality of care for patients with dementia

Skills and attributes perceived by the student nurses to be essential when caring for patients with dementia included patience, communication, compassion, empathy, listening and understanding. The student nurses found credibility in holistic and person-centred care approaches such as life story work and were aspired to follow this care pathway. They identified the "This is Me" booklets, developed by the Alzheimer's Society [30], as a invaluable resource to facilitate this. In relation to the patients within their care, the students stated "*it is really interesting to hear about their lives*" and "*you learn so much about them*". The student nurses recognised how person-centred care and life story work respect the uniqueness of a person with dementia and have a significant positive impact on their wellbeing and quality of care, which they found rewarding. Integrating physical and mental health care environments, creating a parity of esteem between services, was perceived by the students to be a solution to improving the quality of care and making their care and treatment more manageable for healthcare professionals.

> *"I think there's a clear line between mental health and general nursing and I think that line shouldn't be as prominent as it is."*

DISCUSSION

The student nurses' observations that stigmatising attitudes and perceptions of dementia exist in society and in healthcare settings reinforces finding from other studies. Stigma is thought to be caused by a lack of knowledge, understanding and unfamiliarity of dementia leading to a fear of the disease [31]. This can accentuate and deepen the distress experienced by someone with dementia, leading to a loss of independence, role and identity, coupled with feelings of low self-esteem, value and worth [32]. Link and Phelan [33] reasoned that not all medical conditions are treated equally in terms of social significance . This may help to explain why our participants felt that a diagnosis of health conditions such as cancer might elicit a more empathic response than disclosing a diagnosis of dementia. The results are broadly consistent with the concept of labelling theory. The complex behavioural and psychological symptoms associated with dementia are often labelled as "deviant" by healthcare professionals. Behaviours such as wandering, aggression and confused states, are seen to challenge social norms, or the "norms" of the in-patient environment [34]. A label of dementia is hastily given to an individual displaying these behaviours and those with dementia are subsequently isolated into one homogenous and undifferentiated group, leading to stigma [31, 35]. Reducing stigma is thought to be a sequential process; more understanding and awareness of the personal perspective could reduce negative connotations, lead to societal empathy, reduction in fear and stigma [31]. By producing positive images of people living well with dementia, a significant demystification of the condition and a recognition that not all people with dementia are incapable of a relatively "*normal*" functioning in society, can possibly occur [36].

Policy drivers have identified that the current provision of services for people with dementia are insufficient and improvements need to be made. Improving services for patients with dementia is thought not only to enhance the quality of care experienced, but also reduce unnecessary costs [37]. According to The Royal College of Nursing [38] report, this can be achieved through the implementation of the SPACE principles:

S – Staff who are skilled and have time to care

P – Partnership working with carers

A – Assessment and early identification

C – Care that is individualised

E – Environments that are dementia friendly

The concept that the student nurses found it "*surprising*" that as trainee practitioners in the adult field they were exposed to dementia on all clinical placements may reflect that the line between physical and mental health services continues to be prominent. On reflection, the students identified the establishment of a parity of esteem between physical and mental health services would also strive to improve the quality of care for patients with dementia, a notion supported by the Government in their "No Health Without Mental Health" [39] strategy. A 'parity approach' provides a more holistic response to a person in need of care, support and treatment, with their physical and mental needs being treated equally [40]. This relationship is poor at present, such that people with mental ill health have poorer physical health outcomes and the fact that mental illness is likely to affect a patient's compliance with treatment, but also that poor physical health is linked with poor mental health [40, 41]. These issues are especially true for people with dementia due to increased incidence of the disease and the implications of progressive cognitive decline. One attempt at developing a parity of esteem is the commissioning of Mental Health Liaison teams by the Department of Health [42], supported by NICE guidelines [43] to provide consultation, training and assessment for those with suspected or known dementia in acute services, to support both patients and nursing staff. Standards produced by the Royal College of Psychiatrists [44] stated that all staff working with the liaison psychiatry model should receive training consistent with their role which includes working with old people, including the detection and management of dementia and delirium. They advise this training is planned and delivered in collaboration with key partners (for example, acute care nurse and liaison nurse providing joint training to the rest of the liaison team) [44].

The study was consistent with other literature [17, 18], in that participants felt their learning needs lie in managing the complex behavioural and psychological symptomology of dementia, something that they felt their course did not accommodate for sufficiently in comparison to their exposure to the disease on clinical placements. Interestingly, the students felt that these needs could be met through "*practice-based learning*". In previous research, it has been found that placements of this kind have been beneficial for student nurses and provided them with the opportunity to develop new insights into care provision and enhanced understandings of dementia, while also developing their skills in communication, therapeutic practices and person-centred care approaches [45, 46].

Given the influence experience of caring for those with dementia can have on the attitudes and perceptions of nursing students, this provides another reason for exposure to dementia both theoretically and practically to occur earlier in the course, preferably during the first year of study. Introducing this late can result in student nurses being left feeling fearful of dementia and finding the anticipation of working in an environment with dementia patients "*daunting*". Nurse educators should accommodate for the fact that some students have had no previous contact with individuals with dementia, which may affect their perceived competence and willingness to engage with practice placement experiences [16]. The recently published NMC standards [47] for pre-registration nurse education in the UK, provide educators with the opportunity to develop programmes which allow students to develop the knowledge and essential skills necessary to care for patients with dementia. It is important to note that the language used by the students in this study does not always appear to be person centred. For example, the students referred to "dementia patients" or to clinical teams having "a lot of dementia on the ward". The use of more appropriate and person-centred terminology may need to be addressed in nurse education.

Limitations of the study

The main limitation of the study relates to the small sample size (seven participants) and qualitative approach to data collection, which may limit the generalizability of the findings to other areas. In addition, all participants in the study were female which limits the representation of male nursing students and their attitudes, perceptions and experiences of caring for those with dementia.

CONCLUSIONS

Research into the impact of experience of caring for patients with dementia on the attitudes and perceptions of nursing students is limited. Although based on only the views of seven female students, this study does provide some insight into the effects positive experiences in dementia care can have on the attitudes of nursing students towards those suffering from dementia and the confidence they have in their skills and knowledge of caring for this client group. It is difficult to decipher whether the changes in attitudes and perceptions are solely impacted by the nursing students' experiences during their training or from other external influences such as pre-course exposure to the disease. The study reinforces the need for participation in a supportive placement specialised in the care of those with dementia to consolidate nursing student's theoretical learning and develop their confidence and competence in caring for those with dementia. As adult nursing students are being exposed to dementia in all clinical placements, theoretical components of nurse education should be delivered as early in the course as possible to ensure student nurses are prepared with the fundamental dementia awareness before going out onto placement. This helps to accommodate student nurses with no pre-course exposure to dementia.

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The authors declare no conflict of interest.

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Use of Mobile Health Applications and Health-Promoting Behaviors Among Nursing Students: A Cross-Sectional Study

Healthy lifestyle behaviors of nursing students and use of mobile applications

Banu Cevik[1], Gulay Turgay[2], Sultan Kav[3]

[1] Department of Nursing, Baskent University Faculty of Health Sciences, Bağlıca Kampüsü Fatih Sultan Mahallesi, Eskişehir Yolu 18.km TR, 06790, Etimesgut, Ankara, Turkey, bcevik@baskent.edu.tr

[2] Baskent University Vocational Health School Bağlıca Kampüsü Fatih Sultan Mahallesi, Eskişehir Yolu 18.km TR, 06790, Etimesgut, Ankara, Turkey, gturgay@baskent.edu.tr

[3] Department of Nursing, Baskent University Faculty of Health Sciences, Bağlıca Kampüsü Fatih Sultan Mahallesi, Eskişehir Yolu 18.km TR, 06790, Etimesgut, Ankara, Turkey, skav@baskent.edu.tr

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Corresponding author:
Banu Cevik, Baskent University Faculty of Health Sciences, Department of Nursing
Bağlıca Kampüsü Fatih Sultan Mahallesi
Eskişehir Yolu 18.km TR 06790
Etimesgut/ Ankara / Turkey
Email: bcevik@baskent.edu.tr
Mobile phone: +90 537 0547302

Keywords: health-promoting behaviors; mobile application; mobile technology; nursing students; smartphone.

Abstract

Background: Encouraging healthy behavior in student's nursing education is imperative because leveraging technology like mobile applications can facilitate behavior change and improve healthy lifestyles. The purpose of this study is to determine the healthy lifestyle behaviors and the use of mobile health applications among nursing students.

Methods: This study used a cross-sectional survey design. The sample consisted of 101 nursing students across the four-year Bachelor of Nursing program in a foundation university in Ankara, Turkey. Data were collected using a "Nursing Student Information Form", and "Health Promoting Lifestyle Profile II (HPLP-II)".

Results: The vast majority did not actively engage in health-risk behaviors. The mean score of the students' HPLP-II scale is 130.69±19.22. Among subscales, the highest score (27.10±4.58) is in interpersonal relations, and the lowest score in physical activity (19.19±5.23). Most nursing students reported owning a smartphone, having constant internet access, using mobile applications. Students, users of mobile health applications showed a significantly higher score on the interpersonal relations subscale score (p=0.04). However, no significant relation was found between nursing students' perception of mobile health applications and the mean HPLP II scale and subscale scores (P>0.05).

Conclusions: The healthy lifestyle behaviors are moderate and the majority of them use mobile health applications in everyday life. The average score of the physical activity is the lowest, suggesting that the students should be motivated to practice physical exercise. Mobile health applications to promote a healthy lifestyle can be included in the nursing curriculum.

INTRODUCTION

Promoting health and maintaining wellness begins with adopting healthy habits. A healthy lifestyle includes basic behaviors, such as a healthy and balanced diet, exercising, adequate rest, avoiding smoking, alcohol, and substance use [1, 2]. Strategies to control chronic medical conditions include targeting unhealthy behaviors, often by means of the use of patient empowerment tools, such as mobile health (mHealth) technology. Mobile health is the use of personal wireless communication devices, including mobile phones and smartphones, smart-watches, wireless sensors worn or carried by an individual, tablet computers, and point-of-care devices, to support continuous health monitoring and feedback [3, 4].

Nurses have an opportunity to empower patients to self-manage their own care by increasing awareness and use of mHealth technologies in preventive care. To do so, nurses should have the skills necessary to empower them in lifestyle management, as well as to understand both the potential and the limitations of mHealth technologies [5]. Therefore, in order for nursing students to be competent nurses in the future, they must first adopt healthy lifestyle behaviors. The personal health practices of nurses can affect the care they give to patients on health-related issues. The use of mobile learning devices is important in terms of using up-to-date and accurate information and supporting evidence-based applications by students in nursing education. Despite the increasing number of studies on health-promoting behaviors of nursing students, studies have not been sufficiently conducted to date to identify the relationship between health perceptions, and health-promoting behaviors among nursing students. Therefore, this study examined the relationship between the use of mobile health applications and health-promoting behaviors in nursing students.

BACKGROUND

All of the behaviors that protect people from getting sick and keep them healthy throughout their lives are called “Healthy Lifestyle Practices” [6, 7]. A healthy lifestyle is the ability to control the behaviors that may affect the health of the individual and to choose the behaviors that are appropriate for their health while organizing their daily activities. Health behavior is expressed as all of the behaviors that the individual believes and applies to stay healthy and to remain free from diseases [2]. Healthy lifestyle behaviors are behaviors that increase the level of well-being of the individual and enable self-realization. It includes balanced and adequate nutrition, stress management, adequate and regular exercise, non-smoking, taking health responsibility, and hygienic measures [1, 2, 8, 9].

Today, the use of mobile health apps (mHealth apps) on smartphones or tablets for health or medical purposes is increasing rapidly. With the increasing use of mobile technologies in the health sector, individuals can use mobile applications to improve their lifestyle and lead healthy life [2, 6]. Mobile health applications offer opportunities for individuals to follow their health, to access their health information whenever and wherever they want, and other individuals become their followers. Self-monitoring of health-related behaviors and receipt of feedback on these behaviors via mHealth technologies can also support personalized care [1, 10]. Besides, mobile healthcare applications enable individuals to communicate with healthcare professionals and healthcare institutions. Similarly, health institutions can follow up with their patients through mobile health applications [1, 11]. Smart applications used with mobile health tools can help in achieving nutritional goals (counting calories, logging food, losing weight, etc.), increasing physical activity, in changing lifestyle, stop smoking, and managing chronic diseases [4, 6]. Systematic review revealed that mHealth practices have been used more in recent years to adjust nutritional goals (calorie counting, keeping a food diary, etc.), physical activity, and change in lifestyle [3]. In another systematic review, examining the difficulties and problems of using mHealth technologies in developing countries indicated that most mHealth applications are used for smoking cessation, weight loss, and management of chronic diseases [11]. In addition, it has been reported that mHealth applications are not difficult to use and have a positive effect on medication adherence [12].

Nowadays, the young generation is very tech-friendly. The ownership of smartphones is 77% in the United States, but it is found almost everywhere among young adults (18 to 20 years old) with 92% ownership [13]. According to the 2020 mobile phone usage report in our country, 98% of adults in Turkey with 82.4 million population use mobile phones [14]. Modern smartphones have powerful computing and communication capabilities with high-resolution color displays, and phones can store any type of data, including multimedia. In addition to smartphones, there are highly portable wearable devices, such as smartwatches [3]. This technology allows the development of mHealth apps that maximize the use of traditional behavioral modification theories to stimulate, inspire, manage time and provide accurate current information [15, 16].

Nurses are the largest group of healthcare professionals, responsible for promoting and maintaining the health of individuals in the community. One of their main tasks is to provide health education to patients, which helps them live a healthier life. Therefore, for nursing students to become competent nurses in the future, they must first adopt healthy lifestyle behaviors by themselves. Today's nursing students will become future healthcare providers and act as health supporters. However, there are still some concerns about to what extent nurses are ready for their roles in health promotion while also promoting their self-care [17, 18]. The personal health practices of nurses can affect their effectiveness and shape the care interventions they give to patients on health-related issues [9, 19]. It is imperative to encourage healthy behavior in the initial stages of nursing since most of the previously acquired lifestyle habits are difficult to change. For this reason, determining the healthy lifestyle behaviors of nursing students will enable the assessment of the current situation and define the needs in this field. Mobile health applications are widely used in the health sector for many purposes, such as improving health, preventing, treating diseases, and managing chronic diseases. However, studies on the use of mobile health applications of health professionals, especially nurses, are scarce [20, 21]. Chiauzzi et. al [4] reported that nurses did not conduct research on mobile health practice. Choi and Kang [18] reported that nursing students had a high desire to use applications that includes health-improving behaviors on their smartphones.

Leveraging technology like mobile applications can facilitate behavior change and improve healthy lifestyles in nursing students. Therefore, the purpose of our study is to determine the healthy lifestyle behaviors and the use of mobile health applications of nursing students. In this study, we sought to answer the following questions:

1) What is the status of using mobile health applications and health-promoting behaviors among nursing students?

2) Are there any differences between the mean Health-Promoting Lifestyle Profile-II scale and subscale scores according to socio-demographic features and the use of mHealth applications?

METHODS

Design and Participants

This study used a cross-sectional survey design. In this research there were altogether 101 nursing students of a foundation university enrolled in second, third, and the fourth study year. Sample selection was not made in the study, because all students who agreed to participate in the study were included in the study. The study reached 65% of the sample.

Data Collection Tools

Data were collected using the “Nursing Student Information Form” and the “Health-Promoting Lifestyle Profile II Scale”.

The Nursing Student Information Form was created by the researchers based on a literature review. It consists of items on age, gender, marital status, as well as on obtaining information about health habits, use of mobile health applications and perception on benefits.

The Health-Promoting Lifestyle Profile Scale was developed in 1987 by Walker, Sechrist, and Pender [22], and then revised in 1995 as “Health Promoting Lifestyle Profile II” (HPLP-II) [23]. The scale measures the behaviors of individuals that improve their well-being associated with a healthy lifestyle. The HPLP-II is a 52-item scale consisting of six subscales, which are health responsibility, physical activity, nutrition, spiritual growth, stress management, and interpersonal relations. It is a 4-point Likert type scale that has “never”, “sometimes”, “often”, and “regularly” options, the lowest and the highest scores of the scale are 52 and 208 respectively. It is considered that students’ healthy lifestyle behaviors increase with the increasing total score. The Turkish reliability and validity study of the scale was conducted by Bahar et al. [7]. They reported Chronbach Alpha coefficient of the scale as 0.92. The reliability coefficient was 0.77 for the subscale health responsibility, 0.79 for physical activity, 0.68 for nutrition, 0.79 for spiritual growth, 0.80 for interpersonal relationships and 0.64 for stress management.

In this study, the Cronbach’s α coefficient of the scale was 0.92 and for the subscales Cronbach’s α coefficient was obtained as health responsibility 0.85, physical activity 0.80 nutrition 0.73, spiritual growth 0.84, interpersonal relationships 0.72, and stress management 0.85.

Ethical considerations

Prior to participation in the study, all students gave their formal consent. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of a foundation university in Ankara (2020-604.01.01/12526).

Statistical Analysis

Data were analyzed using IBM SPSS statistics software, Version 17. Percentages, means and standard deviations were used for the analysis. Tests of a normal distribution, parametric tests, and correlation analyses were performed. In the analysis, independent sample t-test and ANOVA were used. A p-value of <0.05 was considered statistically significant with a 95% confidence interval.

RESULTS

The demographic characteristics of the nursing students are presented in Table 1. The mean age of the nursing students was 20.96 ±1.56 years (min:18 - max:25); 87.1% were female; 26.7% were first year, 20.8% second year, 28.7% third year, and 23.8% fourth year students; 92.1% had nuclear family structure; 63.4% had income equal to expenses and 74.3% of them perceived their socioeconomic level at a medium level; 59.4% graduated from public high school; 71.3% lived with their families during their study (Table 1).

Table 1. Characteristics of Nursing Students (N = 101)

Characteristics	Number	Percent (%)
Gender		
Female	88	87.1
Male	13	12.9
School year/Class		
First year	27	26.7
Second year	21	20.8
Third year	29	28.7
Fourth year	24	23.8
Family structure		
Nuclear family	93	92.1
Extended family	8	7.9
Income status		
Less than income	11	10.9
Income equal to expenses	64	63.4
More than expenses	26	25.7
Location of longest residence		
Village	3	3.0
District	21	20.8
Province	76	75.2
Abroad	1	1.0
Graduated high school		
Public	60	59.4
Private	41	40.6
Place of living during university education		
Family	72	71.3
Alone	2	2.0
Private dorm	11	10.9
Government dorm	11	10.9
At home with friends	5	5.0

Health-related characteristics of the nursing students involved in the study are shown in Table 2. According to the calculated body mass index of nursing students, it was determined that 69.3% were of normal weight, 14.9% were underweight and 3.0% were obese. In the study, 48.5% of nursing students had a moderate sleep pattern; 25.7% had slept 7-8 hours per day; 29.7% were smoked and 26.7% consumed alcohol. The daily sleep time of students averages 8.05 ± 1.43 (min; 4 max: 12), and 61.4% of nursing students stated that their self-rated general health status was good. Only 10.9% had an existing disease (hyperthyroidism, hypothyroidism, insulin resistance, etc.) and 11.9% were using regular medicines, 47.5% exercised regularly, 54.5% had hobbies (reading books, listening to music, painting, etc.) (Table 2).

Table 2. Health Related Characteristics of Nursing Students (N = 101)

Health-Related Characteristics	Number	Percent (%)
Body Mass Index		
Underweight (<18.5)	15	14.9
Normal weight (18.5-24.9)	70	69.3
Overweight (25-29.9)	13	12.9
Obesity Class 1 (30-44.9)	3	3.0
Sleep patterns		
Good	25	24.8
Moderate	49	48.5
Poor	27	26.7
Smoking status		
Yes	30	29.7
No	71	70.3
Alcohol-use		
Yes	27	26.7
No	74	73.3
Self-rated general health status		
Good	62	61.4
Moderate	36	35.6
Poor	3	3.0
Chronic disease condition		
Yes	11	10.9
No	90	89.1
Regular medication use		
Yes	12	11.9
No	89	88.1
Regular physical activity		
Yes	48	47.5
No	53	52.5
Have a hobby		
Yes	55	54.5
No	46	45.5

Mobile nursing practices of nursing students are not included in the table, but almost all of the nursing students had constant internet access on their smartphones. In the study, 72% of students stated that they use mobile health applications. Nursing students stated that they frequently use e-Pulse (22.7%), physical exercise such as fitness or yoga (17.1%), Hospital Appointment System (17.1%), ovulation calendar (14.1%), calorie counter (11.4%) via mobile health applications. In the study, 86,1% of nursing students found mobile applications useful. They found it useful because they said “Individual follow-up of his/her health improves a person’s knowledge and skills about health” with the highest rate of 68.2%; those who did not find it useful said “If smart health applications are not used regularly by the users, it may not be possible to achieve the targeted health results” with the highest rate of 57.9%.

