



Hellenic Journal of Nursing Science

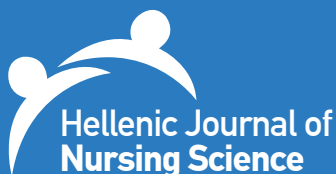
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The Strategic Role of Nursing in Healthcare Reform

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At a time when healthcare systems worldwide are being tested by demographic ageing, chronic diseases, inequalities in access, rapid technological advancement, and growing social expectations, Nursing can no longer be treated as a secondary or supportive component. It must be recognized and empowered as a central pillar of national strategy for public health and social cohesion.

Greece possesses an exceptionally well-trained, scientifically competent, and deeply committed nursing workforce. Nevertheless, the institutional framework, organizational structure, and functional Nursing within the healthcare system remain trapped in perceptions and models of past decades. The result is a structural gap between nurses' actual capabilities and the role they are allowed to perform. This gap is not merely professional; it is systemic, social, and economic.

From Management to Leadership

Modern Nursing science is no longer confined to the provision of care alone. It encompasses clinical judgment, evidence-based practice, diagnostic monitoring, therapeutic coordination, prevention, education, and healthcare administration. Internationally, nurses hold leadership positions in the shaping of health policy, service planning, crisis management, and innovation.

In Greece, however, this transition remains incomplete. The system continues to operate through hierarchical, closed, and often bureaucratic models that underestimate nursing autonomy and restrict its institutional influence. As a result, valuable human capital is lost, healthcare structures are burdened, and the overall efficiency of the system is reduced. The transition from management to leadership is not a luxury. It is a necessity for survival.

Quality, Safety, Sustainability: The Triple Nursing Axis

Quality of care, patient safety, and the sustainability of healthcare services now constitute the strategic core of every serious healthcare system. All three of these pillars are inextricably linked to Nursing.

The international literature is unequivocal where higher nurse-to-patient ratios, better education, clearly defined roles, and institutional empowerment lead to lower mortality rates, fewer complications, shorter hospital stays, and reduced overall costs. In other words, investment in

Nursing is not an expense. It is a cost-effective strategic choice. In a public healthcare system that is constantly pressured by fiscal constraints, strengthening the nursing role may well be the only reform capable of delivering simultaneous clinical, social, and economic benefits.

Institutional Maturity and Professional Self-Awareness

The Hellenic Regulatory Body of Nurses perceives its role as that of an institutional advisor to the State, a scientific body for strategic documentation, and a guarantor of the quality of nursing practice.

The era of fragmented interventions has come to an end. The country requires a comprehensive nursing policy that includes:

- a modern professional framework,
- clear delineation of responsibilities,
- upgraded education,
- institutional participation in healthcare administration,
- continuous quality assessment,
- and a strong presence in Primary Healthcare.

Nursing can no longer remain a passive observer of developments. It must become a co-architect of policy.

Moral Capital and Social Trust

The pandemic highlighted, in the clearest possible way, the moral capital of Nursing. Nurses stood on the front line, often without adequate resources, bearing personal cost, psychological exhaustion, and professional risk. Yet they kept the system standing. This reservoir of social trust must not be squandered. It must be transformed into institutional upgrading, scientific empowerment, and professional recognition. Society is not merely asking for better healthcare services. It is demanding humane care delivered with scientific precision. And this is precisely what modern Nursing represents. The coming decade will determine whether the Greek healthcare system moves toward sustainability or remains trapped in crisis management.

The Hellenic Regulatory Body of Nurses is ready to assume the responsibility that corresponds to its role: through evidence-based documentation, proposals, institutional dialogue, and scientific integrity. With a voice that is clear, assertive, yet responsible. With a goal not of confrontation, but of reform.

Exploring Pruritus in Patients with Chronic Kidney Disease in Relation to Sociodemographic Characteristics and Hemodialysis

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ABSTRACT

Introduction: Pruritus is a common symptom that significantly affects the quality of life of patients with Chronic Kidney Disease (CKD). According to the international literature, approximately 40% of patients with end-stage renal disease are affected by pruritus.

Aim: To explore the association between pruritus in patients with CKD, their sociodemographic characteristics, and hemodialysis treatment.

Methodology: A cross-sectional study was conducted using self-report questionnaires. The questionnaire included two sections: sociodemographic characteristics and assessment of pruritus. Data analysis was performed using SPSS version 23.

Results: Of all the variables examined (sex, marital status, educational level, place of residence, having children, net monthly income, hemodialysis, and the presence of diabetes mellitus), only hemodialysis was significantly associated with pruritus levels ($p=0.003$). Specifically, patients undergoing hemodialysis had higher pruritus levels than patients non undergoing hemodialysis.

Conclusions: The study demonstrated a significant association between hemodialysis and pruritus levels in patients with CKD. This finding indicates the need for targeted management of pruritus in hemodialysis patients.

Keywords: hemodialysis, patients, pruritus, Chronic Kidney Disease

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INTRODUCTION

Pruritus associated with Chronic Kidney Disease (CKD) is a common and burdensome symptom for patients with end-stage renal disease, significantly affecting their quality of life. The pathogenesis of pruritus in CKD remains unclear (Mettang, 2015). According to epidemiological data, approximately 40% of patients with end-stage renal disease experience pruritus, with prevalence estimates varying depending on the diagnostic tools used (Świerczyńska, 2021; Satti, 2019). The pathophysiology of pruritus in CKD is complex, with uremia recognized as the most important systemic disorder. Several mechanisms have been proposed, including secondary hyperparathyroidism, divalent ion disturbances, histamine, allergic sensitization, iron-deficiency anemia, proliferation of cutaneous histiocytes, and neurological disorders (Hatano, 2013).