It has been determined that the mean score of the nursing students’ HPLP-II scale is 137.53 ± 22.96. The highest scores were obtained from interpersonal relations (27.10±4.58) and the lowest scores were obtained from the physical activity subscale (19.19±5.23) (Table 3).

Table 3. The mean HPLP-II and subscale scores (N = 101)

HPLP-II Subscales	Mean±SD	Range (min-max)	Range of possible scores (min-max)
Total HPLP-II score	137.53 ± 22.96	80-202	52-208
Spiritual Growth	26.71±4.87	13-35	9-36
Health Responsibility	23.66±4.80	11-36	9-36
Physical Activity	19.19±5.23	8-32	8-32
Nutrition	20.98±4.38	12-36	9-36
Interpersonal Relationships	27.10±4.58	13-35	9-36
Stress Management	20.46±4.48	8-30	8-32

Table 4 shows comparison of the HPLP-II subscale mean scores according to the socio-demographic characteristics. There was no significant relationship between socio-demographic characteristics and total score of HPLP-II scale (*P*>0.05). The mean total score of the HPLP-II scale and the health responsibility, physical activity, nutrition, and stress management subscale scores were lower in the first-year students. There was a significant relationship between nutrition and gender (*P*=0.05), class and health responsibility (*P*=0.05), spiritual growth and income status (*P*=0.03). The interpersonal relations score was also significantly related to the class (*P*=0.05). Fourth-year students have the highest mean interpersonal relations scores (28.79±3.32) and the first-year students are the lowest (25.33±5.17). Stress management scale score averages of students with high-income status were found to be significantly higher (*P*=0.05). Although it is not mentioned in the table, no significant relationship has been detected in other socio-demographic characteristics (Table 4).

Table 4. Comparison of the HPLP-II and subscale scores according to socio-demographic characteristics (N = 101)

Socio-demographic characteristics	**HPLP-II** x̄±SD	**Health Responsibility** x̄±SD	**Physical Activity** x̄±SD	**Nutrition** x̄±SD	**Spiritual Growth** x̄±SD	**Interpersonal Relations** x̄±SD	**Stress Management** x̄±SD
Gender							
Female	137.40±21.14	23.11±4.58	18.93±4.71	20.65±3.90	26.72±4.60	27.39±4.50	20.57±4.31
Male	138.38±33.94	22.76±6.30	21.00±7.90	23.15±6.60	26.61±6.46	25.15±4.75	19.69±5.69
P value*	0.88	0.81	0.18	0.05	0.95	0.13	0.50
Class							
First	129.51±23.91	21.22±5.06	17.25±4.54	20.25±4.38	26.40±5.11	25.33±5.17	19.03±5.26
Second	142.57±25.93	24.52±4.78	20.95±5.88	20.90±4.64	27.09±5.54	27.52±5.51	21.57±4.52
Third	136.48±20.87	22.75±4.17	19.37±5.28	20.55±4.59	26.34±4.45	27.06±3.69	20.37±4.25
Fourth	143.41±19.84	24.25±4.78	19.62±4.90	22.37±3.80	27.16±4.69	28.79±3.32	21.20±3.52
P value**	0.11	0.05	0.09	0.33	0.89	0.05	0.98
Income status							
< income	122.90±16.64	20.45±4.52	16.45±3.04	18.81±3.37	24.09±3.88	24.81±5.47	18.27±4.10
Income equal to expenses	136.76±21.62	23.12±4.65	18.85±4.85	20.90±3.84	26.48±4.69	27.15±4.64	20.23±4.33
> expenses	145.61±25.61	24.03±5.06	21.19±6.22	22.07±5.63	28.38±5.23	27.96±3.81	21.96±4.68
P value**	0.19	0.10	0.02	0.11	0.03	0.16	0.05

Note: *Independent sample t-test; **One-way ANOVA test

There is a significant relationship between sleep patterns and total score of the HPLP-II scale (*P*=0.002) and subscale scores except for interpersonal relations (*P*=0.18). There is a significant relationship between students' smoking status and stress management scores (*P*=0.03). The stress management subscale mean score (21.08±4.52) of non-smoker students was higher than of smokers (19.00±4.12). Nutritional (*P*=0.07) and spiritual growth (*P*=0.006) subscale mean scores of nursing students who did not use alcohol were found to be higher than the mean scores of students using alcohol which were found as statistically significant. The average HPLP-II score (*P*=0.001), health responsibility (*P*=0.007), physical activity (*P*=0.001), and stress management (*P*=0.01) scores of the students doing physical activity were significantly higher. The average HPLP-II total score, physical activity and spiritual growth scores of nursing students engaged in hobby were significantly higher (Table 5).

The relationship between the HPLP-II subscale scores and the use of mobile health applications is shown in Table 6. In our study, no significant relationship was found between continuous internet use and HPLP-II scale and subscale scores. The nutrition mean score (21.50±4.16) of the students using the mobile health application was higher than the nutri-

Table 5. Comparison of the HPLP-II scale and subscale scores according to health-related characteristics (N = 101)

Health Related Characteristics	N	HPLP-II x̄±SD	Health Responsibility x̄±SD	Physical Activity x̄±SD	Nutrition x̄±SD	Spiritual Growth x̄±SD	Interpersonal Relations x̄±SD	Stress Management x̄±SD
Sleep patterns								
Poor	25	132.68±22.46	23.16±4.74	18.28±4.80	19.52±4.37	25.76±4.89	27.00±4.54	18.96±4.46
Moderate	49	133.15±20.37	21.92±4.33	18.35±4.82	20.78±3.92	25.82±4.27	26.47±4.35	19.80±4.06
Good	27	[a] 151.32±23.73	[a] 25.32±5.14	[a] 21.84±5.72	[a] 22.84±4.79	[a] 29.48±5.12	28.52±4.92	[a] 23.32±4.22
P value*		0.002	0.01	0.01	0.02	0.004	0.18	0.001
Smoking status								
Yes	30	134.83±20.80	22.96±3.82	19.83±5.05	21.66±3.31	25.50±4.94	25.86±4.44	19.00±4.12
No	71	138.67±23.85	23.11±5.18	18.92±5.31	20.69±4.75	27.22±4.78	27.83±4.56	21.08±4.52
P value**		0.42	0.89	0.43	0.30	0.10	0.07	0.03
Alcohol use								
Yes	27	131.62±19.21	22.07±3.62	19.37±4.67	19.70±3.20	24.51±5.01	26.59±4.65	19.37±3.71
No	74	139.68±23.90	23.43±5.14	19.13±5.45	21.44±4.67	27.51±4.59	27.29±4.56	20.86±4.70
P value**		0.11	0.21	0.84	0.07	0.006	0.49	0.14
Physical activity								
Yes	12	145.62±22.37	24.41±4.24	22.37±4.54	21.77±4.58	27.58±5.28	27.81±4.65	21.61±4.34
No	89	130.20±21.12	21.84±4.99	16.32±4.03	20.26±4.10	25.92±4.37	26.47±4.46	19.37±4.37
P value		0.001	0.007	0.001	0.08	0.08	0.14	0.01
Have a hobby								
Yes	55	141.89±22.20	23.81±4.60	20.49±4.89	21.56±4.47	27.63±4.75	27.16±4.32	21.21±4.30
No	46	132.32±22.99	22.17±4.93	17.65±5.25	20.28±4.21	25.60±4.83	27.04±4.91	19.56±4.58
P value**		0.03	0.08	0.006	0.14	0.03	0.89	0.06

Note: *One-way ANOVA test; **Independent sample t-test

Table 6. Comparison of the HPLP-II scale and subscale scores according to the use of Mobile Health applications (N = 101)

mHealth applications	N	HPLP-II x̄±SD	Health Responsibility x̄±SD	Physical Activity x̄±SD	Nutrition x̄±SD	Spiritual Growth x̄±SD	Interpersonal Relations x̄±SD	Stress Management x̄±SD
Have constant internet access								
Yes	97	138.02±22.68	23.13±4.78	19.26±5.28	20.94±4.33	26.83±4.83	27.23±4.49	20.59±4.47
No	4	125.75±30.28	21.50±5.91	17.50±3.69	21.75±6.13	23.75±5.56	24.00±6.37	17.25±4.11
P value*		0.29	0.50	0.51	0.72	0.21	0.16	0.14
Use of mobile health applications								
Yes	78	139.80±21.22	23.50±4.33	19.71±5.16	21.50±4.16	26.85±4.80	27.61±3.90	20.61±4.15
No	23	129.82±27.12	21.60±6.03	17.43±5.19	19.21±4.74	26.21±5.17	25.39±6.16	19.95±5.55
P value*		0.06	0.09	0.06	0.02	0.58	0.04	0.53
Perception of mobile applications								
Useful	87	138.52±21.38	23.40±4.40	19.36±5.02	20.86±4.10	26.74±4.79	27.44±4.29	20.70±4.13
Not useful	14	131.35±31.34	21.00±6.62	18.14±6.47	21.71±5.97	26.50±5.54	25.00±5.83	19.00±6.26
P value*		0.28	0.08	0.41	0.50	0.86	0.06	0.19

Note: *Independent sample t-test

tion mean score (19.21 ± 4.74) of the students who did not use the mobile health applications (*P*=0.02). In addition, the mean scores of interpersonal relations subscale of the students who use mobile health applications was significantly higher than of non-users (*P*=0.04).

DISCUSSION

The benefit of the use of mobile applications is high due to advantages, such as user-friendliness, convenience, and effectiveness. Several studies have stated that individuals are capable of making good healthier eating and exercise decisions with the help of mobile health applications [24, 25]. Nurses may be having an opportunity to empower patients to manage their care in a proactive way by increasing awareness and usability of mobile health technology in preventive care. However, if nurses acquire healthy behaviors during their education, they would be able to advise their patients on healthy behavior while working as a nurse. Today, almost all university students have a smartphone [26]. For this reason, students can easily integrate their healthy lifestyle behaviors into their daily lives using technology. However, there are very few studies in the literature regarding the use of nursing students' mobile health applications and healthy lifestyle behaviors [16, 18]. In their study with 450 nursing students, Choi and Kang [18] stated that nursing students are willing to download the applications for health-promoting behaviors to their smartphones. In this study, almost all of the nursing students stated that they think that mobile health applications are beneficial in developing healthy lifestyle behaviors.

It is expected that nursing students who are trained to meet the health care needs of the society should have high healthy lifestyle behaviors [27]. Positive health behaviors are associated with higher HPLP-II scores; the highest possible score is 208. In this study, the mean score was 137.53 ± 22.96 in nursing students. It can be seen that the healthy lifestyle behaviors of nursing students included in this study are at a medium level. This result is similar to the findings of other studies examining students' health promotion behaviors [6, 18]. Polat et al. [28] stated that nursing students practiced health-promoting behaviors at a moderate level. These results show that nursing students have difficulty in transferring their knowledge and experiences about healthy lifestyle behaviors they acquired during their study period.

Exercise and proper nutrition protect individuals from chronic diseases, infections, stress. It has many positive effects on weight control, cardiovascular diseases, some cancers, obesity prevention, mental health, self-esteem, and body image. Proper nutrition, exercise, weight control are main elements in reducing the harmful effects of chronic diseases such as heart diseases, stroke, cancer, and diabetes. Unhealthy behaviors create burdens for individuals, their families, and the health economy as they increase health care costs. More than half of the students in this study have normal weight range and only 47.5% of them have reported to exercise on a regular basis. This result shows that half of the students take care of their health habits and they pay attention to their nutrition and activities. It is also observed that students do not pay attention to sleep patterns. Nutrition, sleep, and exercise in a healthy lifestyle are very important for the protection of body and mental health, and the prevention of chronic diseases. Our results are similar to those in the literature [6, 8, 29, 30]. Considering this situation, nursing students who are supposed to be future role models in the health care of the patients are faced with problems in obtaining healthy lifestyle behaviors by themselves.

It is reported that regular physical activity reduces the risk of coronary heart disease and stroke, diabetes, hypertension, colon cancer, breast cancer, and depression and overweight. However, in most of the studies with nursing students, the lowest mean score of the HPLP scale is reported to belong to the physical activity subscale [31]. Our study results are similar to the literature [6, 9, 28, 32]. In Iran, Rezaei-Adaryani [33] noted that medical nursing had low scores for exercise. Wittayapun et al. [34] stated that exercise scores were lower among nursing students; nutrition, and stress management were also low. The reason for these results may be the intense nursing education curriculum in general. In our study, physical activity was the lowest practice followed by nutrition and stress management among health-promoting lifestyle behaviors of nursing students. According to the study by Polat et al. [28] the health responsibility, nutrition, and stress management scores of students in the fourth-year were significantly high. In our study, a significant relationship is found between the classes of nursing students and the interpersonal relationship and health responsibility of the HPLP-II subscale. Fourth-year students have the highest mean interpersonal relations scores and the first-year students have the lowest. This may be explained by the fact that there are interpersonal communication courses including communication labs in the nursing education curriculum. Besides, the communication of nursing students with patients and other health professionals in their clinical practice may have contributed to better score interpersonal relations in the HPLP-II scale.

Based on education and experience, nurses are often assumed knowledgeable regarding the importance of health-promoting behaviors, such as healthy eating, physical activity, and stress management. However, this knowledge may not translate into sustainable change [19] because developing healthy lifestyle behaviors may not only be through education. These behaviors are significantly affected by the age, gender, marital status, family income status, and socio-economic status of nursing students [35]. In our study, although there was no significant correlation between the total scores of the HPLP-II scale and the sociodemographic characteristics of the students, a statistically significant relationship was found between the sub-dimensions of the scale. The mean nutrition subscale score of male students is significantly higher than of female students. There have been studies that support our findings [9, 27, 28, 32].

The average physical activity, spiritual growth, and stress management scores were higher for students whose families' income is higher than their expenses. Previous studies also show that positive social and economic factors affect people's health-related behavior positively [9, 28, 31, 35]. Besides, a good economic status enables the use of sports and wellness centers. The study of Bostan and Beşer [36] stated that those with a higher income had higher mean score of the HPLP-II scale and subscales.

Studies have shown that unhealthy lifestyles, such as smoking, a poor diet, a sedentary lifestyle, excessive alcohol consumption are leading to chronic illnesses. The unhealthy lifestyle of nursing students during late adolescence can have long-term adverse effects on their health in adulthood. Smoking is an indicator of unhealthy life behavior; nurses who are smoking cannot be a good role model for the general public and patients. In this study, the difference between smokers' scores on the HPLP-II scale compared to non-smokers was not significant. However, the mean stress score of non-smokers was found to be significantly higher than of smokers. Similar to another study conducted with nursing students, non-smoking students had higher scores on nutrition, physical activity, and stress management on the HPLP-II scale [9, 37]. The mean score of nutrition and spiritual growth subscale of students who do not use alcohol is high in our study. Besides, in our study, the HPLP-II scale score of nursing students dealing with some hobby is significantly higher than those who do not have a hobby. In our study, the HPLP-II score an average of the nursing students with good sleep patterns health responsibility, physical activity, spiritual growth, stress management averages were high. All these results support the need for regular sleep, non-smoking, and a hobby to develop healthy lifestyle behavior.

Today, nursing students will be role models for the patients they will provide care in the future. For this reason, they must acquire healthy lifestyle behaviors during the study period. Enabling students to use mobile health applications on their smartphones makes it easier for them to learn fast, integrate applications, such as sleep, weight, and exercise into their lives. In our study, nursing students have constant internet access and almost all of the nursing students stated that they use mobile health applications. Students who use mobile health applications achieved higher nutritional and interpersonal relations average scores than students who do not use mobile health applications.

Limitations of the study

The main limitation of the current study is that it has been conducted at one university. The second limitation refers to the number of students who responded to the survey. Of those invited to take part in the study, 35% of 156 students did not complete or return the questionnaire.

Implications of the Results for Education and Clinical Practice

Addressing health care practices in more detail in the nursing curriculum, and researching various mobile health applications will contribute to the development of healthy behaviors. The adoption of mobile health applications by nurses, especially during their study period, will enable them to provide care that is more appropriate for their patients in the future. The goal is to educate nurses who care about their own health, so that they can contribute to the health habits of their relatives and community. As a result, in the future, it can contribute to the prevention and reduction of chronic diseases or to increase the self-management of individuals with chronic diseases.

CONCLUSIONS

This study shows that student nurses' healthy living habits are moderate and most of them use mobile health applications. However, the physical activities and exercise habits of nursing students in this study are low.

It is advisable to use smartphone health applications as a way to manage healthy habits of nursing students, and to include mobile health applications in education of nurses.

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Author Contributions

Conceptualization, B.Ç and S.K.; Methodology, B.Ç.; Software, G.T.; Validation, B.Ç., G.T. and S.K.; Formal Analysis, G.T.; Investigation, S.K; Resources, B.Ç.; Data Curation, S.K.; Writing – Original Draft Preparation, B.Ç., G.T. and S.K..; Writing – Review & Editing, B.Ç., G.T. and S.K.; Visualization, B.Ç.; Supervision, S.K.; Project Administration, S.K.

Declaration of Conflicting Interests:

The authors declare no conflict of interest.

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Shared Perceptions, Different Experiences: Therapeutic Alliance among Healthcare Professionals and Psychiatric Patients

Therapeutic Alliance in Psychiatry

Dario Klasan[1,2]*, Ana Mehičić[1], Ivana Jelinčić[1,2,3], Štefica Mikšić[2,4], Marin Mamić[2,5], Ivana Barać[2]

[1] Department of Integrative Psychiatry, University Hospital Centre Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia, darioklasan1@gmail.com, amehicic@kbco.hr; ijelincic9@gmail.com

[2] Department of Nursing and Palliative Medicine, Faculty of Dental Medicine and Health Osijek, Josip Juraj Strossmayer University of Osijek, Crkvena Street 21, Osijek, 31000, Osijek-Baranja County, Croatia, smiksic@fdmz.hr; marinmamic@hotmail.com; ibarac@fdmz.hr;

[3] Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia,

[4] Home for the elderly and disabled persons Đakovo, Petra Preradovića Street 2/A, Đakovo, 31400, Osijek-Baranja County, Croatia

[5] General County Hospital Požega, Osječka Street 107, Požega, 34, 000, Požega-Slavonia County, Croatia,

***Corresponding author:**
darioklasan1@gmail.com, +385 99 3284 447

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Keywords: therapeutic alliance; healthcare professionals; psychiatry.

Abstract

Introduction: The aim of this study is to examine quality levels of the therapeutic alliance between healthcare professionals and hospitalized patients. The research is designed as a cross-sectional study.

Methods: The research was conducted at the Clinical Hospital Center Osijek, specifically at the Clinic for Psychiatry. A total of 184 respondents participated in the study, 132 of whom were hospitalized patients and 53 healthcare workers. All participants were provided timely information regarding the research objectives and methodology, they were given relevant materials, and they gave their consent to participate in the study. The same general demographic questionnaire was used as a research instrument for both healthcare workers and hospitalized patients. In order to assess the quality level of the therapeutic alliance, the *Scale to Assess the Therapeutic Relationship in Community Mental Health Care: STAR* questionnaire was applied, with acquired permission from the authors.

Results: Healthcare professionals rated positive cooperation significantly higher than patients (Fisher's exact test, P=0.01). They also experienced more emotional difficulties in comparison to the domain of positive clinical support for patients (Mann–Whitney U test, P=0.02). However, even though the healthcare professionals gave it a slightly higher grade, there is no significant difference in the overall assessment of the therapeutic alliance between healthcare professionals and patients.

Conclusion: The results of the study indicate that both healthcare professionals and patients perceive a favorable therapeutic alliance. Positive collaboration is rated higher among healthcare professionals than among patients, with professionals potentially experiencing more emotional challenges. On the other hand, patients grade higher the level of excellence, in terms of the positive clinical support they receive, than the healthcare professionals. However, both groups of respondents equally recognize a high level of positive clinical support.

INTRODUCTION

The therapeutic alliance, also referred to as the working alliance, describes the interaction between the healthcare professional and the patient. The therapeutic alliance is considered an important aspect of the therapeutic process and can influence treatment outcomes [1].

Most conceptualizations of the therapeutic alliance are based on Bordin's pantheoretical definition, which includes three elements: the emotional bond established between the patient and the therapist, mutual agreement on the goals of therapy, and the tasks required to achieve them. This definition has enabled extensive empirical research that has repeatedly demonstrated the therapeutic alliance as a consistent predictor of outcomes across different approaches to psychotherapy [2].

In order for a therapeutic alliance to be formed, the patient must have a directed need for recovery, a certain sense of helplessness or inadequacy, and a conscious need to cooperate with the therapist. The therapeutic alliance in psychotherapy differs from a consultative or advisory relationship and from interpersonal influence [3]. The strength of the therapeutic alliance is built through mutual consent to undertaken actions and the maintenance of a collaborative relationship. Indicators of change are the goals achieved through specific tasks, which is made possible by the bond created between the patient and the psychotherapist. The therapeutic alliance is considered an important determinant of psychotherapy success, as it provides a framework for various strategies and methods of the psychotherapist's work [3].

Previous studies indicate that a higher-quality therapeutic relationship is associated with improved recovery of mental health. When patients feel understood, respected, and supported, they are more likely to actively engage in the therapeutic process, follow treatment recommendations, and experience positive changes in their well-being [4, 5]. Assessing the quality of the therapeutic alliance between patients and healthcare professionals has become increasingly important for examining the outcomes and effects of healthcare services aimed at improving mental health [6, 7].

Some theorists have defined the quality of the alliance as “the most important integrative variable” of therapy, and it currently seems possible to claim that the quality of the alliance between patient and therapist is a consistent predictor of positive clinical outcomes, regardless of the psychotherapeutic approach or assessment criteria used [8, 9]. There are numerous validated instruments commonly used to assess the therapeutic alliance in psychotherapy research. Among the most well-known are: Working Alliance Inventory (WAI), Helping Alliance Questionnaire (HAq-II), California Psychotherapy Alliance Scales (CALPAS), Agnew Relationship Measure (ARM), Vanderbilt Therapeutic Alliance Scale (VTAS), and Kim Alliance Scale (KAS) [8]. These instruments assess different perspectives of the therapist–patient relationship, with their main aim being to examine the level of quality and strength of the alliance. Commonly assessed dimensions include agreement on goals, agreement on tasks, bond or relationship quality, collaboration and engagement, communication and feedback, and the working alliance [8].

Feedback obtained from evaluating the quality of the therapeutic alliance empowers therapists to build strong therapeutic relationships, enhance patient engagement, improve treatment planning, and make informed decisions that contribute to positive treatment outcomes. Good alliance quality enriches the therapeutic process and facilitates a collaborative and supportive environment for patients to achieve their therapeutic goals [10].

The aim of this study was to examine the quality of the therapeutic alliance between healthcare professionals and hospitalized patients at the Psychiatric Clinic, assessing cooperation, emotional difficulties, and clinical support from both perspectives. The study contributes to understanding professional–patient relationships in psychiatry and highlights the alliance as a predictor of treatment outcomes.

METHODS

Study design: This research was designed as a cross-sectional study [11].

Setting and samples: A total of 184 participants were included: 132 hospitalized patients (80 men and 53 women) and 53 healthcare professionals (10 men and 42 women). Inclusion criteria for hospitalized patients were: age ≥18 years and hospitalization in one of the aforementioned departments, regardless of whether it was the first or a repeated hospitalization. Inclusion criteria for healthcare professionals were: age ≥18 years and employment in one of the aforementioned departments, regardless of total years of work experience.

Measurements and instruments: A general demographic questionnaire was used for both healthcare professionals and hospitalized patients, including nine items: age, sex, marital status, years of marriage, place of residence, housing status, education, employment status, and occupation. To assess the quality of the therapeutic alliance, the “Scale to Assess the Therapeutic Relationship in Community Mental Health Care: STAR” questionnaire was applied [12]. Permission to use the instrument was obtained from the original author. The instrument consists of 12 items for healthcare professionals (STAR-C) and 12 items for hospitalized patients (STAR-P). All participants rated items on a 5-point Likert scale ranging from 0 to 4 (0 = Never, 1 = Rarely, 2 = Sometimes, 3 = Often, 4 = Very often). The total score ranges from 0 to 48, with higher scores indicating better quality of the therapeutic alliance. Subscale ranges are as follows: Positive collaboration: 0–24; Positive clinician input: 0–12; Non-supportive clinician input: 0–12; Emotional difficulties: 0–12.

Data collection/procedure: Data were collected by administering the demographic questionnaire and STAR scales to both groups of participants during hospitalization or employment at the Clinic.

Ethical considerations: Permission to use the STAR questionnaire was obtained from the original author. All participants were informed in a timely manner about the objectives and procedures of the study, received an information sheet, and provided written informed consent prior to participation. The research was approved by the Ethics Committee of the University Hospital Centre Osijek (R1-318-2/2023) and by the Ethics Committee of the Faculty of Dental Medicine and Health Osijek (2158/97-97-10-23-34). The study was conducted in accordance with all applicable guidelines to ensure proper conduct and the safety of participants, including the principles of Good Clinical Practice, the Declaration of Helsinki, the Health Care Act of the Republic of Croatia, and the Act on the Protection of Patients’ Rights of the Republic of Croatia. Participant anonymity and confidentiality were strictly maintained.

Statistical data analysis: Categorical data were presented as absolute and relative frequencies. Differences in categorical variables were tested using the χ^2 test or Fisher’s exact test where appropriate. The normality of distribution of numerical variables was assessed with the Shapiro–Wilk test. Due to non-normal distribution, data were described using median and interquartile range. Differences in continuous variables between two independent groups were tested with the Mann–Whitney U test. All *P*-values were two-tailed, with the level of significance set at α=0.05. Statistical analyses were performed using MedCalc® Statistical Software version 20.218 (MedCalc Software Ltd, Ostend, Belgium; https://www.medcalc.org; 2023).

RESULTS

The study included 184 participants: 52 (28.3%) healthcare professionals and 132 (71.7%) hospitalized patients. Among healthcare professionals, 42 (81.0%) were women, with a median age of 41 years (range 24–63). Most lived in the city (n = 43,83.0%) and in their own home/apartment (n = 43,82.0%), and 24 (46.0%) had secondary or higher education. Among patients, 80 (61.0%) were men, with a median age of 50 years (range 18–78). Fifty-nine (44.7%) were married, and 79 (59.8%) lived in their own home/apartment.

Therapeutic alliance – STAR questionnaire

Healthcare professionals' responses (STAR-C) indicated frequent positive collaboration: 34 (45.4%) reported very often listening to patients, 40 (76.9%) often perceived good interaction, and 35 (67.3%) reported shared trust. Patients' responses (STAR-P) showed that 39 (29.5%) very often had a trusting relationship with professionals, and 72 (54.5%) often discussed personal goals and treatment with them.

Domain comparisons

No significant difference was observed in Positive Collaboration scores between healthcare professionals and patients, although professionals rated it as excellent more frequently than patients (Fisher's exact test, *P*=0.010) (Table 1).

Table 1. Distribution of respondents according to the assessment of positive collaboration between healthcare professionals and patients

Positive collaboration	Healthcare professionals n (%)	Patients n (%)	Total n (%)	*P*-value
Good (5–12)	0 (0.0)	14 (10.6)	14 (7.6)	0.010
Excellent (13–24)	52 (100.0)	118 (89.4)	170 (92.4)	
Total	52 (100.0)	132 (100.0)	184 (100.0)	

Note: *Fisher's exact test

Emotional difficulties (professionals) were rated significantly higher than Positive Clinician Input (patients) (Mann–Whitney U test, *P*=0.020) (Table 2).

Table 2. Difference in emotional difficulties among healthcare professionals and positive clinical support among patients

	Median (IQR)	Difference (95% CI)	*P*-value*
Emotional difficulties among healthcare professionals	9 (8–10)	–1 (–1 to 0)	0.020
Positive clinical support among patients	8 (6–9)		

Note: *Mann–Whitney U test

Similarly, Fisher's exact test showed that professionals rated Emotional Difficulties as good more often than patients rated Positive Clinician Input (*P*=0.030) (Table 3). No significant differences were observed between Positive Clinician Input (professionals) and Non-supportive Clinician Input (patients).

Table 3. Distribution of respondents according to the assessment of emotional difficulties among healthcare professionals and positive clinical support among patients

Assessment	Emotional difficulties among healthcare professionals n (%)	Positive clinical support among patients n (%)	Total n (%)	*P*-value*
Poor (0–3)	0 (0.0)	2 (1.5)	2 (1.1)	0.030
Good (4–9)	39 (75.0)	72 (54.5)	111 (60.3)	
Excellent (10–12)	13 (25.0)	58 (43.9)	71 (38.6)	
Total	52 (100.0)	132 (100.0)	184 (100.0)	

Note: *Fisher's exact test

Overall therapeutic alliance

Total STAR scores ranged from 0 to 48. Although professionals gave slightly higher scores, no significant difference was found between groups (Table 4).

Table 4. Difference in the overall assessment of therapeutic alliance

	Median (IQR)	Difference (95% CI)	*P*-value*
Healthcare professionals	37 (34–39)	−1 (−3 to 1)	0.230
Patients	35 (31–40)		

Note: *Mann–Whitney U test

Overall, 89 (48.4%) participants rated the alliance as good and 86 (46.7%) as excellent, with no significant differences in distribution between groups (Table 5).

Table 5. Distribution of respondents according to the overall assessment of therapeutic alliance

Overall assessment	Healthcare professionals n (%)	Patients n (%)	Total n (%)	*P*-value*
Poor (12–24)	0 (0.0)	9 (6.8)	9 (4.9)	0.110
Good (25–36)	24 (46.2)	65 (49.2)	89 (48.4)	
Excellent (37–48)	28 (53.8)	58 (43.9)	86 (46.7)	
Total	52 (100.0)	132 (100.0)	184 (100.0)	

Note: *χ^2 test

DISCUSSION

The therapeutic alliance serves as a critical factor influencing treatment outcomes, as it shapes the quality of interaction and collaboration between healthcare professionals and patients. The present study confirmed that the overall quality of the therapeutic alliance among hospitalized psychiatric patients and healthcare professionals is generally high, consistent with prior findings [12, 13].

The Positive Collaboration subscale of the STAR questionnaire, reflecting mutual trust, shared goals, and openness, emerged as a key element in the therapeutic alliance. This aligns with previous research emphasizing that effective collaboration fosters a strong working relationship, promotes patient engagement, and facilitates the achievement of therapeutic objectives [14, 15]. In this study, patients frequently reported discussing personal treatment goals with healthcare professionals, underscoring the relevance of collaborative goal setting in enhancing patient motivation and active participation [19, 20]. These findings suggest that structured collaboration may contribute to improved adherence and treatment outcomes.

The Positive Clinician Input subscale highlights the importance of clinician behaviors, including support, respect, and empathetic listening. Results indicate that healthcare professionals provide high levels of positive clinical support, consistent with previous studies linking clinician responsiveness to patient satisfaction and therapy effectiveness [12, 28, 29]. This reinforces the notion that clinicians' emotional engagement and expression of positive emotions can enhance treatment outcomes, especially in patients with limited social support [30, 36].

Emotional difficulties among healthcare professionals, such as compassion fatigue, burnout, vicarious traumatization, and challenges in maintaining appropriate emotional boundaries, are recognized as potential factors that may interfere with the therapeutic alliance [22–27]. In this study, healthcare professionals reported relatively low levels of emotional difficulties, suggesting that positive emotions and effective coping strategies are maintained, which likely supports the quality of the therapeutic alliance. This finding highlights the potential for interventions aimed at fostering positive emotions in clinicians to further enhance alliance quality and treatment outcomes [28–30].

The results also emphasize the broader implications of a strong therapeutic alliance for patient care. A robust alliance has been consistently shown to predict overall patient satisfaction, symptom reduction, improved functioning, and adherence to both psychotherapeutic and pharmacological interventions [31–35]. Moreover, for patients lacking social support, the therapeutic alliance can partially compensate for these deficiencies, illustrating its unique role in enhancing treatment outcomes in vulnerable populations [36].

Limitations of the study include its cross-sectional design, which limits causal inference, and the reliance on self-reported measures, which may be influenced by social desirability. Future research should consider longitudinal designs to examine the temporal dynamics of the therapeutic alliance and incorporate multi-method assessments, including observational and clinician-rated measures, to provide a more comprehensive understanding. Additionally, exploring interventions aimed at enhancing clinicians' emotional well-being and positive emotions may offer practical strategies to strengthen therapeutic alliances and optimize patient outcomes.

In clinical practice, these findings underscore the importance of fostering positive collaboration, clear communication, and mutual trust. Training programs for healthcare professionals should emphasize skills in goal setting, empathetic engagement, and emotion management, which may enhance both alliance quality and treatment efficacy. In educational settings, integrating these competencies into curricula could prepare future clinicians to establish and maintain strong therapeutic alliances, ultimately improving mental health outcomes.

CONCLUSIONS

The study indicates that both healthcare professionals and hospitalized patients perceive a positive therapeutic alliance, with consistent assessments across groups. Higher levels of collaboration and clinical support suggest that a strong therapeutic alliance may serve as a curative predictor, enhancing patient engagement, adherence to treatment, and overall treatment effectiveness. Emotional challenges among healthcare professionals do not appear to compromise the quality of the alliance, highlighting the potential of a well-maintained therapeutic relationship to positively influence therapeutic outcomes.

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Author Contributions

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The author declares no conflict of interest.

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Environmental Awareness and Sustainable Practices among Nurses: Predictors, Barriers, and the Role of Green Audits

Valentina Ješić[1,2]

[1] Department of Anesthesiology, Intensive Care Medicine and Pain Management, Sestre milosrdnice University Hospital Center, Vinogradska cesta 29, 10000, Zagreb, Croatia, valentina.matic@yahoo.com

[2] Faculty of Health Sciences, University of Novo Mesto, Na Loko 2, 8000, Novo Mesto, Slovenia

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Corresponding author: Valentina Ješić, Tišina Kaptolska 61, 44000, Sisak, Croatia, valentina.matic@yahoo.com, +385 99 503 4197

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Abstract

Introduction: The healthcare sector contributes substantially to environmental pollution, accounting for about 4.5% of global CO_2 emissions, while also generating large amounts of waste and consuming significant energy and water resources. Nurses, as the largest group of healthcare professionals, are well positioned to promote sustainability, but their efforts are often hindered by limited time, resources, and managerial support. This study aimed to examine the level of environmental awareness and the frequency of sustainable practices among nurses in Croatia, and to identify barriers and types of support needed for their more effective implementation.

Methods: A quantitative cross-sectional study was conducted using an online questionnaire among 150 nurses with diverse demographic characteristics. The questionnaire included a scale of environmental awareness, a scale measuring the frequency of sustainable practices, and questions about green audits, participation in sustainability initiatives, barriers, and support needs.

Results: Most participants were women (87%), with a mean age of 35 years and an average of 12 years of work experience. A green audit had been conducted in 20% of institutions. A high level of environmental awareness was observed (mean 4/5), while sustainable practices were moderate (mean 3.6/5). Waste segregation was the most frequent practice, while participation in "green" initiatives was the least common. Higher awareness, the presence of a green audit, and managerial support significantly predicted more frequent implementation of sustainable practices. Key barriers included lack of time, infrastructure, and managerial support.

Conclusion: Nurses in Croatia demonstrate a high level of environmental awareness, but their sustainable actions remain constrained by operational barriers. Institutional measures such as green audits, targeted education, and stronger leadership support are essential for embedding sustainability into everyday nursing practice.

INTRODUCTION

The growing threats of climate change, pollution, and resource depletion have stimulated global efforts toward sustainable development, including in the field of healthcare [1–3]. The healthcare system has a significant environmental footprint. For example, it generates approximately 4.4 to 4.5 percent of total global greenhouse gas emissions [1], produces large quantities of medical waste, and consumes substantial amounts of energy and water [4]. In Croatia, the healthcare sector has been shown to account for about 4.5 percent of CO_2 emissions, which is more than certain industries such as shipbuilding or aviation [5]. These figures emphasize the urgent need to implement sustainable practices at all levels of healthcare delivery.

Nurses, who constitute the backbone of the healthcare workforce, play a crucial role in implementing and promoting sustainability within healthcare institutions [6]. Beyond their clinical duties, they are responsible for managing resources responsibly, reducing medical and infectious waste, ensuring the rational use of materials, and educating patients and colleagues about environmentally responsible practices [7]. Research in this field consistently shows that nurses hold positive attitudes toward environmental protection and view sustainability as part of their professional ethics [8–10]. However, despite these favorable attitudes, the actual implementation of sustainable practices in daily work remains limited. International studies indicate that more than half of nurses rarely engage in “green” activities, while about one third find it difficult to integrate such measures into their daily routines [8].

The main barriers identified include lack of time due to the priority of direct patient care, insufficient material and organizational resources such as recycling containers and alternative materials, absence of formal managerial support or incentives, and inadequate education regarding sustainable procedures [8, 9, 11]. Conversely, evidence suggests that nurses with higher levels of environmental awareness and knowledge are more likely to adopt sustainable practices such as waste reduction, energy conservation, and environmentally responsible procurement [12]. Facilitating factors include ongoing education, professional development, the formation of “green teams,” and visible institutional leadership support, particularly through clear environmental policies and resource allocation [6, 11].

Despite the global trend of “green healthcare,” no data have yet been published in Croatia on environmental awareness and sustainable practices among clinical nurses. The available initiatives, such as the International Green Healthcare Policy Summit held in Zagreb in 2023 and pilot projects on hospital energy efficiency, have mostly been directed at the system and infrastructure level, while the perspective of nursing staff has been less explored [5]. The aim of this study was therefore to address this knowledge gap by examining everyday sustainable practices in nursing in the Croatian context. This study aimed to: a) analyze the level of environmental awareness and sustainable practices among nurses in Croatia, and identify statistically significant predictors of their implementation, including professional experience, sector, managerial support, and the presence of a green audit, and b) examine the main barriers and perceived support mechanisms influencing the integration of sustainability into everyday nursing practice.

METHODS

Design and Sample

A quantitative cross-sectional study was conducted using an online survey. The study included registered nurses employed in the Republic of Croatia with diverse characteristics in terms of gender, age, years of work experience, level of education, and type of healthcare institution. Data collection took place in 2024 through web-based questionnaires distributed via professional platforms and social media, including groups and mailing lists of nursing associations. Participation was voluntary and anonymous, and completion of the questionnaire was considered implied consent. A total of 150 valid responses were obtained. Participants represented a variety of healthcare institutions across Croatia, rather than a single site.

Instrument

A structured online questionnaire was developed specifically for this study and consisted of several sections. The first section included sociodemographic variables such as gender, age, years of work experience, type of institution (public or private), and highest level of education. The second section measured environmental awareness using a set of statements assessing awareness and attitudes toward sustainability in healthcare. Participants rated their agreement on a five-point Likert scale ranging from 1 (strongly disagree/very low awareness) to 5 (strongly agree/very high awareness). Example items included: "I believe healthcare institutions play an important role in environmental protection" and "In my work, I try to consider the impact on the environment." The mean score of these items represented a composite indicator of environmental awareness, with higher scores indicating greater awareness. Internal consistency was satisfactory (Cronbach's α = 0.84).

The third section measured the frequency of sustainable practices with eight items asking participants how often they engaged in specific environmentally responsible behaviors in daily work, rated on a five-point Likert scale from 1 (never) to 5 (always). Five of these behaviors are presented in Table 2 as illustrative higher-frequency items and do not represent the full composite. A mean composite score (1–5) was calculated, with higher values indicating more frequent engagement in sustainable practices. Internal reliability for the eight-item scale was acceptable (Cronbach's α = 0.78).