The impact of pruritus on patients with CKD is multidimensional, affecting quality of life, sleep, and emotional status (Shirazian, 2017). Assessing the severity of pruritus is challenging, as no measurement methods are universally accepted. Available instruments include severity scales, multidimensional assessment scales, and scales evaluating the impact on quality of life, such as the Dermatology Life Quality Index (DLQI) and the Skindex (Verduzco, 2020; Fishbane, 2020). Recent studies have identified significant associations between pruritus severity and various factors. Specifically, the study by Hasan et al. in 53 patients with CKD found significant associations between pruritus severity and factors such as sex, the area affected by pruritus, and sleep quality (Hasan, 2021). However, therapeutic approaches often produce conflicting results, which has been attributed to study limitations (Poku et al., 2022).

The aim of the present study was to investigate the relationship between pruritus, the sociodemographic characteristics of patients with CKD, and hemodialysis treatment. More specifically, the study examines the effect of hemodialysis on pruritus levels and its association with patients' quality of life. The findings are expected to contribute to a better understanding of the phenomenon and to improved management of pruritus in patients with CKD.

METHODOLOGY

Study Design

This was a cross-sectional observational study conducted in the public hospitals of the Larissa Regional Unit. The research design involved the collection of primary quantitative data through a self-report questionnaire. The questionnaire consisted of three distinct sections: (a) patients' sociodemographic characteristics; (b) the Scoring Atopic Dermatitis (SCORAD)/Numerical Rating Scale

(NRS)/sleep disturbance scales for the assessment of pruritus; and (c) the Dermatology Life Quality Index (DLQI) for assessing quality of life in relation to dermatological status. Data was collected during patients' scheduled visits to the hemodialysis units and outpatient nephrology clinics of the participating hospitals.

Study Sample

The target population of the study consisted of patients with CKD who were being followed up at the public hospitals of the Larissa Regional Unit (the General Hospital of Larissa "Koutlimpaneio and Triantafylleio" and the University Hospital of Larissa). Convenience sampling was applied, with a total sample of 111 patients.

The inclusion criteria were: (a) diagnosis of CKD; (b) age over 18 years; (c) ability to understand the Greek language; and (d) consent to participate in the study. The exclusion criteria were: (a) the presence of rashes and pruritus not associated with CKD but attributable to another disease; (b) severe psychiatric illness affecting the ability to participate; and (c) unwillingness to participate in the study. The sample size was calculated based on the expected rate of pruritus in patients with CKD (40% according to the literature), with a 95% confidence level and a 5% margin of error.

Data Collection

A self-report questionnaire with three sections was used. The first section concerned patients' sociodemographic characteristics. The second section included the Scoring Atopic Dermatitis (SCORAD) and Numerical Rating Scale (NRS) for the assessment of pruritus, as well as questions on sleep disturbances. The third section included the Dermatology Life Quality Index (DLQI) for assessing quality of life in relation to dermatological status; this instrument has been validated in the Greek population. Questionnaires were completed during patients' scheduled visits to the hemodialysis units and outpatient nephrology clinics from April to September 2023. Completion of the questionnaire took approximately 15-20 minutes and was carried out in the presence of the researcher, who provided clarifications when needed.

Ethical Considerations

The study was approved by the Scientific Committees and the Boards of Directors of the General Hospital of Larissa "Koutlimpaneio and Triantafylleio" and the University Hospital of Larissa. The research was conducted in accordance with the principles of the Declaration of Helsinki, and the basic principles of research ethics and scientific conduct were observed. More specifically, all participants were informed in writing and orally about the purpose and procedure of the study, as well as about the safeguarding of anonymity and the confidentiality

of the data collected for the research. Participation was voluntary, and all participants signed an informed consent form. They also retained the right to withdraw from the study at any time without having to provide a specific reason and without any impact on their health care. The data were coded and stored on a computer to which only the principal investigator of the study had the password.

Statistical analysis

Statistical analysis of the data was performed using SPSS version 23.0. Descriptive statistical analysis was first applied, followed by inferential statistical analysis. Quantitative variables were described using means and standard deviations, whereas categorical variables were described using frequencies, mean values, standard deviations, and percentages. The normality of the quantitative variables derived from the questions of the main study instrument was assessed with the Kolmogorov-Smirnov test. Associations between variables were examined using Pearson's correlation coefficient for normally distributed variables and Spearman's coefficient for non-normally distributed variables. For comparisons of mean values between two independent groups, the independent-samples t-test or the non-parametric Mann-

Whitney U test was used, depending on the normality of the distribution of the relevant variable. For comparisons among more than two groups, one-way analysis of variance (one-way ANOVA) or the non-parametric Kruskal-Wallis test was used. The level of statistical significance for all statistical analyses in the study was set at $p < 0.05$.

RESULTS

Of the 125 patients approaching, 111 participated in the study, yielding a response rate of 88.8%. The demographic and clinical characteristics of the participants are presented in Table 1. The study sample consisted of 111 patients with CKD, of whom 77% ($n=85$) were men. The mean age of the participants was 52 ± 6 years, with 87% ($n=97$) being over 45 years of age. Regarding marital status, the majority of patients were married and had children. Of all patients, 55.8% ($n=62$) were undergoing hemodialysis, while 35.1% ($n=39$) were diagnosed with diabetes mellitus (Figure 1). In addition, the age group most frequently undergoing hemodialysis was 40-59 years (28 patients), followed by 60-79 years (22 patients), 20-39 years (5 patients), and finally patients aged 80 years and above (4 patients) (Figure 2).

Regarding pruritus levels (Table 2), patients generally

Figure 1. Percentage of patients with CKD undergoing hemodialysis as a proportion of all participants.