The fourth section included items related to experience, support, and barriers. Participants were asked whether a green audit had been conducted in their institution (yes/no, explained as a formal environmental review or certification), whether they perceived managerial support for sustainable practices (yes/no), and whether they had participated in any organized sustainability initiatives or training (yes/no). In addition, they were provided with a list of potential barriers such as lack of time, insufficient financial or material resources, lack of knowledge or training, limited support from colleagues, and absence of managerial support, and were asked to select all relevant obstacles. A corresponding checklist of possible forms of support (e.g., additional education, clear guidelines and protocols, greater involvement of management, financial incentives, establishment of "green teams") was also included.

The questionnaire was piloted on a small sample (N = 10) of nurses to assess clarity and completion time. Based on feedback, minor wording adjustments were made to improve comprehensibility.

Ethical Considerations

The study adhered to the principles of the Declaration of Helsinki. According to Croatian legislation and institutional policies, formal IRB approval was not required for anonymous online surveys without sensitive personal data. Participation was voluntary and anonymous, and informed consent was implied by completion of the online questionnaire. Confidentiality was assured, and all data were stored securely with password protection and used solely for research purposes.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 25. Descriptive statistics were used to summarize sample characteristics and item distributions (means and standard deviations for continuous variables; frequencies and percentages for categorical variables). Group comparisons based on the presence of a green audit were performed using independent-samples t-tests for continuous variables and chi-square tests for categorical variables. Multiple linear regression analysis was conducted to identify independent predictors of the average frequency of sustainable practices. Predictor variables included environmental awareness (1–5 scale), years of work experience, presence of a green audit (1 = yes, 0 = no), and perceived managerial support (1 = yes, 0 = no). Gender and sector (public vs. private) were initially considered but were excluded from the final model due to non-significant contributions in preliminary analyses. Model assumptions such as multicollinearity and normality of residuals were checked. Statistical significance was set at $P<0.05$.

RESULTS

Sample description and presence of green audit

The study analyzed 150 participants, including 130 women and 20 men of varying ages and work experience. The mean age was 35.0 years (SD = 9.4; median 34), and the mean length of work experience was 12.1 years (SD = 10.2; median 10). Of the total sample, 100 participants (66.7%) were employed in public healthcare institutions (clinical hospital centers, general hospitals, health centers), and 50 (33.3%) in the private sector (special hospitals, polyclinics, private practices). Regarding education, 42% of respondents had completed secondary nursing school, 45% held a higher or bachelor's degree, and 13% held a master's degree, mostly in nursing management. A total of 30 participants (20%) reported that a green audit or another form of formal sustainability assessment had been conducted in their institution (Table 1).

Table 1. Demographic characteristics and differences according to the presence of a green audit (N = 150)

Variable		Total (N = 150)	Green audit Yes (n = 30)	Green audit No (n = 120)	*P* (Yes vs No)
Gender, n (%)					
	Women	130 (86.7)	26 (86.7)	104 (86.7)	0.990
	Men	20 (13.3)	4 (13.3)	16 (13.3)	
Age (years), M (SD)		35.0 (9.4)	36.5 (9.1)	34.7 (9.5)	0.580
Work experience (years), M (SD)		12.1 (10.2)	14.8 (11.0)	11.4 (9.9)	0.100
Public institution, n (%)		100 (66.7)	25 (83.3)	75 (62.5)	0.030*
Environmental awareness (1–5)		3.9 (0.7)	4.3 (0.5)	3.8 (0.7)	<0.001***
Sustainable practices (1–5)		3.6 (0.7)	4.0 (0.5)	3.5 (0.6)	<0.001***

Note: Green audit = formal internal or external review of environmental practices in the institution. Scores for environmental awareness and sustainable practices are mean values on a scale from 1 to 5 (higher scores indicate greater awareness and more frequent practices). *P* values obtained with χ^2 test (without Yates correction) for proportions and Welch's t-test for means. *$P<0.05$, **$P<0.01$, ***$P<0.001$.

Frequency of Sustainable Practices

Of the five surveyed aspects of sustainable behavior in daily work, the most frequently reported practice was waste segregation (M = 4.2, SD = 0.8). Energy conservation, such as switching off lights and medical devices when not in use, was also rated highly (M = 3.8, SD = 1.0). Reducing paper use, for example through digital documentation, showed a moderate frequency (M = 3.5, SD = 1.1). Reuse of materials or equipment when feasible was reported less often (M = 2.7, SD = 1.2). The least frequent activity was participation in "green" initiatives at the workplace (M = 2.3, SD = 1.1) (Table 2).

Note: The composite index of sustainable practices (M = 3.6, SD = 0.7) is based on the full set of eight items and is therefore not a simple arithmetic mean of the five illustrative behaviors listed in Table 2.

Table 2. Average frequency of sustainable practices in daily work (N = 150)

Sustainable practice	Mean (SD)
Waste segregation for recycling	4.2 (0.8)
Energy conservation (switching off lights and devices)	3.8 (1.0)
Reduced paper use (digital documentation)	3.5 (1.1)
Reuse of materials or equipment (when feasible)	2.7 (1.2)
Participation in "green" initiatives	2.3 (1.1)

Note: Frequency scale: 1 = never, 5 = always. SD = standard deviation.

Predictors of Sustainable Practices (Multiple Regression)

A multiple linear regression analysis was conducted to identify factors that significantly predict the frequency of sustainable practices among respondents. The dependent variable was the average score of sustainable practices (continuous, scale 1–5). The independent variables entered into the model were environmental awareness (scale 1–5), years of work experience, presence of a green audit in the institution (binary: 1 = yes, 0 = no), and perceived managerial support (1 = yes, 0 = no) (Table 3). Educational level was not a significant correlate of sustainable practices (P=0.18) and was therefore excluded from the final model.

Table 3. Multiple regression analysis of predictors of the frequency of sustainable practices (N = 150)

Predictor	B (SE)	β	P
(Constant)	1.10 (0.40)	–	0.006
Environmental awareness (1–5)	0.50 (0.10)	0.45	<0.001***
Green audit in institution	0.30 (0.12)	0.19	0.010**
Perceived managerial support	0.25 (0.11)	0.17	0.021*
Years of work experience	0.009 (0.005)	0.14	0.065

Note: Dependent variable: average frequency score of sustainable practices (1–5). Values represent unstandardized regression coefficients (B) with standard errors (SE), standardized coefficients (β), and p-values. Binary coding: green audit (1 = yes, 0 = no); managerial support (1 = yes, 0 = no). The regression model was statistically significant (F(4,145) = 24.3, P<0.001) and explained approximately 38% of the variance in the frequency of sustainable practices (adjusted R0.38 = ^{2}). ***P< 0.001, **P< 0.01, *P< 0.05.

Perceived Barriers and Needed Support for Sustainability

The survey section on barriers and support options allowed respondents to select multiple items. Nearly all participants (96%) identified at least one significant barrier. The most frequently reported barrier was lack of time (100 respondents, 66.7%). Lack of resources and infrastructure was reported by 80 respondents (53.3%). Half of the participants (75 respondents, 50%) cited insufficient managerial support, while 50 respondents (33.3%) indicated lack of knowledge or training. Sustainability not being a workplace priority was noted by 40 respondents (26.7%).

When asked about the forms of support that would help them engage more in sustainable practices, the majority emphasized the need for greater managerial support and engagement (110 respondents, 73.3%). Additional education and training were identified by 90 respondents (60.0%), while 85 respondents (56.7%) highlighted the importance of clear guidelines and protocols. Participation in organized initiatives or “green teams” was selected by 70 respondents (46.7%). Financial incentives or rewards were the least frequently chosen option, noted by 50 respondents (33.3%) (Table 4).

Table 4. Most frequently perceived barriers to implementing sustainable practices and proposed forms of support (N = 150)

Barriers (multiple answers possible)	n (%)	Support needed (multiple answers possible)	n (%)
Lack of time for additional activities	100 (66.7)	Greater managerial support and engagement	110 (73.3)
Lack of resources or infrastructure	80 (53.3)	Additional education and training	90 (60.0)
Insufficient managerial support	75 (50.0)	Clear guidelines and protocols	85 (56.7)
Lack of knowledge or training	50 (33.3)	Formation of “green teams”	70 (46.7)
Sustainability not a workplace priority	40 (26.7)	Financial incentives or rewards	50 (33.3)

Note: Values represent the number and percentage of respondents (N = 150) who selected each option. Multiple responses were possible; therefore, totals exceed 100%.

DISCUSSION

This study is among the first in Croatia to quantitatively examine sustainable practices in nursing. The findings provide valuable insights into the level of environmental awareness among nurses, the frequency of "green" activities, and the main barriers and support needs related to implementing sustainability in everyday practice.

High environmental awareness but moderate application of practices

Participants generally demonstrated relatively high environmental awareness and positive attitudes toward sustainability, which provides a good foundation for future interventions. However, sustainable practices were only moderately implemented: some behaviors (e.g., waste segregation) were well established, while others (e.g., participation in environmental initiatives) lagged behind. This pattern is consistent with the composite index score of 3.6/5, which reflects the broader set of surveyed behaviors beyond those listed in Table 2. This discrepancy between high awareness and moderate behavioral application has also been observed in international research.

Luque-Alcaraz et al. [9] reported that nurses display strong environmental awareness but tend to engage in sustainable practices more frequently in their private lives than in professional settings. Similarly, Yeboah [13], in a systematic review, highlighted a consistent gap between awareness and the actual implementation of sustainable activities among healthcare professionals.

These findings are further supported by Kırtıl et al. [14], who conducted a phenomenological study among operating room nurses in Turkey and found limited awareness of environmental sustainability and numerous barriers, including insufficient education and lack of institutional support. On the organizational level, Bobini et al. [15] showed that while 97% of Italian healthcare leaders recognize sustainability as a strategic priority, only 41% of organizations had formalized strategies, with most institutions acting in a fragmented way and lacking a systematic approach.

Taken together, these studies confirm that high levels of awareness, whether at the individual or institutional level, are not sufficient to ensure the consistent implementation of sustainable practices. Translating awareness into tangible change requires a systematic framework, well-defined policies, continuous education, and strong support from organizational leadership.

Education alone is insufficient motivation – organizational factors are more decisive

Although respondents reported relatively high environmental awareness, differences in the frequency of sustainable practices according to educational level were negligible. This finding is inconsistent with numerous international studies in which higher education levels are consistently associated with stronger environmental behavior. A possible explanation is that in the Croatian context organizational factors, such as managerial support and available infrastructure, exert greater influence on behavior than individual characteristics.

Attia et al. [16] found that "green competencies" and awareness were stronger predictors of sustainable practices than educational attainment. Similarly, Chung [17] emphasized that awareness of climate change strongly promotes sustainable practices, even in the absence of formal education. These findings support our result that organizational conditions are decisive for behavior, regardless of educational level.

Additional studies reinforce this interpretation. Sepetis et al. [18], in a study of 379 healthcare professionals from public and private sectors, showed that the main predictors of sustainable practices were organizational attitudes and behaviors, whereas individual characteristics, including education, had limited influence. The principal barriers identified were insufficient communication, lack of managerial support, and weak institutional awareness, indicating that meaningful change requires a transformation of organizational behavior.

Similarly, Shaban et al. [19], in a concept analysis of eco-conscious nursing, concluded that education and awareness are important prerequisites but that sustainable healthcare practices become feasible only when combined with institutional support, clear protocols, and infrastructure. The authors highlight that “eco-conscious nursing” must be systematically integrated into organizational culture and strategy if education and motivation are to translate into actual behavioral change.

These findings demonstrate that education alone, without parallel institutional support and organizational frameworks, is insufficient to ensure the consistent implementation of sustainable practices in the nursing profession.

Green Audits and Institutional Commitment

It is particularly notable that only a small proportion of participants reported the implementation of a “green” audit in their institution, suggesting that most workplaces still lack a formal assessment or sustainability strategy. Institutions that had conducted such an audit demonstrated higher levels of environmental awareness and more frequent adoption of sustainable practices. However, it remains unclear whether the audit itself triggered greater staff engagement or whether institutions with a more established culture of sustainability were more likely to introduce an audit, a typical ambiguity in cross-sectional studies.

Similar findings are reported by Badanta et al. [20], who showed that institutional strategies and formal protocols encourage sustainable staff behavior. Mills [21] emphasizes that removing workplace barriers and providing clear guidelines significantly facilitates the implementation of sustainable practices. Slutzman et al. [22], in a systematic review, noted that waste audits are a standard tool for measuring waste and shaping policies, but they also highlighted considerable methodological inconsistency and variable quality, which limit their impact on systemic change without standardized protocols and staff training. Furthermore, Khosravi et al. [23], in a systematic review, stressed that the adoption of green practices in healthcare institutions is influenced by a wide range of factors, including government regulations, financial incentives, technological capabilities, and resource constraints, with audits alone rarely acting as the main driver.

These findings support our conclusion that institutional commitment plays a crucial role, while also suggesting that audits can only be effective when integrated into a broader, system-supported strategy with clear protocols, adequate resources, and coordination across the entire system.

Predictors of Sustainable Practices: Environmental Awareness and Managerial Support

Multiple regression analysis showed that environmental awareness was the strongest individual predictor of sustainable practices, while perceived managerial support also played a significant role. In contrast, years of work experience and type of institution (public versus private sector) were not identified as significant factors, suggesting that barriers such as lack of time, resources, and organizational culture are fairly universal.

These results are consistent with the findings of Luque-Alcaraz et al., who emphasize the importance of team support and institutional leadership for the implementation of sustainability [9]. Attia et al. [16] similarly confirm that competencies and institutional support exert a stronger influence on behavior than demographic characteristics or sectoral differences. Comparable results were reported by Abou Hashish et al. [24] in a study conducted among nurse managers in Egypt, showing that knowledge management competencies play a pivotal role in the implementation of evidence-based practices, while organizational support had only a partial but still significant effect.

Taken together, this evidence indicates that the successful implementation of sustainable practices stems from a combination of professional competencies and a supportive institutional climate, while individual characteristics play only a secondary role.

Practical Implications

Key implications and recommendations for sustainable nursing practice are summarized in Table 5.

Table 5. Practical implications and recommendations for future research

Area	Recommendations
Education and training	Integrate sustainability principles into continuing education and nursing curricula; organize workshops focused on practical implementation steps.
Organizational support	Clearly communicate sustainability as an institutional priority; allocate time and provide infrastructure (e.g., recycling bins, materials, energy-efficient equipment).
Structures for change	Appoint "sustainability ambassadors" and establish multidisciplinary "green teams" to promote and coordinate sustainable initiatives.
Recognition and incentives	Develop systems for recognizing and rewarding successful sustainability initiatives at both departmental and individual levels.
Safety frameworks	Implement clear protocols on safe reuse and other environmentally responsible practices to minimize risks and address staff uncertainties.

Note: Recommendations are based on study findings and aligned with international guidelines for sustainable healthcare practices.

Limitations

The sample was convenient and may not be representative of the overall population of nurses in Croatia. The data were self-reported and therefore subject to social desirability bias, while the cross-sectional design prevents conclusions about causality. The questionnaire captured only a limited range of practices and barriers; additional aspects of sustainability warrant further investigation. For clarity, five illustrative behaviors were presented in Table 2, while the composite index (M = 3.6/5) was calculated from all eight items.

Recommendations for Future Research

Further studies with larger, more representative samples and longitudinal or experimental designs are needed. Qualitative research could provide deeper insights into specific barriers and facilitators. It would also be valuable to explore managerial perspectives and to evaluate the effects of pilot programs (e.g., educational modules, green teams) on staff behavior and environmental outcomes.

CONCLUSION

This study demonstrated that nurses in Croatia possess a strong ecological awareness and generally positive attitudes toward sustainability, yet face numerous organizational barriers that limit the consistent implementation of sustainable practices. Key challenges include lack of time, support, and resources, indicating that sustainability in healthcare depends not only on individual awareness but also on structural changes. Progress opportunities lie in a motivated core of staff who, with adequate education, clear guidelines, and managerial support, can act as drivers of change toward a greener healthcare system. Institutionalizing sustainability through formal policies, infrastructure, and leadership engagement, alongside professional education and recognition of sustainable initiatives, would enable nurses to translate awareness into concrete action. Supporting healthcare professionals in these efforts can significantly reduce the system's ecological footprint while safeguarding and improving population health.

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Author Contributions

Conceptualization, V.J.; Methodology, V.J.; Formal Analysis, V.J.; Investigation, V.J.; Data Curation, V.J.; Writing – Original Draft Preparation, V.J.; Writing – Review & Editing, V.J.; Visualization, V.J.; Supervision, V.J.

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The author declares no conflict of interest.

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Specific Stressors in Palliative Care: Prevalence and Association with Nurses' Life Satisfaction

Karolina Omašić[1], Sanja Bunčić-Gutić[2], Monika Barušić[3], Iva Dujić[4], Sanja Loinjak[5], Lucija Puškarić[4], Iva Vilček[6], Renata Apatić[7,8,9], Robert Lovrić[8]*

[1] Mobile Palliative Care Team, Health Centre Vukovar, Sajmište 1, Vukovar, 32000, Vukovar-Srijem County, Croatia, karolina.tutis@gmail.com

[2] Community Nursing Service, Health Centre of Osijek-Baranja County, Kralja Petra Krešimira IV 6, Osijek, 31000, Osijek-Baranja County, Croatia, patronazaosijek9@dzobz.hr

[3] Community Services Center "Klasje" Osijek, Ružina 32, Osijek, 31000, Osijek-Baranja County, Croatia, monikabarusic1@gmail.com

[4] Department of Internal Medicine, General County Hospital Vinkovci, Zvonarska 57; 32100 Vinkovci, 32100, Vukovar-Srijem County, Croatia, ivicaa.dujicc@gmail.com; lucija.puskaric@obvk.hr

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[5] Department of Maxillofacial and Oral Surgery, University Hospital Centre Osijek, Josipa Huttlera 4, Osijek, 31000, Osijek-Baranja County, Croatia, sanja.loinjak@kbco.hr

[6] Department of Traumatology and Orthopedics, General hospital Virovitica, Ljudevita Gaja 21, Virovitica, 33000, Viroviticko-podravska county, Croatia, vilcekiva1@gmail.com

[7] Medical School Osijek, Vukovarska 209, Osijek, 31000, Osijek-Baranja County, Croatia, apatic.renata@gmail.com

[8] Nursing Institute "Prof. Radivoje Radić" and Department of Nursing and Palliative Medicine, Faculty of Dental Medicine and Health, J. J. Strossmayer University in Osijek, Crkvena 21, Osijek, 31000, Osijek-Baranja County, Croatia, rlovric@fdmz.hr

[9] Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia

***Corresponding author:** rlovric@fdmz.hr.; +385912000973

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Abstract

Introduction: Palliative care is one of the most demanding areas of healthcare practice, where nurses are exposed to specific stressors that can affect their quality of life. The study aimed to determine the prevalence of these stressors, examine differences according to gender, educational level, and workplace setting, and explore their association with nurses' life satisfaction.

Methods: A cross-sectional study was conducted on a sample of 115 nurses employed in 35 healthcare institutions providing palliative care in Croatia. Two validated instruments were used: the Palliative Care Stress Scale and the Life Satisfaction Scale.

Results: The most frequent stressor was the inability to alleviate the pain and suffering of patients or their families ($\bar{x}$ = 2.98), while refusal of care was the least frequent ($\bar{x}$ = 2.62). No significant differences were found in the prevalence of stressors by gender or education ($P>0.05$), nor by workplace setting ($P=0.740$). The occurrence of stressors related to lack of skills was associated with length of service ($\rho = -0.307$; $P<0.001$), whereas other stressors were not associated with age or years of service. The overall level of life satisfaction was 3.85 (situational 4.01, global 3.82). The prevalence of stressors was not associated with life satisfaction ($\rho = 0.033$; $P=0.726$).

Conclusion: Organisational and personal resources are crucial for maintaining nurses' well-being and quality of life in palliative care. Systematic support measures, supervision, and strengthening of the ethical climate are required to enhance staff well-being and the quality of care provided.

INTRODUCTION

Palliative care occupies an increasingly important place within healthcare systems worldwide, driven by the growing number of patients with chronic, progressive, and terminal illnesses. Demographic trends, including population ageing and the rise of chronic non-communicable diseases, contribute to an expanding need for a palliative approach that aims to alleviate suffering, preserve dignity, and provide support to patients and their families [1]. Nurses are at the heart of palliative care, performing a multifaceted role that extends beyond clinical duties to include emotional, communicative, and educational responsibilities. This multidimensional nature of their work renders the nursing profession particularly susceptible to stress. Numerous authors emphasise that palliative care is among the most demanding areas of nursing practice, as it entails constant confrontation with death, existential questions, and complex family dynamics [2, 3].