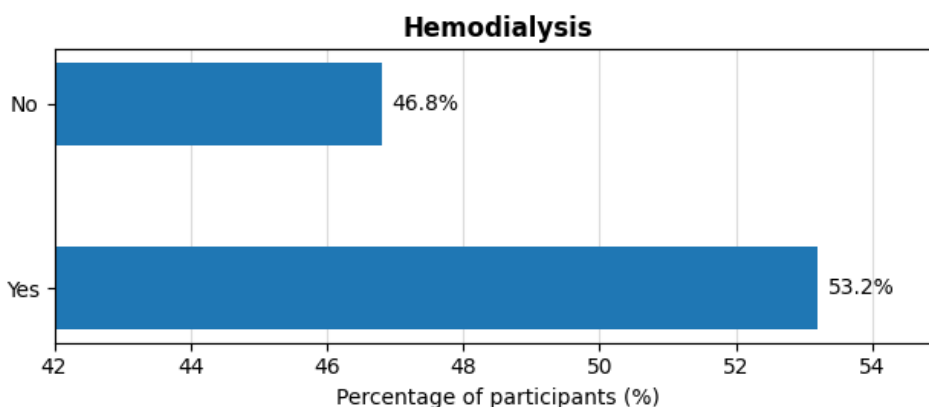
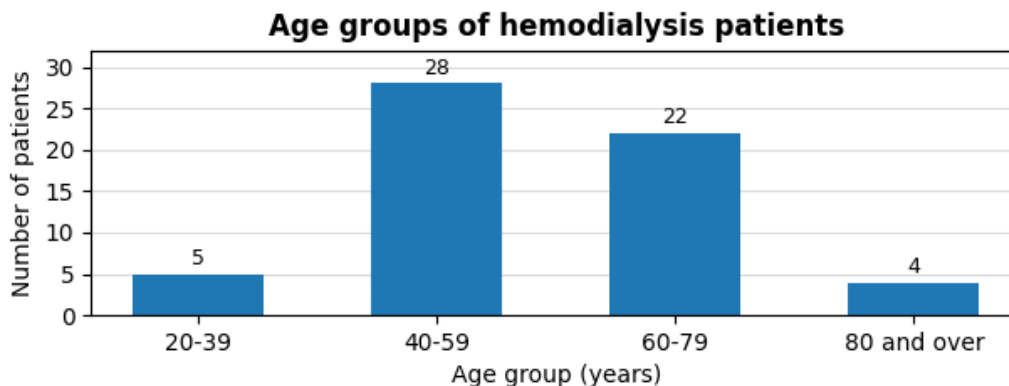


Figure 2. Age groups of hemodialysis patients. The horizontal axis shows patient age groups, and the vertical axis shows the number of patients.



reported low levels, with a mean value of 2.25 ± 2.79 for the 24-hour period and 2.84 ± 3.41 for the 72-hour period (0-10 scale). A total of 51.4% of patients reported the onset

of pruritus after the diagnosis of CKD, with the majority (39.6%) reporting a very small increase in intensity.

Table 1. Demographic and clinical characteristics of participants (N=111)

Characteristics	n (%) or M $\pm$ SD
Age (years)	59.81 $\pm$ 14.71
Sex	
Men	55 (49.5)
Women	56 (50.5)
Marital status	
Married	77 (69.4)
Single	19 (17.1)
Widowed	13 (11.7)
Divorced	2 (1.8)
Educational level	
Illiterate	12 (10.8)
Primary education	37 (33.3)
Secondary education	41 (36.9)
Higher education / TEI / IEK	21 (18.9)
Clinical characteristics	
Hemodialysis	59 (53.2)
Diabetes mellitus	39 (64.9%)

Table 2. Pruritus characteristics in the total sample

Variables	M $\pm$ SD or n (%)
24-hour pruritus (0-10)	2.25 $\pm$ 2.79
72-hour pruritus (0-10)	2.84 $\pm$ 3.41
Sleep disturbances (0-10)	2.46 $\pm$ 3.10
Onset after CKD diagnosis	
Yes	57 (51.4)
No	54 (48.6)
Increase in intensity after diagnosis	
Very little	44 (39.6)
Little	19 (17.1)
Moderate	24 (21.6)
Much	6 (5.4)
Very much	11 (9.9)

The investigation of associations between demographic characteristics and pruritus levels is presented in Table 3. Of all the variables examined, only hemodialysis was found to be significantly associated with pruritus levels ($p=0.003$). Specifically, patients undergoing hemodialysis had higher pruritus levels (median=3.0) than patients not undergoing hemodialysis (median=0.0) (Table 4). In the age analysis,

the reported coefficient did not indicate a statistically significant association between age and pruritus levels ($\rho=-0.057$, $p=0.554$). The remaining demographic variables also showed no statistically significant effect on pruritus levels, although having children showed a borderline association ($p=0.051$).