Stress in the nursing profession arises from a wide range of sources. At the organisational level, it includes staff shortages, high workload, insufficient resources, and unclear professional roles. At the interpersonal level, it encompasses conflicts with colleagues, communication barriers, and challenging interactions with patients' families. On a personal level, stress may stem from moral dilemmas, feelings of helplessness, and continuous emotional involvement in the care of dying patients [4]. Prolonged exposure to these factors is associated with an increased risk of burnout, reduced quality of life, and lower satisfaction with both work and life in general [5]. These adverse effects extend beyond healthcare professionals themselves, influencing the quality and safety of care, as staff exhaustion has been shown to increase the risk of errors and reduce patient satisfaction [6, 7].

The literature highlights that the impact of stress on well-being is not uniform but depends on the complex interaction between demands and resources. According to the Job Demands–Resources (JD-R) theory, stressors lead to exhaustion only when available resources, such as team support, autonomy, and professional supervision, are insufficient to buffer their effects [8]. Research confirms that the presence of such resources can moderate the relationship between work demands and subjective well-being [9, 10]. In the context of palliative care, where emotional demands are inevitable, the availability of resources becomes crucial for maintaining professional resilience.

The specificity of palliative care is also reflected in the phenomena of moral distress and secondary traumatic exposure. Moral distress occurs when a nurse knows the right course of action but is prevented from acting accordingly by institutional constraints or family pressures. Numerous studies indicate that moral distress can have serious consequences for emotional well-being and long-term professional sustainability [11, 12]. Secondary traumatic exposure, in turn, results from empathic engagement with patients' and families' suffering, and prolonged exposure can lead to symptoms resembling post-traumatic stress disorder [13]. These specific dimensions make stress in palliative care more complex than in most other healthcare settings.

Quality of life and life satisfaction represent key indicators of healthcare workers' psychological well-being. Life satisfaction is defined as a cognitive evaluation of one's life circumstances, reflecting the overall balance between expectations and actual conditions [14, 15]. Empirical research across various healthcare environments consistently demonstrates that high levels of stress are associated with lower assessments of quality of life and satisfaction [16, 17]. However, the relationship between specific stressors in palliative care and life satisfaction remains only partially explored, particularly in countries with less developed palliative care systems.

In the Croatian context, only a limited number of studies are available. One study indicated that job demands, control levels, and social support predict job satisfaction and burnout among nurses in palliative care [18]. Another study found that providing palliative care increases professional stress and is associated with poorer mental health [19]. However, specific stressors and their relationship with life satisfaction in this context have not yet been systematically examined, justifying the need for further research.

Accordingly, the aim of this study was to investigate the prevalence of specific stressors among nurses working in palliative care and their relationship with life satisfaction. The study sought to determine: a) whether differences exist in the prevalence of stressors according to gender, educational level, and workplace setting; b) whether age and length of service are associated with the prevalence of stressors; and c) whether the prevalence of stressors is associated with the level of life satisfaction.

METHODS

Study design

A cross-sectional study was conducted across 35 healthcare institutions in the Republic of Croatia that provide palliative care.

Setting and sample

The study included 115 nurses employed in hospitals, primary healthcare centres, and palliative care institutions across Croatia. The inclusion criteria were permanent employment in a palliative care institution and voluntary participation. The sample size exceeded the statistical minimum calculated using G*Power software (version 3.1), ensuring adequate statistical power for the applied tests [20].

Measurements/instruments

Data were collected using a structured questionnaire consisting of two parts. The first part included sociodemographic data: age, gender, education, workplace, length of service, and type of institution. The second part comprised two validated scales.

The first instrument was the Palliative Care Stress Scale [21], which measures six stress factors in nursing practice. The scale contains 29 items rated on a four-point Likert scale (1 = do not feel stressed to 4 = always feel stressed). Written permission for the instrument use was obtained from the author.

The second instrument was the Life Satisfaction Scale [22, 23], consisting of 20 items divided into two subscales (global and situational satisfaction). Items are rated on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree). Higher scores indicate higher levels of life satisfaction. The scale is publicly available for research use.

Internal consistency of the instruments in this study was assessed using Cronbach’s alpha coefficient. The stress scale demonstrated an overall $\alpha = 0.94$ (range for individual factors: 0.82–0.91), and the life satisfaction scale $\alpha = 0.93$ (global satisfaction $\alpha = 0.92$, situational satisfaction $\alpha = 0.82$). All coefficients indicate high reliability.

Data collection/procedure

Data were collected over two months using an online questionnaire created with Alchemer software [24]. The questionnaire included basic study information, instructions for participants, and all scale items. A link to the online form was distributed via email. Once participants completed and confirmed the questionnaire, responses were automatically stored on a secure and anonymous server managed by the research team. The online format reduced potential risks for participants and ensured multiple levels of confidentiality [25].

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki. Participants were informed about the study aims, and completion of the questionnaire implied informed consent. Anonymity and confidentiality of all data were fully guaranteed. As this was an anonymous survey among healthcare professionals without the collection of personal or sensitive data, formal approval from an ethics committee was not required.

Statistical data analysis

Data were analysed using R software, version 4.0.4 (R Foundation for Statistical Computing, Vienna, Austria) [25]. Descriptive statistics included measures of central tendency and dispersion (mean, standard deviation, median, minimum, and maximum), while categorical variables were presented as absolute and relative frequencies. The Mann–Whitney U test was used to compare two groups, and the Kruskal–Wallis test was used for three or more groups. Spearman’s correlation coefficient was applied to examine associations between variables. The reliability of instruments was assessed using Cronbach’s alpha with a 95% confidence interval. Statistical significance was set at *P*<0.05.

RESULTS

A total of 115 nurses and nursing technicians working in palliative care participated in the study, with a significantly higher proportion of women, 95 (83.5%) of them (*P*<0.001). Participants ranged in age from 21 to 68 years. The mean length of work experience in palliative care was 6.60 years (SD = 7.95), with a range from 0 to 41 years. The largest group of participants, 24 (20.9%), worked as palliative care coordinators (*P*<0.001) (Table 1).

Table 1. Characteristics of participants (N = 115)

Characteristic		n (%)	*P**
Gender			
	Male	19 (16.5)	<0.001
	Female	96 (83.5)	
Educational level			
	Secondary education	34 (29.6)	
	Undergraduate degree	50 (43.5)	0.066
	Graduate degree	31 (27.0)	
Workplace setting in palliative care			
	Palliative care coordinator	24 (20.9)	
	Mobile palliative care team	15 (13.0)	
	Palliative care institution	1 (0.9)	
	Hospital palliative care team	4 (3.5)	
	Day hospital	2 (1.7)	<0.001
	Palliative care outpatient clinic	0 (0.0)	
	Ward with palliative beds	15 (13.0)	
	Palliative care ward	25 (21.7)	
	Other wards/medical departments	29 (25.2)	

Analysis showed that participants were most frequently exposed to stress caused by the inability to alleviate the physical and emotional pain of patients and their families ($\bar{x}$ = 2.98, SD = 0.22), and least frequently to stress caused by refusal of care by the patient or family ($\bar{x}$ = 2.62, SD = 0.26). The overall mean level of stress on a scale from 1 to 4 was 2.86 (SD = 0.86) (Table 2).

Table 2. Prevalence of stress factors among nurses working in palliative care (N = 115)

Subscales / Stress factors	Mean (SD)	Range
1. Differences in perspectives among team members	2.86 (0.19)	(1 - 4)
2. Inability to alleviate the physical and emotional pain of patients and families	2.98 (0.22)	(1 - 4)
3. Refusal of care by patients or families	2.62 (0.26)	(1 - 4)
4. Lack of skills among nurses and/or the entire team	2.77 (0.07	(1 - 4)
5. Inadequate work management system	2.93 (0.07)	(1 - 4)
6. Confronting patients whose lives are at risk	2.89 (0.06)	(1 - 4)
Total	2.86 (0.86)	(1 - 4)

The Mann–Whitney U and Kruskal–Wallis tests showed no statistically significant differences in the prevalence of specific stress factors with respect to gender or educational level, either for individual subscales or for the total stress score (Table 3).

Table 3. Differences in the prevalence of specific stressors according to gender and educational level

Stress factors (range)	Gender Median (IQR)	*P**	Educational level Median (IQR)	*P*†
Differences in perspectives among team members (25–27)	M: 25 (23–27) F: 27 (22–31)	0,149	Secondary: 27 (23–30) Undergr.: 26,5 (22–30) Graduate: 27 (21–30,5)	0,764
Inability to alleviate the physical and emotional pain of patients and families (18–23)	M: 19 (17–22) F: 21,5 (18–24,5)	0,090	Secondary: 22 (19–25) Undergr.: 21,5 (18–24) Graduate: 19,5 (17–23,5)	0,345
Refusal of care by patients or families (9–13)	M: 9 (8–11,5) F: 11 (8–13)	0,241	Secondary: 12 (9–14) Undergr.: 9 (8–13) Graduate: 11 (8–12)	0,167
Lack of skills among nurses and/or the team (7–9)	M: 7 (6–9) F: 9 (7–10)	0,056	Secondary: 9 (7–11) Undergr.: 8 (7–9) Graduate: 8 (6,5–9)	0,330
Inadequate work management system (10–12)	M: 12 (11,5–12) F: 12 (10–14)	0,514	Secondary: 12 (12–14) Undergr.: 12 (11–14) Graduate: 12 (8,5–12)	0,077
Confronting patients whose lives are at risk (6–7)	M: 6 (5,5–7) F: 6 (4–7)	0,758	Secondary: 6,5 (6–7) Undergr.: 6 (4–7) Graduate: 6 (4–6,5)	0,062
Total (79–87)	M: 81 (70,5–86) F: 86 (75,5–95)	0,095	Secondary: 88 (80–96) Undergr.: 84,5 (75–92) Graduate: 79 (71–90,5)	0,125

Note: *Mann-Whitney U / Wilcoxon test; †Kruskal-Wallis test; M = Male; F = Female; IQR = Interquartile range.

Similarly, the Kruskal–Wallis test revealed no statistically significant differences in the prevalence of specific stress factors across different workplace settings within palliative care, for either individual subscales or the overall stress level (P=0.740). The medians of total stress levels are presented in Figure 1.

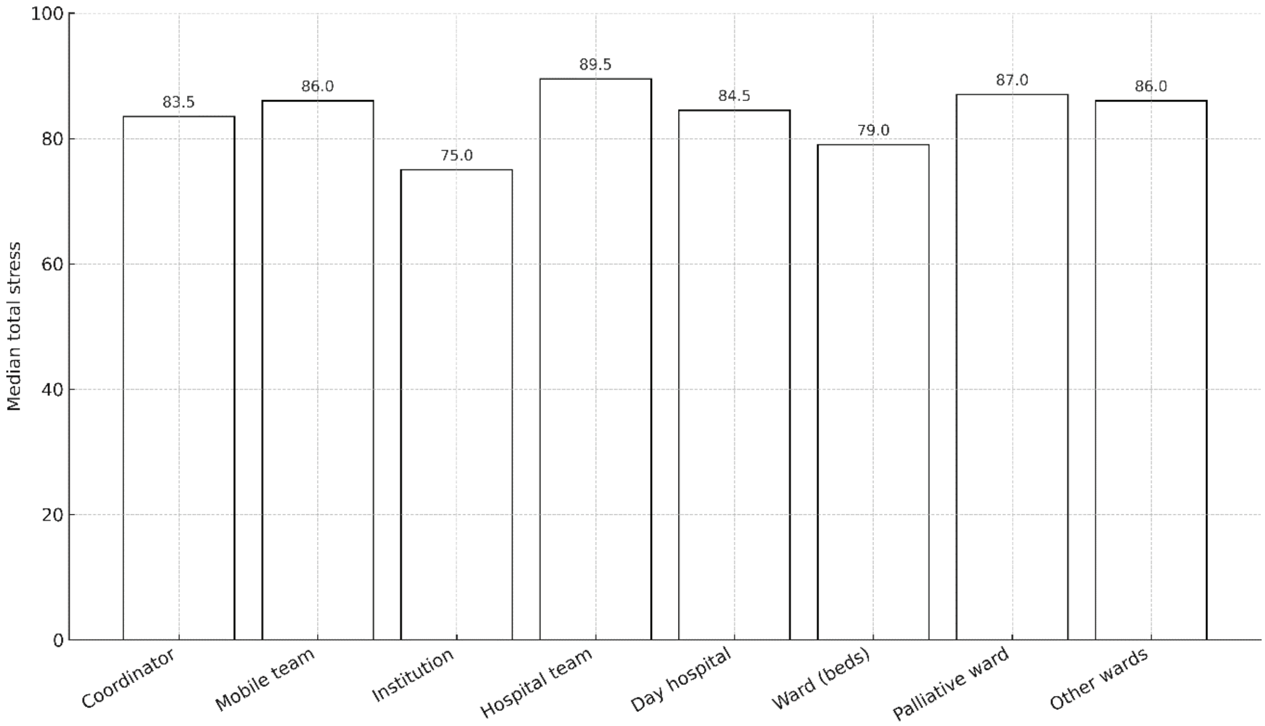

Figure 1. Median total stress among nurses across workplace settings in palliative care.

Spearman's correlation analysis indicated a significant negative association between stress among nurses and/or the entire team due to lack of skills and length of work experience (ρ = −0.307, *P*<0.001) (Table 4). In other words, participants with shorter work experience in palliative care reported higher stress related to insufficient personal and team skills. For all other stress factors, as well as for the total stress scale, no significant associations were found with age or length of service.

Table 4. Correlation between specific stress factors and age and length of service

Subscales / Stress factors	**Age**		**Length of service**	
	ρ*	***P* value**	**ρ***	***P* value**
1. Differences in perspectives among team members	- 0.143	0.129	- 0.163	0.083
2. Inability to alleviate the physical and emotional pain of patients and families	- 0.013	0.881	- 0.068	0.475
3. Refusal of care by patients or families	- 0.072	0.446	- 0.046	0.624
4. Lack of skills among nurses and/or the entire team	- 0.162	0.084	- 0.307	< 0.001
5. Inadequate work management system	- 0.136	0.148	- 0.086	0.363
6. Confronting patients whose lives are at risk	- 0.105	0.263	- 0.010	0.914
Total	- 0.131	0.164	0.152	0.107

Note: ρ – Spearman's correlation coefficient.

According to the subscales of the questionnaire, situational life satisfaction was higher ($\bar{x}$ = 4.01, SD = 0.03) than global life satisfaction ($\bar{x}$ = 3.82, SD = 0.25). The mean overall life satisfaction score was 3.85 (SD = 0.88) (Figure 2).

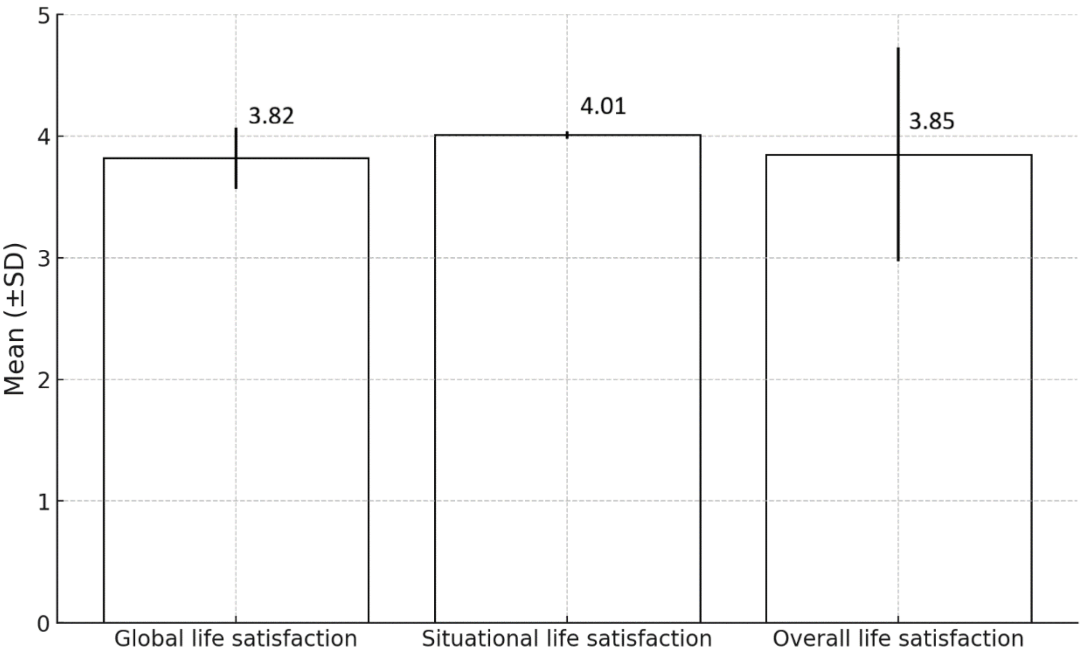

Figure 2. Levels of life satisfaction according to the subscales of the questionnaire.

Spearman's correlation analysis did not show any statistically significant associations between specific stress factors and levels of life satisfaction (global or situational), nor between overall stress and overall life satisfaction ($\rho = 0.033$, *P*=0.726) (Figure 3). These results suggest that participants' subjective perception of stress was not directly related to their self-assessed life satisfaction.

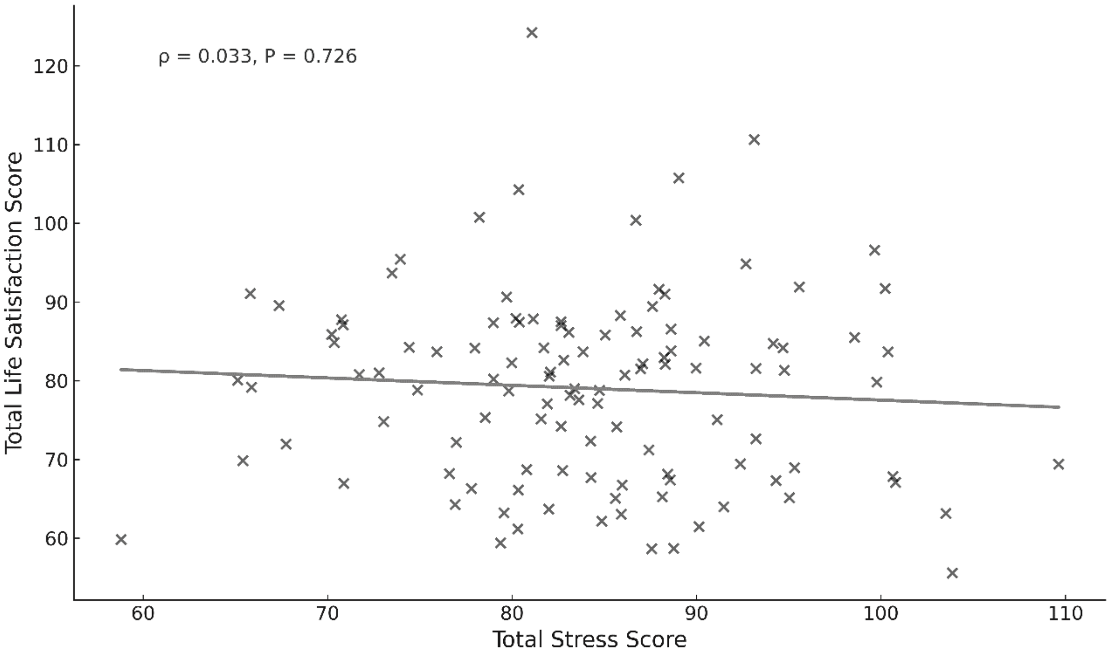

Figure 3. Correlation between total stress level and life satisfaction among nurses working in palliative care.

DISCUSSION

The purpose of this study was to gain a deeper understanding of specific stress factors among nurses working in palliative care and to examine their associations with sociodemographic characteristics and life satisfaction. The obtained results provide valuable insight into the complexity of stress demands in this field and enable comparison with findings from previous international research, as well as a critical appraisal of the specific Croatian context.

The analysis of sociodemographic characteristics in this study showed a predominance of women. This result reflects the overall gender distribution in the nursing profession in Croatia, where women represent almost 90% of the workforce [26]. Despite the high representation of women, further analyses revealed no significant gender differences in the prevalence of stress. This result aligns with the literature indicating that gender is not a key predictor of stress perception in palliative care, as emotional and ethical demands in this setting are universal and transcend individual differences [4, 11]. Nonetheless, some studies have reported that female nurses more often experience higher levels of emotional exhaustion, while male nurses tend to display greater emotional distance from patients [27, 28]. The present results suggest that such patterns are not pronounced in the Croatian context, possibly reflecting a homogenising effect of the palliative work environment, where professional demands outweigh gender-related differences.

Although higher education could be expected to contribute to a stronger sense of competence and confidence, the results indicate that formal qualifications alone were not a significant factor. According to the Job Demands–Resources (JD-R) theory, stress arises when job demands exceed available resources [4]. In other words, holding a degree does not necessarily ensure access to adequate team support, supervision, or organisational fairness, which is confirmed in this study. Similar results have been reported in studies from the Netherlands and Sweden, where education did not protect against burnout when organisational resources were insufficient [8, 10]. This underscores the importance of a structured work environment that enables the transfer of knowledge into practice, as even highly educated professionals remain vulnerable to stress in the absence of such conditions.

The distribution of participants across different palliative care settings also showed no significant differences in the prevalence of specific stressors. The results suggest that the key stressors of palliative care are present regardless of context. This finding supports the notion that the nature of the work itself, such as continuous exposure to suffering, end of life situations, and ethical dilemmas, constitutes a unique experience. Previous research confirms that the quality of organisational climate and moral support, rather than ward type or team structure, determines differences in perceived stress [29–31]. These findings confirm that organizational resources, rather than specific workplace settings, are crucial for minimizing stressors and preserving staff well-being. In other words, palliative care inherently creates a demanding emotional and ethical environment, and differences between institutional and community-based contexts become secondary to the core nature of the work. It also raises the question of whether future interventions should be universally designed for palliative practice rather than tailored to individual workplaces.

When analysing the occurrence of specific stressors, the most striking finding was that nurses most intensely experienced stress arising from the inability to alleviate the physical and emotional pain of patients and their families. This finding accentuates the emotional essence of palliative work and confirms that confronting suffering and death represents the deepest challenge in nursing within this field [11, 13]. This type of stressor cannot be eliminated, as it stems from the very nature of the work; however, this underlines the importance of emotional support and supervision programs. Results from international studies also confirmed the domination of this stressor. For example, research in Japan and the United Kingdom indicated that the inability to relieve suffering most often leads to moral distress and feelings of helplessness [2, 21]. This result confirms that it is a universal feature of palliative work, further justifying the development of psychological support as an essential standard of practice.

The next most frequent stressor was related to inadequate management systems and differing perspectives among team members, further demonstrating that organisational factors have an equally strong impact as emotional demands. Team conflicts and unclear leadership structures often exacerbate the already challenging circumstances of palliative care, and the literature consistently confirms that such conditions increase the risk of burnout and compromise the quality of care [2, 4, 30, 31]. Conversely, refusal of care by patients or families was reported as the least frequent stressor. However, its clinical relevance should not be underestimated. Although less common, such situations raise complex ethical questions and may trigger moral distress [12]. The lower frequency of this stressor in this sample may reflect the characteristics of the Croatian healthcare system and cultural patterns, where patients and families less often decline interventions. Yet even in rare cases, the potential emotional and ethical burden on staff may be comparable to that of more frequent stressors, highlighting the need for additional training and preparation of staff.

An interesting finding of this study concerns the relationship between length of service and stress related to lack of skills. Participants with shorter work experience more frequently reported this stressor and expressed higher levels of burden associated with feelings of inadequate competence, underscoring the importance of experiential learning and gradual development of professional confidence. Previous studies show that younger nurses, although formally educated, often feel insecure when facing complex clinical and ethical situations, and that systematic mentorship and supervision can mitigate this type of stress [27, 28, 32]. More experienced nurses have likely developed a broader range of coping strategies; however, it is crucial to note that length of service was not associated with other stressors. This finding indicate that even senior staff remain vulnerable, especially when resources are lacking, supporting the JD-R model and research showing that experience alone does not protect against exhaustion [4, 8, 32]. This finding is especially significant as it demonstrates that professional resilience is not a one-way, static function of experience but a dynamic process dependent on the continuous availability of support and resources. This result highlights the need for ongoing education and supervision for experienced staff as well as for those with less experience.

The lack of association between specific stressors and life satisfaction found in this study may seem surprising given the expected link between stress and overall well-being. However, life satisfaction differs conceptually from job satisfaction and emotional exhaustion, as it reflects a global and relatively stable assessment of one's life circumstances [14, 15]. Therefore, short-term or specific work-related stressors may not directly affect this broader life dimension but rather exert their influence through mediating variables such as job satisfaction or mental health. Research indicates that occupational stress more strongly affects work-related outcomes (for example, job satisfaction, burnout) than global life satisfaction, which is more stable [16, 33]. Thus, the absence of an association in our study is consistent with theoretical expectations. This finding can also be interpreted as evidence of professional resilience. Despite being exposed to stressors, nurses maintain stable global evaluations of life satisfaction, possibly due to social support and personal coping strategies not captured in this study.

This study represents one of the few investigations in the Croatian context to systematically examine specific stressors in palliative care and their immediate connections with quality of life and staff well-being. In doing so, this research enriches existing knowledge and provides a foundation for more precise design of interventions within the national healthcare system.

Limitations

Several limitations should be considered when interpreting the results. The cross-sectional design does not allow conclusions about causal relationships, and the use of self-report instruments is subject to various biases, including social desirability bias [34]. Although the sample size was sufficient for the conducted analyses, the distribution within certain subgroups (e.g., across specific work settings) was uneven, which may have limited the power to detect potential differences. Furthermore, the measure of life satisfaction used in this study represents a global construct and may not be sensitive enough to detect subtle effects of specific occupational stressors. Therefore, future studies could benefit from combining measures of job satisfaction, moral distress, and burnout [12, 35].

Implications and recommendations for future research

Practical and educational implications clearly arise from the present results. Organisational resources and leadership style proved crucial for maintaining staff well-being. The systematic introduction and maintenance of clinical supervision, regular team reflection, fair workload distribution, and clearly defined protocols represent key measures to reduce strain and prevent burnout in palliative care [2, 6, 30]. In addition, developing leadership competencies focused on staff support and inclusion can contribute to greater engagement and improved quality of palliative care.

The importance of early professional development should also be emphasised. The results indicate that younger nurses and those with shorter work experience in palliative care more frequently experience stress related to perceived lack of skills. Therefore, it is essential to develop structured mentorship and training programmes focusing on clinical and communication skills, decision-making in end-of-life situations, and emotional regulation. Such initiatives directly address this stressor and foster professional resilience [4, 8, 32].

It is also vital to address the ethical dimension of care. Strengthening the ethical climate through transparent processes and accessible ethics consultation, together with specific programmes aimed at recognising and managing moral distress, represents a necessary strategy given the strong relationship between ethical climate, moral distress, staff well-being, and quality of life [30, 12, 33]. Furthermore, it is advisable to systematically assess staff well-being, including burnout, engagement, job satisfaction, and moral distress, alongside care outcomes such as safety, satisfaction, and quality, as the literature consistently confirms that staff well-being and patient outcomes are inextricably linked [2, 7].

Recommendations for future research include longitudinal designs that would allow the exploration of causal relationships between job demands, available resources, and staff quality of life [34], as well as studies that simultaneously consider individual, team, and organisational factors. It would be particularly valuable to include measures of job satisfaction, moral distress, and burnout, as these outcomes are more sensitive to changes in the palliative work environment than global life satisfaction [12, 35]. In addition to quantitative approaches, qualitative research could provide deeper insight into subjective experiences of suffering, meaning, and team dynamics in palliative care, thereby contributing to a more comprehensive understanding and more effective development of interventions [36].

CONCLUSIONS

This study showed that nurses working in palliative care are primarily exposed to stress arising from the inability to alleviate the physical and emotional pain of patients and their families. In contrast, refusal of care by patients and families was the least pronounced stressor. The results also indicated that gender, education, and workplace setting do not significantly influence the prevalence of stressors, supporting the notion that the demands of palliative care are universal. The association between length of service and perceived lack of skills confirms the importance of experiential learning and structured support for less experienced nurses. Contrary to expectations, no significant association was found between specific stressors and global life satisfaction, suggesting that work-related stressors are more likely to affect domain-specific outcomes such as job satisfaction or burnout rather than broader assessments of life quality.

These results emphasise the need to strengthen organisational resources, provide systematic education and mentorship for junior staff, and develop an ethical climate capable of mitigating moral distress. The study contributes to understanding the specific challenges of the Croatian palliative care context and the development of interventions aimed at preserving staff well-being and improving the quality of care. Future research should apply longitudinal and multilevel approaches, combining quantitative and qualitative methods, to gain a deeper understanding of the relationships between stressors, resources, and well-being outcomes in palliative care.

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Author Contributions

Conceptualization, K.O. and R.L.; Methodology, K.O., R.L., S.B.G., I.D., S.L., I.V., and R.A.; Software, I.D., S.L. and L.P.; Validation, K.O., M.B., and S.L.; Formal Analysis, M.B., L.P., I.V., and R.A.; Investigation, K.O., I.V., and R.L.; Resources, S.B.G., M.B., and I.D.; Data Curation, K.O., and R.L.; Writing – Original Draft Preparation, K.O., R.L., S.B.G., M.B., I.D., S.L., L.P., I.V., R.A.; Writing – Review & Editing, K.O., R.L., S.B.G., M.B., I.D., S.L., L.P., I.V., R.A.; Visualization, K.O., S.L., R.A., and I.D.; Supervision, R.L., and S.B.G.; Project Administration, L.P., and R.L.; Funding Acquisition, K.O., and R.L.

Declaration of Conflicting Interest:

The author declares no conflict of interest.

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Different Faces of Preoperative Fear: Insights from Cardiac Surgery Patients

Preoperative Fear in Patients Undergoing Cardiac Surgery

Antun Kraljević[1], Stana Pačarić[1,2], Željko Mudri[3,4]*, Jasenka Vujanić[2], Marija Barišić[3,5], Suzana Luketić[1,3], Nikolina Farčić[1,3]

[1] University Hospital Centre Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia, antun.kraljevic@kbco.hr; suzana.luketic@fdmz.hr

[2] Nursing Institute “Professor Radivoje Radić”, Faculty of Dental Medicine and Health Osijek, Josip Juraj Strossmayer University of Osijek, Car Hadrijan Street 10e, Osijek, 31000, Osijek-Baranja County, Croatia, spacaric@fdmz.hr; jvujanic@fdmz.hr

[3] Department of Nursing and Palliative Medicine, Faculty of Dental Medicine and Health Osijek, Josip Juraj Strossmayer University of Osijek, Crkvena Street 21, Osijek, 31000, Osijek-Baranja County, Croatia, zmudri@fdmz.hr; mbarisic@fdmz.hr; ibarac@fdmz.hr; nfarcic@fdmz.hr

[4] Department of Sociology, Croatian Catholic University, Ilica Street 242, Zagreb, 10 000, Croatia

[5] Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia

***Corresponding author:** zmudri@fdmz.hr, +385 91 180 15 22

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Abstract

Introduction: Surgical fear refers to the emotional response experienced by patients while preparing for a surgical procedure. The aim of this study was to assess the level of preoperative fear among cardiac surgery patients and to explore its relationship with age, gender, risk factors for chronic diseases, and type of surgery.

Methods: This cross-sectional study was conducted between January and April 2025 at the Department of Cardiac Surgery, Osijek Clinical Hospital Center. A total of 87 patients aged 30 to 75 years, scheduled for elective cardiac surgery (coronary artery bypass grafting, valvuloplasty, or correction of heart defects), were included. Data were collected using the validated Croatian version of the Surgical Fear Questionnaire (CRO-SFQ), which measures short-term and long-term fear of surgery, as well as a questionnaire covering sociodemographic and clinical variables. Statistical analyses included descriptive methods and non-parametric tests (Mann–Whitney, Kruskal–Wallis, and Wilcoxon Signed-Rank tests), with the level of significance set at $P<0.05$.

Results: The median overall surgical fear score was 36 (IQR 23–42). Women reported significantly higher levels of fear compared with men ($P=0.01$). Higher fear scores were also observed among patients undergoing heart valve replacement or reconstruction compared with those undergoing coronary artery bypass grafting ($P=0.04$). No statistically significant differences in fear levels were found in relation to the presence of chronic disease risk factors.

Conclusion: Surgical fear is prevalent among most cardiac surgery patients, with higher levels observed in women and in those undergoing more complex procedures. Integrating systematic preoperative interventions, including patient education and psychological support, into clinical practice may help reduce the emotional burden associated with surgery.

INTRODUCTION

Fear experienced by patients preparing for surgery is a well-recognized emotional state [1]. Surgical fear refers to the emotional response that patients experience while preparing for a surgical procedure, with a reported prevalence of approximately 60 to 80 percent in various populations [2]. It represents a significant burden for patients, healthcare professionals, and the entire healthcare system [3, 4]. Higher levels of preoperative fear are associated with a range of adverse outcomes, including an increased need for anesthetics and analgesics, prolonged recovery from anesthesia, and delayed overall postoperative recovery [2].

In some patients, fear of surgery also includes fear of anesthesia [5]. Other factors that may influence the level of fear before surgery include the type of planned procedure, the time remaining until surgery, previous surgical experiences, the amount of preoperative information provided, and the patient's age and gender [6, 7, 8].

Results from a study examining fear and anxiety in patients undergoing coronary artery bypass grafting indicate that the greatest fear occurs during the waiting period before surgery [8]. Preoperative assessment of surgical fear provides valuable information for improving preoperative care and postoperative recovery, and it represents the first step in planning targeted interventions. Early identification of patients with high levels of preoperative fear, followed by the implementation of targeted strategies such as education, psychological support, and non-pharmacological techniques, can improve postoperative outcomes, shorten hospital stays, and reduce the need for additional medical interventions [2].

A review of 17 systematic reviews including 188 controlled trials and 16,884 participants suggests that preoperative fear and anxiety can be effectively reduced by non-pharmacological interventions provided by nurses [9]. Interventions such as patient education, audiovisual materials, empathic and patient-centered approaches, massage, and music therapy have been shown to reduce preoperative fear with a low risk of adverse effects [9].

Patients undergoing cardiac surgery face numerous preoperative challenges due to the complexity of the procedure, the high prevalence of comorbidities, and the increased vulnerability of this population [10, 11]. These patients are mostly older adults with reduced cardiovascular reserve and multiple comorbid conditions, which significantly increase the risk of perioperative complications and major adverse cardiac events [10–12]. Guidelines from the Society of Cardiology for Enhanced Recovery After Cardiac Surgery (ERAS), the International Society of Cardiology, and the Society of Thoracic Surgeons (STS) emphasize the need for systematic and comprehensive preoperative evaluation to optimize perioperative outcomes [12]. In this context, the assessment of preoperative fear and anxiety is crucial because these conditions are associated with higher perioperative mortality and morbidity and with prolonged recovery [10–14]. Mood changes, anxiety, depression, and fear in the preoperative period can negatively affect recovery after surgery and trigger an unfavorable neuroendocrine response in the postoperative period [15–19]. Among cardiac surgery patients awaiting surgery, fear of the unknown and insufficient information about the planned procedure are key contributors to high preoperative anxiety [8, 13].

No previous study in Croatia has assessed preoperative fear among patients awaiting elective cardiac surgery. Therefore, the aim of this study was to assess the level of preoperative fear among cardiac surgery patients and to examine its relationship with gender, age, risk factors for chronic diseases, and type of surgery

.

METHODS

Study design

A cross-sectional study was conducted.

Setting and samples

The study was conducted at the Osijek Clinical Hospital Center between January and April 2025. Participants were patients admitted to the Department of Cardiac Surgery of the Osijek Clinical Hospital Center 24 hours before an elective procedure.

The inclusion criteria were as follows: patients aged 30 to 75 years scheduled for elective coronary artery bypass grafting (CABG), heart valve replacement (aortic valve replacement, mitral valve replacement), or correction of heart defects, and patients who could speak and read Croatian.

The exclusion criteria were: emergency patients, patients undergoing palliative revascularization, patients younger than 30 or older than 75 years, those with a life expectancy of less than one year, those with cognitive or mental disorders, and patients unable to communicate in Croatian.

A total of 100 questionnaires were distributed. Ten patients declined to participate, and three questionnaires were incomplete. Therefore, 87 patients met the study criteria. No control group was used.

Measurements and instruments

The research instrument consisted of the validated Croatian version of the Surgical Fear Questionnaire (CRO-SFQ) and a questionnaire on general and sociodemographic characteristics of the patients. The validation of the Croatian version of the Surgical Fear Questionnaire among adult patients scheduled for elective surgery was conducted by Karačić et al. [20]. Permission to use this version of the questionnaire for the present study was obtained from the author.

The original questionnaire was developed in the Netherlands to assess fear levels in adult patients awaiting elective surgery [21]. It consists of eight items. A score of 0 indicates “not afraid at all,” while a score of 10 indicates “very afraid.” The questionnaire includes two subscales: one refers to fear of short-term consequences of surgery (SFQ-s), and the other to fear of long-term consequences (SFQ-l). Items 1 to 4 belong to the SFQ-s, and items 5 to 8 belong to the SFQ-l.

The reliability of the Croatian version, as reported by Karačić et al. [20], was 0.79 for the SFQ-s, 0.84 for the SFQ-l, and 0.81 for the total score. The total level of surgical fear is obtained by summing the scores on both subscales. The total score ranges from 0 to 80, while each subscale ranges from 0 to 40. A higher score indicates a higher level of surgical fear [20].

The second part of the questionnaire included sociodemographic data such as gender, age, marital status, education level, and employment status. The section on clinical variables included the presence of comorbidities, risk factors, and the type of surgical procedure.

Data collection and procedure

Data were collected by means of a survey conducted after admission, that is, 24 hours before surgery. Patients participated voluntarily after receiving detailed information about the study topic and objectives. The survey took approximately 10 to 15 minutes to complete. After providing oral and written informed consent, patients completed the questionnaire at their own pace, and the forms were collected by medical staff during the evening rounds. Questionnaires with incomplete responses were excluded from the analysis. The data were accessible only to the lead researcher.

Ethical considerations

The study was approved by the Ethics Committee of the Clinical Hospital Center Osijek (approval number: R1-14818-4/2024). All participants provided informed consent before inclusion in the study. The research was conducted in accordance with the Declaration of Helsinki. Data collection and storage followed ethical standards and principles of human rights protection in biomedical research.

Statistical data analysis

Descriptive statistical methods were used to describe the frequency distribution of the investigated variables. The Shapiro–Wilk test was used to assess the normality of numerical variables (fear of short-term and long-term consequences of surgery and overall surgical fear), and it showed significant deviation from normality for all variables ($P<0.05$).

Non-parametric statistical tests were therefore used in further analyses, and mean values were expressed as median and interquartile range. The Kruskal–Wallis test was used to assess differences between multiple independent variables, while the Mann–Whitney test was applied to examine differences between two independent variables. The Wilcoxon Signed-Rank test was used to assess differences between two dependent variables. The level of statistical significance was set at P<0.05. Data were processed using JASP software, version 0.19.3 (Department of Psychological Methods, University of Amsterdam, Amsterdam, The Netherlands).

RESULTS

The study included 87 patients who underwent surgery at the Department of Cardiac Surgery. The majority were male, 67 (77.0%), had completed secondary education, 61 (70.1%), and were married, 69 (57.8%). The median age of the patients was 67 years (interquartile range 60 to 74).

Comorbidities were recorded as multiple-choice responses, and most patients reported having hypertension, 65 (33.3%). The majority of patients underwent coronary artery bypass grafting, 45 (51.7%). According to body mass index, most patients were overweight, 40 (46.0%). A total of 56 patients (64.4%) did not use tobacco products, and 47 (54.0%) did not consume alcohol (Table 1).