Table 3. Associations between demographic characteristics and pruritus levels

Variables	Statistical test	p-value
Age	rho=-0.057	0.554
Sex	U=1449.5	0.582
Marital status	H=6.419	0.093
Educational level	H=3.931	0.269
Place of residence	U=1367.5	0.467
Having children	U=723.5	0.051
Monthly income	H=1.471	0.689
Hemodialysis	U=1038.5	0.003*
Diabetes mellitus	U=1199.0	0.192

***Statistically significant difference (p<0.05)**

Table 4. Pruritus levels by treatment group

Group	Median pruritus value	IQR
With hemodialysis	3.0	4.5
Without hemodialysis	0.0	2.0

The stratified analysis (Table 5) showed significant differences in pruritus patterns between hemodialysis and non-hemodialysis patients in relation to sociodemographic characteristics. Regarding educational level, a consistent trend toward higher pruritus levels was observed among patients with lower education, with illiterate patients showing the highest levels ($M=2.83\pm3.42$) and graduates of higher education showing the lowest levels ($M=1.95\pm2.31$). This pattern was more evident among hemodialysis patients, where variation was greater (from 2.67 to 4.20)

than among non-hemodialysis patients (from 0.85 to 1.57). With regard to marital status, divorced and widowed patients had higher pruritus levels than married and unmarried patients, and this trend was more pronounced in the hemodialysis group. In particular, having children appeared to have a protective role, as patients with children had lower pruritus levels ($M=2.12\pm2.65$) than those without children ($M=2.69\pm3.21$), although this difference was borderline non-significant ($p=0.051$).

Table 5. Pruritus levels by sociodemographic characteristics and treatment group

Characteristic	Total sample n, M $\pm$ SD	With hemodialysis n, M $\pm$ SD	Without hemodialysis n, M $\pm$ SD	p-value
EDUCATIONAL LEVEL				0.269
Illiterate	12, 2.83 $\pm$ 3.42	5, 4.20 $\pm$ 3.89	7, 1.57 $\pm$ 2.64	
Primary education	37, 2.41 $\pm$ 2.95	20, 3.45 $\pm$ 3.21	17, 1.18 $\pm$ 1.74	
Secondary education	41, 2.15 $\pm$ 2.74	23, 2.89 $\pm$ 2.86	18, 1.22 $\pm$ 2.01	
Higher education / TEI / IEK	21, 1.95 $\pm$ 2.31	11, 2.67 $\pm$ 2.51	10, 0.85 $\pm$ 1.52	
MARITAL STATUS				0.093
Unmarried	19, 1.63 $\pm$ 2.09	8, 2.50 $\pm$ 2.33	11, 0.91 $\pm$ 1.64	
Married	77, 2.27 $\pm$ 2.73	42, 3.12 $\pm$ 3.24	35, 1.23 $\pm$ 1.48	
Widowed	13, 3.08 $\pm$ 3.45	8, 4.25 $\pm$ 3.89	5, 1.40 $\pm$ 2.07	
Divorced	2, 4.50 $\pm$ 4.95	1, 6.00*	1, 3.00*	
CHILDREN				0.051
Yes	85, 2.12 $\pm$ 2.65	48, 2.96 $\pm$ 3.15	37, 1.08 $\pm$ 1.52	
No	26, 2.69 $\pm$ 3.21	11, 3.82 $\pm$ 3.67	15, 1.80 $\pm$ 2.41	

Note: The p-values refer to comparisons between the categories of each characteristic in the total sample (Kruskal-Wallis H test for educational level and marital status; Mann-Whitney U test for having children).

DISCUSSION

The main finding of the present study is the significant association between hemodialysis and pruritus levels in patients with CKD. Specifically, hemodialysis patients reported higher pruritus levels and more quality-of-life problems, particularly in the domains of daily activities, interpersonal relationships, and sleep. This finding is supported by the study by Xie et al. (2022), who also found that pruritus significantly worsens the quality of life of hemodialysis patients. In contrast to previous studies (Xie, 2022), no association between age and pruritus was found in the sample of the present study. This finding is consistent with the results of Adejumo et al. (2016), who also found no association between demographic characteristics and pruritus intensity. This difference is likely due to the different characteristics of the populations studied (Adejumo, 2016). Regarding sociodemographic factors, the present study did not identify statistically significant associations between educational level, marital status, and pruritus levels, despite the observed trend toward higher pruritus levels in patients with lower educational attainment. This finding is consistent with the study by Adejumo et al. (2016), who likewise found no statistically significant association between demographic characteristics and pruritus intensity. The absence of statistical significance is likely attributable to the relatively small sample size ($n=111$) and the dominant role of hemodialysis as a factor. The borderline finding regarding having children ($p=0.051$) is of particular interest, suggesting a possible protective role. Having children may provide enhanced psychosocial support, reduce stress, and encourage better self-care (Kiliś-Pstrusińska et al., 2013; Kisomi et al., 2024). Similarly, the higher tendency toward pruritus among widowed and divorced patients may reflect a lack of social support. Future studies with larger samples could further investigate the interaction between psychosocial factors and pruritus in CKD. The effect of marital status and having children on sleep problems is also of particular interest, as this finding adds new knowledge to the existing literature. In addition, the present study confirmed the strong positive association between pruritus levels and reduced quality of life, as previously reported in earlier studies (Granados, 2016; Rehman, 2018).

A key limitation of the study is that it was conducted in two hospitals within a specific geographic region, which limits the generalizability of the findings. On the other hand, both the high response rate and the agreement of the findings with the international literature strengthen the reliability of the results. The study findings indicate the need for targeted interventions for hemodialysis patients with pruritus. Specifically, the design of an individualized intervention leaflet tailored to the needs of patients in the hemodialysis unit is recommended, as also suggested by Ezzat et al. (2021) (Ezzat, 2021).