Table 1. Sociodemographic data of patients and distribution of comorbidities, risk factors for chronic diseases and types of surgical procedures

Variable	n (%)
Gender	
Male	67 (77)
Female	20 (23)
Age	
60 and younger	24 (27.6)
61 do 70	33 (37.9)
71 and older	30 (34.5)
Level of education	
Elementary school	19 (21.8)
Secondary education	61 (70.1)
Undergraduate and graduate degree	7 (8)
Type of employment	
Retired	62 (71.3)
Unemployed	10 (11.5)
Employed	15 (17.2)
Marital status	
Married	69 (57.8)
Single	11 (12.6)
Widow/er	17 (19.5)
Surgical procedure	
Coronary artery bypass graft	45 (51.7)
Heart valve replacement or reconstruction	25 (28.7)
Combined procedure	15 (17.2)
Correction of heart defects and failures	2 (2.3)
Comorbidities	
Hypertension	65 (33.3)
Vascular disease	16 (8.2)
Kidney disease	10 (5.1)
Hyperlipidemia	60 (30.8)
Diabetes	40 (20.5)
Neurological disorders	4 (2.1)
Medication for chronic diseases	
Yes	77 (88.5)
No	10 (11.5)
BMI	
Malnutrition	0
Normal body weight	19 (21.8)
Overweight	40 (46)
Obesity Class 1	20 (23)
Obesity Class 2	7 (8)
Obesity (Severe) Class 3	1 (1.1)
Smoking	
Yes	31 (35.6)
No	56 (64.4)
Alcohol	
Yes	1 (1.1)
No	47 (54)
Occasionally	39 (44.8)
	Me (IQR)
Chronological age	67 (60 – 74)
BMI	27.5 (25.2 – 31.2)

Note: n – number of examinees, % - percentage; Me – median; IQR - interquartile range

In the part of the questionnaire related to surgical fear, the highest level of agreement was observed for the item “I am afraid of the surgery” (Me = 5; IQR 3–7). The lowest level of agreement was recorded for the items “I am afraid of side effects,” “I am afraid that my health will worsen after surgery,” “I am afraid that the surgery will not work,” “I am afraid that I will not recover from surgery,” and “I am afraid of a long recovery time after surgery” (Me = 3; IQR 2–5) (Table 2).

Table 2. Distribution and descriptive statistics of surgical fear

Surgical fear											
N (%)											Me (IQR)
0	1	2	3	4	5	6	7	8	9	10	
I am afraid of the surgery											
0	3 (3.4)	6 (6.9)	12 (13.8)	13 (14.9)	20 (23)	7 (8)	11 (12.6)	10 (11.5)	2 (2.3)	3 (3.4)	5 (3-7)
I am afraid of being anesthetized											
4 (4.6)	15 (17.2)	20 (23.0)	11 (12.6)	16 (18.4)	10 (11.5)	5 (5.7)	3 (3.4)	3 (3.4)	0	0	4 (2-5)
I am afraid of the pain after the surgery											
2 (2.3)	5 (5.7)	6 (6.9)	13 (14.9)	13 (14.9)	20 (23)	12 (13.8)	8 (9.2)	5 (5.7)	1 (1.1)	2 (2.3)	5 (3-6)
I am afraid of side effects											
1 (1.1)	12 (13.8)	15 (17.2)	16 (18.4)	13 (14.9)	14 (16.1)	8 (9.2)	2 (2.3)	3 (3.4)	1 (1.1)	2 (2.3)	3 (2-5)
I am afraid that my health will worsen after surgery											
4 (4.6)	8 (9.2)	16 (18.4)	16 (18.4)	5 (5.7)	15 (17.2)	8 (9.2)	6 (6.9)	7 (8)	1 (1.1)	1 (1.1)	3 (2-5)
I’m afraid the surgery will not work											
9 (10.3)	7 (8)	14 (16.1)	13 (14.9)	11 (12.6)	10 (11.5)	5 (5.7)	3 (3,4)	10 (11,5)	3 (3,4)	2 (2,3)	3 (2-6)
I am afraid that I will not recover from surgery											
7 (8,0)	9 (10,3)	15 (17,2)	10 (11,5)	7 (8)	12 (13,8)	8 (9,2)	7 (8,0)	7 (8,0)	4 (4,6)	1 (1,1)	3 (2-5)
I am afraid of the long recovery time after surgery											
3 (3.4)	4 (4.6)	9 (10.3)	12 (13.8)	12 (13.8)	12 (13.8)	10 (11.5)	9 (10.3)	9 (10.3)	5 (5.7)	2 (2.3)	3 (2-5)

Note: N – number of examinees; % - percentage; 0 – no fear – 10 – huge fear; Me – median; IQR – interquartile range

The median overall surgical fear score was 36 (IQR 23–42). No statistically significant differences were observed between the levels of fear of short-term and long-term consequences of surgery (Table 3).

Table 3. Descriptive statistics and comparison of differences in short-term and long-term consequences of surgery

Fear of surgical procedure	Me (IQR)	P*
Fear of short-term consequences of surgery	16 (12 – 21)	0.71
Fear of long-term consequences of surgery	18 (10 – 21)	
Fear of surgical procedure (total)	36 (23 – 42)	

Note: Me – median; IQR – interquartile range; P – statistical significance; *Wilcoxon Sign Rank test

The results showed a statistically significant difference in surgical fear according to patient gender (Mann–Whitney test; *P*=0.01), with women reporting significantly higher levels of surgical fear than men. No statistically significant differences in surgical fear were observed with respect to risk factors for chronic diseases (Table 4).

Table 4. Surgical fear according to sociodemographic variables and risk factors for chronic diseases

	Fear of operational procedure	
Variable	**Me (IQR)**	***P***
Gender		
Male	33 (21 – 41)	0.01*
Female	39 (32.50 – 51)	
Age		
60 and younger	34 (23.75 – 39.50)	0.34**
61 do 70	33 (19 – 41)	
71 and older	37 (30 – 45.75)	
Level of education		
Primary education	38 (28 – 52.50)	0.10**
Secondary education	35 (23 – 41)	
College and higher education	32 (18.50 – 40)	
Type of employment		
Retired	36.50 (23 – 42.75)	0.57*
Unemployed	35 (26.75 – 46.25)	
Employed	32 (23.50 – 38)	
Marital status		
Married	37 (26 – 44)	0.10**
Single	18 (16 – 35)	
Widow/er	37 (21 – 40)	
BMI		
Normal body weight	26 (17 – 35.50)	0.10*
Overweight	38 (26 – 45.25)	
Obesity Class 1	34 (23 – 41)	
Obesity Class 2 and 3	37.50 (34.25 – 43)	
Smoking		
Yes	33 (22.50 – 43)	0.45**
No	37 (23 – 41.25)	
Alcohol		
Yes and occasionally	17 (13 – 20.25)	0.88**
No	16 (11.50 – 20.50)	
Medication for chronic diseases		
Yes	37 (24 – 43)	0.20*
No	30.50 (17.50 – 39.50)	

Note: Me – Median; IQR - interquartile range; *P* – statistical significance; *Mann-Whitney test; **Kruskal Wallis test

The results showed a statistically significant difference in surgical fear of long-term consequences (Kruskal–Wallis test; *P*=0.04), with significantly higher levels of fear among patients who underwent heart valve replacement or reconstruction compared with those who underwent coronary artery bypass graft surgery (Table 5).

Table 5. Surgical fear by type of cardiac surgery

Type of cardiac surgery	Me (IQR)	*P**
Fear of short-term consequences of surgery		
Coronary artery bypass graft	17 (11 – 20)	
Heart valve replacement or reconstruction	18 (15 – 21)	0.44
Combined procedure	16 (14 – 17.50)	
Correction of heart defects and failures	13 (10 – 16)	
Fear of long-term consequences of surgery		
Coronary artery bypass graft	14 (8 – 20)	
Heart valve replacement or reconstruction	20 (16 – 22)	0.04
Combined procedure	20 (11 – 25)	
Correction of heart defects and failures	9.50 (4.75 – 14.25)	
Overall fear of operational procedure		
Coronary artery bypass graft	32 (19 – 40)	
Heart valve replacement or reconstruction	37 (30 – 47)	0.17
Combined procedure	37 (25.50 – 43)	
Correction of heart defects and failures	22.50 (14.75 – 30.25)	

Note: Me – median; IQR - interquartile range; *P* – statistical significance; * Kruskal Wallis test

DISCUSSION

The aim of this study was to examine the level of preoperative fear among patients undergoing cardiac surgery. The findings indicate that preoperative fear is present in the majority of patients, with higher levels observed in women and in those undergoing more complex surgical procedures. Studies conducted worldwide show that fear and anxiety during the preoperative period vary according to age, gender, marital status, education level, type of surgery, and anesthesia. Other common fears include concerns about surgery delays, waking up early from anesthesia, postoperative pain, financial loss, and death [22–27].

A study conducted in Croatia produced results consistent with international research, confirming that surgical fear levels are similar across populations [1, 3, 21, 22]. These findings also support the validity of the Croatian version of the SFQ as a reliable self-assessment tool for measuring surgical fear in adults undergoing elective procedures [1, 3, 20–22].

In this study, patients reported the highest levels of preoperative fear in questionnaire items related to fear of surgery and postoperative pain. These results are consistent with other studies in which patients also rated fear of surgery and postoperative pain as the most prominent concerns [20, 28]. The mean total fear score in this study was 36 points. In comparison, studies conducted in Sri Lanka [29], the Czech Republic [30], and Turkey [3] reported mean SFQ scores of 31.8, 35.7, and 37.55 points, respectively, while a previous Croatian study reported a mean score of 22.65 [20]. A study of patients awaiting cataract surgery reported a markedly lower mean SFQ score of 8.2 [1], which is considerably lower than values reported for general surgical procedures. These findings suggest that the intensity of surgical fear varies depending on the type of procedure performed.

A Turkish study found that fear levels were higher among patients undergoing neurosurgery and thoracic surgery under general anesthesia, indicating that those awaiting larger and more complex operations tend to experience greater fear [23]. The present study confirmed this trend, showing significantly higher levels of long-term surgical fear in patients undergoing heart valve replacement or reconstruction compared with those undergoing coronary artery bypass grafting.

Patients awaiting cardiac surgery may experience considerable anxiety and uncertainty. A longitudinal study of patients undergoing coronary artery bypass grafting found that fear and anxiety levels fluctuated at three time points: while waiting for surgery at home, during hospitalization the night before surgery, and three months postoperatively. The highest levels were recorded during the waiting period at home, while lower levels were observed in the hospital and at three months after surgery [8].

Several studies have demonstrated that anxiety and fear during the preoperative and postoperative periods after cardiac procedures can negatively affect recovery, contributing to a higher rate of complications, longer hospital stays, and reduced effectiveness of cardiac rehabilitation programs [31]. In Spain, a study found that the prevalence of preoperative anxiety and depression among cardiac surgery patients was 32 percent and 19 percent, respectively. A hospital stay longer than three days before surgery was identified as a major risk factor for preoperative depression. Furthermore, preoperative anxiety was significantly associated with increased postoperative pain and higher analgesic consumption. Anxiety and depression are common mood disorders among cardiac surgery patients over 65 years of age, and prolonged preoperative hospitalization appears to heighten the risk of developing these conditions. The authors therefore recommend minimizing preoperative hospital stays to reduce the emotional burden on patients [32].

The burden associated with coronary artery disease in patients undergoing coronary artery bypass grafting has increased significantly in recent decades, resulting in a higher risk of intraoperative and postoperative complications. This increase is linked to older patient age, a higher proportion of women, a greater incidence of recent myocardial infarction, reduced left ventricular function, multivessel disease, and more comorbidities [33]. Identifying factors that influence preoperative fear and understanding their interrelationships are essential for planning targeted interventions. According to patients themselves, conversation and communication with healthcare staff are among the most effective ways to reduce fear and anxiety [34]. Educating patients about the surgical procedure is also an important approach to decreasing surgery-related fear [29].

The results of this study indicate that surgical fear is gender specific, with women reporting significantly higher levels of fear than men, which is consistent with other studies [30, 35]. This difference may be related to hormonal factors, such as estrogen and progesterone, which influence women's emotional state, as well as psychosocial stress related to family responsibilities [36]. In contrast, men may be less likely to express fear because doing so could be perceived as a sign of emotional vulnerability or weakness [35]. However, some studies have reported no significant gender differences in preoperative fear [29].

In this study, no significant difference in preoperative fear was observed by age. A study from Turkey found that younger patients reported higher levels of fear compared with older patients [23]. Lower fear levels among older individuals may be related to greater familiarity with the hospital environment, as older patients often seek medical care for chronic conditions and may view aging as a natural process associated with acceptance of mortality. Conversely, other studies have shown that increasing age may actually heighten fear of surgery [1, 29, 30].

In the present study, patients with lower education levels had higher fear scores than those with higher education, although the difference was not statistically significant. The role of education level remains unclear because of inconsistent findings across studies. Some research found no significant relationship [8], whereas other studies showed that higher education was associated with lower levels of fear [1]. Preoperative education may reduce uncertainty and surgical fear, helping patients to be better emotionally prepared. Studies that incorporated preoperative education have demonstrated its beneficial effect on the emotional state of patients, particularly in terms of postoperative rehabilitation [37].

Study Limitations and Future Research Directions

This study has several limitations. First, it was conducted on a relatively small sample of patients. Second, the research was carried out at a single clinical center, which limits the generalizability of the findings to the broader population of cardiac surgery patients. Future studies should include larger, multicenter samples to improve the external validity of findings on preoperative anxiety in cardiac surgery.

Longitudinal research is needed to examine the persistence of preoperative fear and its impact on postoperative outcomes, including recovery trajectories and quality of life. Further investigations should also assess the effectiveness of structured preoperative education programs, with an emphasis on tailoring content to specific surgical procedures (for example, valve replacement versus coronary artery bypass grafting) and demographic groups (for example, gender differences). Additionally, qualitative studies may provide deeper insight into patients' subjective experiences of preoperative fear and their expectations regarding surgery.

Implications for Clinical Practice and Education

The findings suggest that implementing standardized preoperative education and psychological support interventions may reduce uncertainty and preoperative fear among cardiac surgery patients, thereby improving emotional preparedness and potentially enhancing postoperative recovery. Integrating individualized educational modules into routine preoperative care could be particularly beneficial for high-risk groups, such as women and patients undergoing more complex procedures.

For nursing and medical education, these findings underscore the importance of training healthcare professionals in communication skills, psychological support techniques, and the delivery of evidence-based educational interventions. Incorporating these competencies into educational curricula could promote a more patient-centered approach to perioperative care.

CONCLUSIONS

A moderate level of preoperative fear was observed among cardiac surgery patients. Women reported significantly higher levels of preoperative fear compared with men. No significant differences in fear levels were found with respect to patient age. Patients undergoing heart valve replacement or reconstruction exhibited higher levels of fear of long-term consequences compared with those undergoing coronary artery bypass surgery. The overall level of preoperative fear did not differ significantly according to education level, marital status, employment status, or the presence of risk factors.

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Author Contributions

Conceptualization, A.K., S.P. and N.F.; Methodology, Ž.M., M.B and I.B.; Software, A.K., Ž.M. and J.V.; Validation, J.V., M.B. and I.B.; Formal Analysis, Ž.M. and I.B.; Investigation, A.K., S.P., M.B. and S.L.; Resources, A.K., S.P. and S.L.; Data Curation, A.K. and S.P.; Writing – Original Draft Preparation, A.K., S.P. and N.F.; Writing – Review & Editing, A.K., S.P., J.V., Ž.M., M.B., S.L., I.B., and N.F.; Visualization, Ž.M., J.V., M.B. and S.L.; Supervision, I.B. and N.F.; Project Administration, A.K. and M.B.

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The author declares no conflict of interest.

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Perceived Sleep Quality among Intensive Care Unit Patients: A Cross-Sectional Study

**Perceived Sleep Quality
among Intensive Care Unit Pavtients**

Kristina Pauzer[1], Ivana Mitrović[1], Zvjezdana Gvozdanović[2,3], Željka Dujmić[2,4,5], Maja Čebohin[2], Goranka Rafaj[6], Maja Carević[2,7], Nikolina Farčić[1,2*]

[1] University Hospital Centre Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia, kristina.pauzer@kbco.hr; ivana.mitrovic@kbco.hr; nfarcic@fdmz.hr

[2] Department of Nursing and Palliative Medicine, Faculty of Dental Medicine and Health Osijek, Josip Juraj Strossmayer University of Osijek, Crkvena Street 21, Osijek, 31000, Osijek-Baranja County, Croatia, mcebohin@fdmz.hr; zgvozdanovic@fdmz; zdujmic@fdmz.hr; majacarevic2009@gmail.com

[3] General County Hospital Našice, Bana Jelačić Street 10, Našice, 31500, Osijek-Baranja County, Croatia

[4] General Hospital "Dr. Josip Benčević" Slavonski Brod, Andrije Štampara Street 42, Slavonski Brod, 35 000, Brod-Posavina County, Croatia

[5] Faculty of Medicine Osijek, Josip Juraj Strossmayer University of Osijek, Josip Huttler Street 4, Osijek, 31000, Osijek-Baranja County, Croatia

[6] Department of Nursing, University of Applied Sciences in Bjelovar, Trg Eugena Kvaternika 4, Bjelovar, 43000, Bjelovar-Bilogora County, Croatia, grafaj@vub.hr

[7] Medical School Osijek, Vukovarska cesta 209, Osijek, 31000, Croatia, majacarevic2009@gmail.com

***Corresponding author:** nfarcic@fdmz.hr, +385 98 186 85 69

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Abstract

Introduction: Sleep plays a crucial role in the recovery of patients in the intensive care unit (ICU), yet it is frequently disrupted by specific environmental and clinical factors. Sleep quality influences the cognitive, emotional, and physical health of patients and is recognized as an important component of the treatment process. The aim of this study was to examine how hospitalized ICU patients perceive their sleep quality and to identify the main environmental factors that influence it.

Methods: A cross-sectional quantitative study was conducted in the ICU of the Clinical Hospital Center Osijek between February and April 2025. The study included 95 hospitalized patients. Data were collected using a questionnaire developed specifically for this research, based on available literature. Statistical analysis included both descriptive and inferential methods.

Results: The strongest negative associations with sleep quality were observed for the infusion pump alarm sound (ρ = 0.753) and pain (β = 0.274; *P*=0.003). Diagnostic procedures (β = 0.326; *P*= 0.002) and blood sampling (β = 0.241; *P*=0.02) demonstrated weaker but still statistically significant negative associations. No significant differences in sleep quality were observed between sexes (*P*=0.86), whereas the presence of malignant disease was associated with poorer sleep quality (*P*=0.04).

Conclusion: Sleep among ICU patients is markedly impaired, particularly due to noise, pain, and frequent nighttime interventions. Additional efforts are needed to optimize the ICU environment, educate healthcare staff, and individualize care to improve sleep quality in intensive care settings.

INTRODUCTION

Sleep is a fundamental biological need that plays a crucial role in maintaining physical, psychological, and emotional health. During sleep, numerous vital processes occur, including tissue regeneration, hormonal regulation, memory consolidation, and emotional stabilization. In the context of hospital care, particularly in intensive care units (ICUs), patients' sleep quality is often impaired due to a combination of environmental, organizational, and clinical factors [1-4]. Studies indicate that more than 70 percent of ICU patients report sleep disturbances such as frequent awakenings, reduced REM sleep, and a persistent feeling of fatigue [2].

Sleep disruption in the ICU arises from multiple causes, including noise from medical equipment alarms, intense lighting, pain, invasive medical procedures, and the use of analgesics and sedatives [3-6]. Numerous studies confirm that poor sleep quality not only delays recovery but also increases the risk of complications such as delirium, metabolic disorders, and immune dysfunction [7-10]. Inadequate sleep also negatively affects patients' perception of healthcare quality and prolongs hospital stay [11-14]. Delirium, increasingly linked to sleep deprivation, further worsens clinical outcomes and increases mortality [15, 16].

Despite growing evidence highlighting the importance of sleep, its protection in hospital settings has not been systematically integrated into clinical practice. Guidelines such as the ABCDEF bundle in critical care (2017) include sleep as a key component of patient care, yet their practical implementation remains limited [17]. The 2018 update of the Society of Critical Care Medicine's Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult ICU Patients (PADIS) expanded recommendations to include immobility and sleep disruption, recognizing them as modifiable risk factors associated with adverse ICU outcomes [18]. The most recent PADIS Working Group update (2025) further introduced recommendations for the pharmacological management of agitation, sedation, and sleep in critically ill adult patients [19].

Additional challenges in sleep assessment stem from objective monitoring methods such as polysomnography, which are often impractical in ICU settings. For this reason, subjective tools such as the modified Freedman Sleep Quality Questionnaire (mFSQQ) are increasingly used in daily practice, allowing patients to directly evaluate their sleep quality and identify specific disturbances [2, 20, 21].

The literature reveals a relative scarcity of studies that simultaneously analyze patients' subjective sleep experiences and the impact of specific environmental factors in the ICU. Furthermore, there is still no consensus on which factors have the most pronounced negative influence or how these can be effectively mitigated [8, 22].

This study contributes to the existing body of knowledge through a detailed analysis of ICU patients' perceived sleep quality, with a particular focus on environmental influences. Special attention is given to the effects of noise, lighting, and nocturnal medical interventions, as well as their relationship with patients' subjective perception of sleep. The aim of this study was to assess the quality of sleep among patients hospitalized in the intensive care unit and to identify the main environmental factors contributing to its impairment.

METHODS

Study design

This study employed a cross-sectional quantitative design to examine the quality of sleep among hospitalized patients in an intensive care unit (ICU) and to determine the influence of environmental factors on sleep.

Setting and samples

The research was conducted in the Intensive Care Unit of the University Hospital Centre Osijek between February and April 2025. The study included 95 hospitalized patients. Eligible participants were conscious adult patients aged 18 years or older, of both sexes, who were able to provide informed consent. A convenience sampling method was used to recruit participants.

Measurements and instruments

Data were collected using a structured questionnaire developed specifically for this study, based on the validated Freedman Sleep Questionnaire, which has been widely used in similar research [1]. The questionnaire was adapted to the target population, taking into account the specific sociocultural characteristics of the hospital environment in the Republic of Croatia. It included items related to sociodemographic characteristics (age, sex), clinical data (diagnosis, presence of comorbidities, and length of ICU stay), and a subjective assessment of sleep quality.

Sleep quality, sleep duration, frequency of nocturnal awakenings, and level of daytime sleepiness were assessed using a 10-point Likert type numerical scale, where higher scores indicated better sleep quality or lower levels of sleepiness. In addition, participants rated the perceived impact of environmental factors (noise, lighting, medical interventions, and medical equipment) on sleep quality using a 10-point Likert type scale, where higher scores indicated a greater perceived negative impact.

Data collection/procedure

Data collection was conducted through patient interviews after at least one night of ICU stay, when patients' level of consciousness and ability to communicate were stable. Participation was voluntary and anonymous. All participants were informed about the purpose of the study and provided written informed consent before inclusion.

Ethical considerations

The study was approved by the Ethics and Professional Committee of Nurses and Medical Technicians for Health Care of the University Hospital Centre Osijek (approval number: R1-96-5/2025). It was conducted in accordance with all applicable ethical standards, including the principles of Good Clinical Practice, the Declaration of Helsinki, the Health Care Act of the Republic of Croatia, and the Act on the Protection of Patients' Rights. No identifying data were collected, ensuring participant anonymity.

Statistical data analysis

Data were analyzed using JASP software, version 0.19.3 (Department of Psychological Methods, University of Amsterdam, Amsterdam, The Netherlands). Descriptive statistics included measures of central tendency and dispersion, namely the median and interquartile range. Normality of distribution was assessed using the Shapiro–Wilk test, which indicated significant deviation ($P<0.05$); therefore, nonparametric methods were applied. The Mann–Whitney U test was used to compare two groups, while the Kruskal–Wallis test with post hoc Dunn test and Bonferroni correction was applied for comparisons involving more than two groups. Relationships between variables were examined using Spearman correlation coefficients, and predictors of sleep quality were analyzed using linear regression analysis. The level of statistical significance was set at $P<0.05$.

RESULTS

The study included 95 participants treated in the intensive care unit (ICU), the majority of whom were male (59; 62.1%). The median age of participants was 67 years (interquartile range [IQR] 57–74 years), and the median length of hospitalization was 4 days (IQR 3–5 days). The median sleep quality score was 26 (IQR 21–30), where lower scores indicate greater sleepiness (Table 1).

Table 1. Sociodemographic and hospitalization-related variables and descriptive statistics of the subscales of the questionnaire assessing sleep quality among ICU patients

Variable	N (%)
Gender	
Male	59 (62.1)
Female	36 (37.9)
Admission diagnosis	
Cerebrovascular accident (stroke)	17 (17.9)
Myasthenic crisis	1 (1.1)
Myocardial infarction	45 (47.4)
Pulmonary embolism	7 (7.4)
Other	34 (31.4)
Comorbidities	
Hypertension	74 (80.4)
Diabetes	25 (27.2)
COPD	2 (2.2)
Malignancy	3 (3.3)
Cardiovascular	54 (58.7)
	Me (IQR)
Age	67 (57 – 74)
Glasgow Coma Scale (GCS) score at admission	15 (15 – 15)
Glasgow Coma Scale (GCS) score at discharge	15 (15 – 15)
Length of stay in ICU	4 (3 – 5)
Questionnaire for assessing sleep quality among ICU patients – subscales	
Sleep quality	26 (21 – 30)
Daytime sleepiness	19 (16 – 23)
Sleep disruption due to environmental factors	88 (73 – 100)

Note: N – number of participants; % – percentage; Me – median; IQR – interquartile range.

Correlation analysis showed that sleep quality was strongly positively correlated with daytime sleepiness (ρ = 0.500; *P*<0.001) and moderately negatively correlated with sleep disruption (ρ = −0.379; *P*<0.001), indicating that lower sleep quality was associated with greater daytime sleepiness. In addition, sleep disruption was moderately positively correlated with daytime sleepiness (ρ = 0.402; *P*<0.001), suggesting that greater sleep disruption was accompanied by greater daytime sleepiness (Table 2). A significant weak negative correlation was found between participants' age and sleep quality (ρ = −0.207; *P*=0.04), indicating that older participants had better sleep quality (Table 2).

No statistically significant differences in sleep quality, daytime sleepiness, or sleep disruption were found between male and female participants. Analysis by admission diagnosis revealed a statistically significant difference in sleep quality (Kruskal–Wallis test; *P*=0.002). Participants admitted with a cerebrovascular accident had significantly better sleep quality compared with those admitted for other diagnoses (Dunn–Bonferroni post hoc test; *P*<0.05). Regarding the presence of malignancy as a comorbidity, a statistically significant difference in sleep quality was also found (Mann–Whitney test; *P*=0.04), with participants without malignancy demonstrating significantly better sleep quality than those with malignancy (Table 3).

Table 2. Correlations between sleep quality, daytime sleepiness and sleep disruption, and correlations of these variables with age, Glasgow Coma Scale scores and length of ICU stay

		Daytime sleepiness	Sleep disruption	Age	GCS (admission)	GCS (discharge)	Length of stay in ICU
Sleep quality	ρ^*	0.500	-0.379	-0.207	-0.114	0.028	0.138
	P	<0.001	<0.001	0.04	0.27	0.78	0.18
Daytime sleepiness	ρ^*		-0.402	-0.156	-0.030	0.015	0.025
	P		<0.001	0.13	0.77	0.88	0.81
Sleep disruption	ρ^*		-	0.142	-0.002	-0.039	0.085
	P		-	0.16	0.98	0.70	0.41

Note: *P* – statistical significance; ρ – Spearman's correlation coefficient; * Spearman correlations.

Table 3. Sleep quality, daytime sleepiness and sleep disruption by sex, admission diagnosis and comorbidities

	Sleep quality		Daytime sleepiness		Sleep disruption	
	Me (IQR)	***P****	**Me (IQR)**	***P****	**Me (IQR)**	***P****
Sex						
Male	27 (20 – 29)	0.86	20 (16 – 23)	0.25	87 (71 – 98)	0.10
Female	26 (21 – 30.75)		19 (15 – 22)		93(73.75 – 106.25)	
Admission diagnosis		***P*****		***P*****		***P*****
Cerebrovascular accident	20 (16 – 23)	0.002	21 (17.75 – 27)	0.09	79 (73 – 93)	0.17
Myocardial infarction	19 (15 – 22)		18 (16 – 21)		90 (75 – 102)	
Pulmonary embolism	87 (71 – 98)		16 (15 – 18)		94 (77.5 – 102.5)	
Other	93 (73.75 – 106.25)		20 (14.5 – 24)		91(70.75 – 101.5)	
Comorbidities		***P*****		***P*****		***P*****
Hypertension	Yes 26.5 (20 – 29.75)	0.75	19 (16 – 23)	0.93	89.5 (73.25 - 99.75)	0.37
	No 25 (22 – 29)		19 (16 – 23)		86 (67 – 99)	
Diabetes	Yes 24 (19 - 28)	0.23	19 (16 – 21)	0.58	93 (82 – 102)	0.16
	No 27 (22 – 29.75)		19 (16 – 23)		87.5 (20.25 – 98.75)	
COPD	Yes 23 (18.5 – 27.5)	0.84	17 (16.5 – 17.5)	0.46	95 (91.5 – 98.5)	0.50
	No 26 (21 – 29)		19 (16 – 23)		88 (73 – 99)	
Malignancy	Yes 17 (16.5 – 19.5)	0.04	14 (13.5 – 19.5)	0.27	82 (72.5 – 92.5)	0.77
	No 26.5 (21 – 30)		19 (16 – 23)		88 (73 – 99.25)	
Cardiovascular diseases	Yes 24.5 (20 – 29)	0.22	19 (16 – 23)	0.81	94 (71.5 – 102)	0.24
	No 27 (23 – 31)		19.5 (16 - 22.25)		87 (74 – 93)	

Note: Me – median; IQR – interquartile range; *P* – statistical significance; * Mann–Whitney test; ** Kruskal–Wallis test.

Sleep disruption was strongly and positively correlated with interruptions caused by vital signs monitors (ρ = 0.629; *P*<0.001), pulse oximeter probes (ρ = 0.590; *P*<0.001), intravenous pump alarms (ρ = 0.753; *P*<0.001), and the measurement of vital parameters (ρ = 0.700; *P*<0.001) (Table 4).

Table 4. Association of sleep disruption with auditory and visual signals from medical equipment

		Vital signs monitor	Finger pulse oximeter probe	IV pump alarms	Measurement of vital signs
Sleep disruption	ρ*	0.629	0.590	0.753	0.700
	P	<0.001	<0.001	<0.001	<0.001

Note: P – statistical significance; ρ – Spearman's correlation coefficient; * Spearman correlations.

Linear regression analysis, with ICU activities as predictor variables, showed that the model explained 36.5% of the variance in sleep quality (*P*<0.001; adjusted R^2 = 0.365). Statistically significant predictors were pain (*P*=0.003), diagnostic tests (*P*=0.002), and blood sampling (*P*=0.02). Pain had a negative effect on sleep quality, whereas diagnostic tests and blood sampling contributed positively to the sleep quality of patients treated in the ICU (Table 5).

Table 5. Regression results – sleep quality as the dependent variable

	β	t	*P*	R²
(Constant)		11.449	<0.001	0.365
Pain	-0.274	-3.068	0.003	
Vital signs monitor	-0.228	-1.981	0.05	
Noise	0.185	1.328	0.18	
Ventilator alarm	-0.120	-0.751	0.45	
Light	0.202	1.757	0.08	
Finger pulse oximeter probe	0.054	0.415	0.67	
Nursing interventions	-0.082	-0.631	0.53	
Conversations	-0.265	-1.907	0.06	
Diagnostic tests	0.326	3.123	0.002	
IV pump alarms	-0.157	-1.145	0.25	
Measurement of vital signs	-0.160	-1.338	0.18	
Blood sampling	0.241	2.229	0.02	
Medication administration	0.038	0.308	0.75	
Phones and mobile devices in the room	-0.236	-1.778	0.07	

Note: β — regression coefficient; t — t statistic; *P* — statistical significance; Adjusted R² — coefficient of determination (adjusted R² = 0.365).

DISCUSSION

The results of this study indicate that the intensive care unit (ICU) environment significantly reduces patients' subjective perception of sleep quality and that sleep among ICU patients is markedly impaired, particularly due to noise, pain, and frequent nocturnal interventions. Sleep quality in the ICU represents a major challenge, as disrupted sleep patterns are associated with cognitive impairment, delayed recovery, and increased mortality [23]. Effective pain management not only improves physiological stability but also contributes to better sleep, which is essential for recovery, reducing delirium, and restoring immune and cognitive functions [15]. Pain emerged as the most significant negative predictor of sleep quality in this study, consistent with previous results [23, 24]. Pain is reported by 38–51% of patients at risk of dying and is considered one of the most distressing symptoms [25]. Pain control in the ICU plays a crucial role in improving patient outcomes, as untreated or undertreated pain may lead to increased anxiety, delirium, prolonged hospitalization, and a higher risk of chronic pain [23, 24]. According to the PADIS guidelines, a combination of pharmacological and non-pharmacological strategies, individually tailored to each patient, should be implemented [18, 19].

Noise in the ICU is a major environmental factor that negatively affects sleep quality. The World Health Organization recommends that hospital noise levels should not exceed 35–40 dB [2, 26, 27], whereas in ICUs they often reach 53–86 dB [28, 29]. In the present study, most participants reported perceiving noise as excessive and identified it as one of the main causes of sleep disturbance. Measures such as reducing the volume of monitor and telephone alarms and using vibration modes can help lower noise levels and improve rest conditions. Regarding staff communication, patients in this study reported acoustic alarms and auditory signals from medical devices as more disturbing than staff conversations, which partially differs from earlier studies emphasizing loud staff communication as the main source of noise [22]. In a qualitative study conducted in Turkey during the COVID-19 pandemic, equipment sounds and healthcare workers' voices were identified as key factors disturbing patients' sleep, explained by increased workload and the presence of many inexperienced nurses [30]. Loud communication can generate more noise than alarms or phones; healthcare professionals should therefore be more aware of communication-related noise within the team [31]. The observed results may be explained by the fact that nurses working in intensive care units generally possess extensive professional experience and adhere to clinical guidelines, including adjusting communication volume according to the time of day and night. According to the literature, single-bed rooms can help reduce noise and improve sleep quality [32], but they also have certain drawbacks. For patients, they may increase anxiety due to reduced accessibility to staff [2], while for healthcare workers they may introduce additional stressors such as increased walking distance, reduced patient visibility, and weaker team communication [33].

Inappropriate lighting intensity in the ICU can disturb circadian rhythms and contribute to shorter total sleep duration [24, 34, 35]. To prevent these effects, it is recommended that natural light or artificial lighting be provided during the day, while all unnecessary light sources be turned off and curtains closed at night, preferably by 10 p.m. [36]. The majority of participants reported that lighting levels did not pose a major problem, which may be attributed to nurses' experience in adjusting light intensity according to the time of day and clinical interventions, thereby minimizing patients' exposure to inappropriate illumination.

Stressors such as feelings of loneliness and fear of death negatively affect sleep in ICU patients [37]. Physical contact and communication with patients help them express anxiety and discomfort and ask questions. Moreover, the sense of safety provided by the presence of nursing staff and clinical procedures may contribute to better sleep quality [22, 37]. Blood sampling and diagnostic procedures in this study had a positive effect on sleep perception. Previous studies also report that sleep interruptions due to blood sampling had a smaller impact when a "sleep-promoting" schedule was established, suggesting that the timing and context of these procedures can influence their effect on sleep [38].

The correlations between daytime sleepiness and sleep quality demonstrate a strong association between these variables: poorer sleep quality was associated with greater daytime sleepiness. In the study by Bihari et al., average daytime sleepiness during ICU stay was high, indicating chronic sleep deprivation [22].

In this study, no statistically significant differences in sleep quality were found between sexes, differing from Bihari et al., who observed that sleep quality improved with age in women but not in men. They attributed this to differences in sleep architecture, with older women exhibiting a higher proportion of deep sleep [22]. Studies examining ICU populations have reported a higher incidence of subjective sleep problems among women [39]. However, results remain inconsistent: some studies show that certain objective sleep parameters, such as apnea occurrence or sleep architecture measured by polysomnography, are more prevalent or severe in men, or that differences depend on age and comorbidities [40].

Malignancy emerged as the comorbidity most strongly associated with poorer sleep quality in this study, underscoring the need for individualized approaches to oncology patients. A study conducted in Nepal found that 56% of patients with advanced malignancy experienced significant sleep disturbances [41]. Other comorbidities did not significantly affect sleep quality, consistent with previous research showing that shorter total sleep duration is associated with a higher number of comorbidities, including heart failure and chronic respiratory diseases. Although malignancy was not identified as the dominant comorbidity, the overall burden of comorbidities significantly reduces sleep duration in ICU patients [42].

It is important to emphasize that environmental factors such as noise, light, and frequent interventions are not the only causes of disturbed sleep. Medications such as benzodiazepines and corticosteroids can also disrupt sleep architecture [22]. Sedatives and analgesics, including opioids, are among the most frequently prescribed medications in the ICU, with more than 90% of patients receiving them at some point during hospitalization [43]. In addition to pharmacological measures, non-pharmacological methods such as music therapy, earplugs, and eye masks are recommended to improve sleep quality among ICU patients [44, 45]. Furthermore, family involvement strengthens emotional support and helps alleviate patients' feelings of isolation and loneliness [46]. Studies on healthy individuals suggest that environmental factors have a greater impact on the subjective perception of sleep quality than on objective parameters, underscoring the multifactorial nature of sleep disturbances [47].

Limitations

This study has several limitations. It relied solely on subjective assessments without objective measurements of sleep quality or environmental conditions, which may reduce the precision of the results. Additionally, the study was conducted on a relatively small sample from a single clinical center, which limits the generalizability of the results.

Recommendations for Future Research

Future studies should incorporate objective methods such as polysomnography or actigraphy, as well as direct measurements of noise intensity (in decibels) and light levels (in lux). Interventional studies evaluating the effects of earplugs, eye masks, optimized lighting, and the implementation of designated "quiet hours" are also recommended. Long-term outcomes, including cognitive recovery, delirium, and post-traumatic stress disorder, should be monitored, with analyses conducted across different types of ICUs to identify organizational factors that support better sleep. Larger multicenter samples are needed to enhance representativeness, and longitudinal studies are required to assess the persistence of sleep disorders and their impact on recovery and quality of life. In addition, combining objective instruments with qualitative approaches could provide deeper insight into patient experiences and the effectiveness of sleep promoting interventions in the ICU.

Implications for Clinical Practice and Education

The results highlight the need for systematic optimization of environmental conditions in the ICU and for staff education on the importance of sleep preservation. Identifying high-risk patients and implementing individualized sleep management strategies could contribute to faster recovery, fewer complications, and an overall improvement in the quality of care.

CONCLUSIONS

This study demonstrated that patients experience significantly reduced sleep quality during their stay in the intensive care unit (ICU). This result is reflected in a marked decline in the subjective assessment of sleep quality. In accordance with the study objective of examining environmental factors, the most frequently identified sources of sleep disruption were infusion pump alarms, the measurement of vital parameters, and the presence of medical equipment. Auditory signals, particularly those emitted by infusion pumps, showed the strongest association with poorer sleep perception. Light was also recognized as a disturbance, although its individual impact was smaller. Pain had a negative effect on sleep quality, while diagnostic tests and blood sampling had a positive effect on the sleep quality of patients treated in the intensive care unit. Overall, the results highlight the need to develop strategies that reduce noise exposure and optimize nighttime medical activities.

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Author Contributions

Conceptualization, K.P., I.M. and N.F.; Methodology, Z.G., Ž.D and G.R.; Software, M.Č., Ž.D., Z.G. and M.C.; Validation, M.Č., Z.G. and G.R.; Formal Analysis, M.Č., N.F. G.R. and M.C.; Investigation, K.P., I.M.; Resources, K.P. and Ž.D.; Data Curation, K.P., I.M.; Writing – Original Draft Preparation, K.P., N.F.; Writing – Review & Editing, K.P., I.M., Z.G., Ž.D., M.Č., G.R., M.C. and N.F.; Visualization, M.Č., G.R. and Ž.D.; Supervision, Z.G. and N.F.; Project Administration, K.P., I.M. and M.C.

Declaration of Conflicting Interest:

The author declares no conflict of interest.

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