The findings of the present study indicate the need to systematically incorporate the assessment and management of pruritus into nursing care for hemodialysis patients. Specifically, the adoption of a

standardized assessment protocol is recommended, including: (a) systematic recording of pruritus intensity at each hemodialysis session using the NRS scale (0-10); (b) weekly assessment of the impact of pruritus on sleep and daily activities; and (c) monthly assessment of quality of life using the DLQI scale (Vernon et al., 2021; Altınok & Akyar, 2019). In addition, it is necessary to develop an educational program for nursing staff in hemodialysis units. This program should include the pathophysiology of pruritus in CKD; techniques for early recognition and assessment of symptoms; pharmacological and non-pharmacological interventions (such as adjustment of hemodialysis parameters, use of appropriate moisturizing products, and relaxation techniques); and psychosocial support skills for patients with chronic pruritus (Alkhafaji & Al-Mayahi, 2023). Regarding patient interventions, the creation of individualized educational material (printed leaflets and audiovisual material) is recommended, providing practical guidance on daily skin care, recognition of factors that exacerbate pruritus (e.g., hot water, certain fabrics), non-pharmacological relief methods (cold compresses, distraction techniques), and when to seek medical help (Rigatto et al., 2024). Especially for patients without family support or with a low educational level, for whom the present study showed a trend toward higher pruritus levels, the development of peer support groups and linkage with psychosocial support services is recommended (Pasyar et al., 2020; Ghenaati et al., 2024). Implementation of these interventions should be accompanied by systematic monitoring and evaluation of their effectiveness to ensure continuous improvement in the quality of care.

CONCLUSIONS

The present study contributes to the understanding of the relationship between hemodialysis and pruritus in CKD, highlighting the need for an individualized approach to hemodialysis patients. The finding regarding the effect of the family environment on patients' quality of life indicates the need to integrate the family into the therapeutic plan. The development of an educational program for nursing staff in hemodialysis units is recommended, with a focus on the early recognition and management of pruritus. Future research could examine the effectiveness of targeted interventions for pruritus management, as well as the role of psychosocial factors in the onset and intensity of symptoms.

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Assessment of Empathy, Perception of Nursing Care, and Attitudes Toward People with Disabilities Among Nursing Students

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ABSTRACT

Introduction: The attitudes of healthcare professionals, and particularly of nurses, toward people with disabilities have a significant impact on the quality of care. Empathy, namely the ability to understand patients' emotions and needs, is critical for effective care. In addition, the nursing process, which includes assessment, diagnosis, and the implementation of individualized therapeutic plans, ensures continuous and high-quality care for people with disabilities.

Aim: The aim of the present study was to assess empathy, attitudes toward people with disabilities, and perceptions of nursing care among nursing students. Possible correlations among these variables were also explored.

Methodology: A quantitative research approach was followed through the online completion of four questionnaires using the Google Forms platform. The sample consisted of 122 nursing students. Statistical processing was performed with IBM SPSS v.26, after the data had first been appropriately coded and transformed to ensure compatibility with the software.

Results: The study showed that nursing students present moderate to high levels of empathy. A positive attitude toward people with disabilities was also identified, while their perception of nursing care was oriented more toward technical and communication-related characteristics. Empathy is positively associated with attitudes toward people with disabilities, and perceptions of nursing care are partly negatively correlated with these attitudes. In addition, empathy is partly negatively correlated with students' perceptions of nursing care. Finally, case-specific correlations were observed among empathy, attitudes, and perceptions.

Conclusions: The study demonstrated moderate to high empathy, positive attitudes toward people with disabilities, and a technical approach to perceptions of nursing care. Selective correlations were observed among empathy, attitudes, and perceptions, with some relationships being negative and others positive.

Keywords: Empathy, Nursing care, People with disabilities, Student attitudes, Nursing education

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INTRODUCTION

According to the World Health Organization (WHO), more than one billion people worldwide have some form of disability. This proportion is expected to increase over time because of population ageing and the impact of non-communicable diseases. It is also estimated that every person will experience a permanent or temporary disability at some point (WHO, 2021). These difficulties are described as one of the main challenges faced by people with disabilities in accessing basic health services (Geckil et al., 2017). Nurses and physicians constitute the largest professional groups in the health sector (Lo et al., 2017; Ika et al., 2019). The literature recognizes that negative attitudes among healthcare personnel can directly affect the quality of interaction with people with disabilities (Uysal et al., 2014; Med et al., 2013). Specifically, the negative attitudes of health professionals toward people with disabilities play a decisive role in inequalities in access to and quality of health services (Desroches, 2020). In the existing literature, nurses' and nursing students' attitudes toward people with disabilities are often at moderately positive levels (Oliva Ruiz et al., 2020; Ozdemir & Karadag, 2021). This situation indicates the need for further research aimed at improving nurses' attitudes toward people with disabilities (Geckil et al., 2017).

Another important characteristic of care for people with disabilities is the expression of empathy (Jones & Miller, 2018). Empathy "involves not only understanding the patient's situation and emotions, but also the ability to communicate that understanding" (Cecchetti et al., 2021). Empathy is a fundamental element for many health professionals. In the context of patient care, empathy is the ability to understand and convey each patient's subjective experiences and views (Eklund et al., 2019). In addition, empathy is necessary for assessing patients' actual needs and providing individualized care, thereby ensuring holistic and high-quality care (Moudatsou et al., 2020; Treglia, 2020). Empathy among nursing students is influenced by factors such as interpersonal relationships, gender, self-efficacy, self-esteem, and satisfaction with the choice of field of study. Interpersonal relationships are the strongest predictive factor (Kim, 2018). Finkelman and Kenner (2013) emphasize that the caring relationship, attention to human responses, integration of assessment data, application of scientific evidence, advancement of professional nursing knowledge, promotion of social justice, and assurance of safe and evidence-based practice are characteristics of professional nursing. Professional, personal, scientific, aesthetic, and ethical human interactions are important in nursing, where the patient must be at the center of practice (Kandula, 2019). Patient-centered care includes several aspects, such as respect for patients' values and priorities, provision of assistance and emotional support, patient comfort, patient education, continuity and coherence of healthcare services, respect for patients, their family members and friends, their participation in the therapeutic process, and, ultimately, easy access to healthcare (Boer et al., 2013; Cleary, 2016; Rathert et al., 2013).

The nursing process is a systematic problem-solving approach used in nursing care and includes five stages: assessment, diagnosis, planning, implementation, and evaluation (Aserati et al., 2014). This process forms the basis of the scientific approach to nursing care and is expected to guide nursing practice in providing care to patients (Tadzong-Awasum & Dufashwenayesu, 2021; Osman et al., 2021). In clinical practice, the nursing process must be implemented deliberately through critical thinking, clinical reasoning, and decision-making, with the aim of meeting patients' healthcare needs (Keshk et al., 2018; Lambie et al., 2015). Through the nursing process, nursing care is standardized, thereby improving communication and continuity of care (Adraro & Mengistu, 2020; Agyeman-Yeboah et al., 2017; Akhtar et al., 2018). When implemented effectively, the nursing process can enable the provision of holistic and high-quality nursing care, improving patient outcomes (Shewangizaw & Mersha, 2015; Shiferaw et al., 2020; Mondragón-Hernández & Sosa-Rosas, 2019; Adraro & Mengistu, 2020).

In addition, the nursing process provides a framework for critical thinking, problem solving, and knowledge development (Hagos et al., 2014; Akhtar et al., 2018). The aim of the present study was to assess empathy, attitudes toward people with disabilities, and perceptions of nursing care among nursing students.

The research questions include the following: What is the level of empathy among nursing students? What are nursing students' perceptions of nursing care? What are nursing students' attitudes toward people with disabilities? How is students' empathy correlated with their attitudes toward people with disabilities? Is there a correlation between students' perceptions of nursing care and their attitudes toward people with disabilities? How is students' empathy related to their perception of nursing care? Is there a correlation among empathy, attitudes toward people with disabilities, and perceptions of nursing care?

METHODOLOGY

Study design

For the present study, the quantitative method was selected, as it uses statistical techniques to analyze the large volume of data collected during the research process, with the aim of investigating relationships among different variables. Quantitative research focuses on the scientific examination of phenomena through statistical analyses and numerical variables, using tools such as questionnaires. The questionnaire format was selected as the most appropriate tool for conducting the study. Specifically, the four questionnaires selected for the present study were incorporated into the Google Forms electronic platform to facilitate their broad and immediate distribution. The shared link for completing the questionnaire was sent to public groups of nursing students via the internet and social networking media.

Regarding the sampling method, random criterion-based sampling was followed, since the sample was selected on the basis of availability and relevance to the research

subject (Creswell, 2014). The sample (N=122) consisted of randomly selected students who met specific inclusion criteria (active enrollment in a nursing department in Greece) and were able to respond to the online survey.

Measurement Tools

Four questionnaires were used for the present study. The demographic questionnaire included variables such as gender, age, year of study, professional involvement in the healthcare sector, participation in volunteering, contact with people with disabilities, type of institution (public/private), area of residence, and nationality, with the aim of analyzing the characteristics of the sample.

The MAS (Multidimensional Attitudes Scale) (Findler et al., 2007) measures attitudes toward disability across three dimensions (affective, cognitive, and behavioral) through a social scenario and 34 items on a five-point Likert scale. Its Greek version shows high reliability (Cronbach's alpha: 0.83-0.92) and can be used in education to detect attitudes and prejudices (Govina et al., 2020).

The NDI-35 (Nursing Dimensions Inventory) assesses perceptions of nursing care. It consists of practice-related statements organized into seven factors (e.g., Technical, Intimacy, Important/Unimportant aspects of care), which are rated on a five-point scale. Its Greek version shows satisfactory reliability (Cronbach's alpha=0.85, test-retest reliability $r=0.82$) and is used to study students' and nurses' attitudes toward care (Kotrotsiou et al., 2014).

The Toronto Empathy Questionnaire (TEQ) (Spreng et al., 2009) is a tool for assessing empathy as an emotional process, with 16 items on a five-point Likert scale. It includes elements such as emotional contagion, understanding of emotions, and altruism. It demonstrates high validity (correlation with EQ $r=0.80$) and reliability (Cronbach's alpha=0.85-0.87, test-retest $r=0.81$). The Greek version confirms its suitability for use in adult populations and in the field of education (Kourmoussi et al., 2017).

Ethical Considerations

The questionnaires distributed were anonymous, with the aim of ensuring and protecting participants' personal data. Participants had also been informed about the purposes of the study and about the fact that they could withdraw at any time. No pressure was exerted to participate under any circumstances. Approval from an ethics committee was not requested, as the study was anonymous, non-interventional, and did not involve sensitive personal data.

Statistical Analysis

As a primary stage, the statistical processing of the data required their appropriate coding and transformation so that they would be compatible with the functionality of IBM SPSS v.26, which was used for processing and presenting the results.

Reliability Analysis

The present analysis aimed to investigate the reliability of the data by estimating the values of Cronbach's alpha internal consistency coefficient for each scale and subscale of the present study. Initially, the "Multidimensional Attitudes Scale Toward People with Disabilities - MAS Scale" (Alpha=.799) was found to present very good levels of reliability both overall and by subscale. More specifically, the subscales "Thoughts/Perceptions" (Alpha=.944) and "Affect-related emotions" (Alpha=.912) showed excellent reliability, the "Calmness-related emotions" subscale (Alpha=.893) showed very high reliability, while the "Behaviors" subscale (Alpha=.720) showed acceptable and satisfactory reliability. Regarding the "Nursing Dimensions Inventory GR-NDI-35" questionnaire (Alpha=.888), it was estimated to present very high reliability, a finding also observed for its "Clinical Work" subscale (Alpha=.870), whereas reliability for the "Patient Needs" subscale (Alpha=.675) was marginally acceptable. Finally, regarding the "Toronto Empathy Scale" (Alpha=.763), reliability was estimated to be at acceptable and satisfactory levels, according to the following reliability table (Table 1).

RESULTS

The majority of participants were women (80.33%), aged 18-25 years (94.26%), and mainly in the 2nd year of study (80.33%). Most were not working in the health sector (84.43%) and had not participated in disability-related volunteering activities (87.70%), although 83.61% had personal or professional contact with people with disabilities. The vast majority attended a public university (99.18%) and lived in an urban area (74.59%). In terms of nationality, most were Greek (93.44%), with smaller proportions of Albanian (4.92%) and Cypriot (1.64%) origin. The majority of students (87.70%) had not enrolled in or participated in volunteering activities related to the care of people with disabilities, while 83.61% stated that they had had personal or professional contact with them (Table 2).

Table 1. Cronbach's alpha reliability coefficient

	Cronbach's Alpha	N of Items
Multidimensional Attitudes Scale Toward People with Disabilities - MAS Scale	.799	34
Affect-related emotions	.912	13
Calmness-related emotions	.893	3
Thoughts/Perceptions	.944	10

Behaviors	.720	8
Nursing Dimensions Inventory GR-NDI-35	.888	35
Clinical Work	.870	17
Patient Needs	.675	7
Toronto Empathy Scale	.763	16

Table 2. Frequency table - Demographic characteristics

		<i>N</i>	<i>N%</i>
1. Gender	Male	24	19.67%
	Female	98	80.33%
	Total	122	100.00%
2. Age	18-25	115	94.26%
	26-35	5	4.10%
	36-45	1	0.82%
	46+	1	0.82%
	Total	122	100.00%
3. Year of study	1st	0	0.00%
	2nd	98	80.33%
	3rd	11	9.02%
	4th or higher	13	10.66%
	Total	122	100.00%
4. Employment status in the healthcare sector	Not employed	103	84.43%
	Part-time employment	15	12.30%
	Full-time employment	4	3.28%
	Total	122	100.00%
5. Are you enrolled in a volunteering program or have you participated in activities related to the care of people with disabilities?	No	107	87.70%
	Yes	15	12.30%
	Total	122	100.00%
6. Have you ever had contact (personal or professional) with people with disabilities?	No	20	16.39%
	Yes	102	83.61%
	Total	122	100.00%
7. Educational institution of study	Public University	121	99.18%
	Private College	0	0.00%
	IEK - SAEK - DYPA	1	0.82%
	Total	122	100.00%
8. Area of residence	Urban	91	74.59%
	Semi-urban	16	13.11%
	Rural	15	12.30%
	Total	122	100.00%
9. Nationality	Greek	114	93.44%
	Cypriot	2	1.64%
	Albanian	6	4.92%
	Total	122	100.00%

Regarding the Clinical Work subscale of the nursing care questionnaire, it was initially estimated that protecting the patient's privacy and measuring vital signs recorded the highest percentages, with 95.08% rating them as very important. Similarly, observing the effects of a medication on the patient was considered vital by 94.26%, while reassuring the patient about a clinical procedure was characterized as crucial by 93.44%. In addition, the need for active listening to the patient was recognized by 84.43% of participants, while maintaining a pleasant attitude toward patients was considered important by 83.61%. Likewise, technical competence in a clinical procedure received a high rating from 81.15%, while explaining a clinical procedure to the patient was considered important by 79.51%. Involving the patient in their care was rated as very important by 75.41% of participants, while guidance in self-care was similarly rated by 70.49%. The nurse's presence beside the patient during a clinical procedure was important for 67.21%, while reporting the patient's condition to a senior nurse was considered crucial by 66.39%. Finally, although with lower percentages, assisting the patient in activities of daily living (e.g., washing, dressing) was considered important by 59.02% of participants, while recognizing the patient as a person was rated as very important by 58.20%. Regarding patients' needs, it was initially estimated that prioritizing the patient's needs over the nurse's personal needs was recognized as very important by only 24.59%, while 66.39% rated it as less important. Similarly, the act of a nurse sitting with the patient received a low impor-

tance score, as only 23.77% considered it very important, while 61.48% characterized it as less important. A similar trend was observed in exploring the patient's lifestyle, with only 31.97% rating it as very important, while 50.83% considered it of moderate or low importance. In addition, individualized attention to each patient's problems was considered very important by 36.89%; however, 49.18% placed it in the lower levels of importance. Regarding the spiritual needs of patients, caring for them was recognized as very important by 45.90%, but 40.17% considered it of moderate importance. Similarly, arranging contact between the patient and the chaplain received higher importance percentages (49.18%), although 36.88% rated it as of moderate importance. Finally, maintaining patients' records was characterized as very important by 44.26%, while 35.25% placed it at lower levels of importance. Regarding the emotional and religious dimensions of care, praying for the patient was considered very important by 21.31%, while 63.11% considered it of moderate or low importance; feeling sorry for the patient was judged important by 10.66%, with 67.21% placing it in the lower levels of importance. Reassuring a terminally ill patient that they are not going to die showed a relatively higher evaluation, with 25.41% considering it very important, while 57.38% placed it at the lowest scale level. Finally, keeping relatives informed about everything concerning the patient was considered very important by 54.92%, while 23.77% placed it in the lower importance categories (Table 3) (Table 4).

Table 3. Nursing Dimensions Inventory GR-NDI-35

Clinical Work	Very important		Moderately important		Slightly important		Important		Not at all important		Total	
	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
1. Involve a patient in their care	92	75.41%	12	9.84%	2	1.64%	14	11.48%	2	1.64%	1.54	1.08
2. Reassure the patient about a clinical procedure	114	93.44%	3	2.46%	0	0.00%	5	4.10%	0	0.00%	1.15	.61
5. Observe the effects of a medication on the patient	115	94.26%	2	1.64%	1	0.82%	4	3.28%	0	0.00%	1.13	.57
11. Be pleasant with patients	102	83.61%	11	9.02%	2	1.64%	6	4.92%	1	0.82%	1.30	.80
12. Protect the patient's privacy	116	95.08%	3	2.46%	2	1.64%	1	0.82%	0	0.00%	1.08	.40
16. Assist the patient with an activity of daily living (washing, dressing, etc.)	72	59.02%	26	21.31%	6	4.92%	16	13.11%	2	1.64%	1.77	1.13
19. Recognize the patient as a person	71	58.20%	25	20.49%	8	6.56%	13	10.66%	5	4.10%	1.82	1.19
20. Explain a clinical procedure to the patient.	97	79.51%	10	8.20%	1	0.82%	13	10.66%	1	0.82%	1.45	1.00
21. Dress neatly when working with patients	89	72.95%	14	11.48%	3	2.46%	14	11.48%	2	1.64%	1.57	1.09
24. Report the patient's condition to a senior nurse	81	66.39%	16	13.11%	8	6.56%	16	13.11%	1	0.82%	1.69	1.11
25. Be beside the patient during a clinical procedure	82	67.21%	20	16.39%	6	4.92%	12	9.84%	2	1.64%	1.62	1.06
26. Be honest with the patient	84	68.85%	20	16.39%	6	4.92%	11	9.02%	1	0.82%	1.57	1.00
28. Listen to the patient	103	84.43%	7	5.74%	3	2.46%	8	6.56%	1	0.82%	1.34	.88

29. Consult the doctor about the patient	104	85.25%	9	7.38%	1	0.82%	7	5.74%	1	0.82%	1.30	.82
30. Guide the patient in self-care (washing, dressing, etc.)	86	70.49%	18	14.75%	3	2.46%	13	10.66%	2	1.64%	1.58	1.07
33. Measure the patient's «vital signs» (e.g., pulse and blood pressure)	116	95.08%	2	1.64%	2	1.64%	2	1.64%	0	0.00%	1.10	.47
35. Be technically competent in a clinical procedure	99	81.15%	12	9.84%	2	1.64%	9	7.38%	0	0.00%	1.35	.84

Table 4. Nursing Dimensions Inventory GR-NDI-35

Patient Needs	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
4. Attend individually to each patient's problems	45	36.89%	32	26.23%	23	18.85%	17	13.93%	5	4.10%	2.22	1.20
10. Attend to a patient's spiritual needs	56	45.90%	29	23.77%	12	9.84%	17	13.93%	8	6.56%	2.11	1.31
15. Arrange for the patient's chaplain to visit them	60	49.18%	21	17.21%	17	13.93%	17	13.93%	7	5.74%	2.10	1.31
17. Keep patients' records up to date	54	44.26%	22	18.03%	13	10.66%	25	20.49%	8	6.56%	2.27	1.38
22. Sit with a patient	29	23.77%	37	30.33%	33	27.05%	18	14.75%	5	4.10%	2.45	1.13
23. Explore the patient's lifestyle	39	31.97%	43	35.25%	11	9.02%	21	17.21%	8	6.56%	2.31	1.27
34. Put the patient's needs first (i.e., before your own)	30	24.59%	32	26.23%	29	23.77%	11	9.02%	20	16.39%	2.66	1.38

Additional questionnaire items not classified into scales	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
3. Pray for the patient	26	21.31%	28	22.95%	29	23.77%	19	15.57%	20	16.39%	2.83	1.37
6. Keep in contact with the patient after discharge from the hospital	9	7.38%	15	12.30%	26	21.31%	18	14.75%	54	44.26%	3.76	1.33
7. Reassure a terminally ill patient that they are not going to die	31	25.41%	15	12.30%	23	18.85%	21	17.21%	32	26.23%	3.07	1.54
8. Stay at work after the end of the shift to complete a task	45	36.89%	22	18.03%	13	10.66%	26	21.31%	16	13.11%	2.56	1.49
9. Come to work when you do not feel well	10	8.20%	13	10.66%	33	27.05%	14	11.48%	52	42.62%	3.70	1.34
13. Make a patient do something even if they do not want to	8	6.56%	24	19.67%	31	25.41%	20	16.39%	39	31.97%	3.48	1.30
14. Show that you are busy all the time	7	5.74%	10	8.20%	28	22.95%	15	12.30%	62	50.82%	3.94	1.26
18. Feel sorry for a patient	13	10.66%	38	31.15%	28	22.95%	27	22.13%	16	13.11%	2.96	1.22
27. Organize the work of others for the patient	22	18.03%	25	20.49%	27	22.13%	27	22.13%	21	17.21%	3.00	1.36
31. Share a personal problem with a patient	5	4.10%	2	1.64%	8	6.56%	10	8.20%	97	79.51%	4.57	.99
32. Keep relatives informed about everything concerning the patient	67	54.92%	21	17.21%	6	4.92%	26	21.31%	2	1.64%	1.98	1.27

Table 5. Toronto Empathy Scale

	Never or almost never		Rarely		Sometimes		Often		Always		Total	
	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
1. When someone else is excited, I tend to become excited too.	4	3.28%	13	10.66%	46	37.70%	46	37.70%	13	10.66%	2.42	.93
2. Other people's misfortunes do not bother me very much. (R)	4	3.28%	20	16.39%	47	38.52%	35	28.69%	16	13.11%	2.32	1.01
3. It upsets me to see someone being treated without respect.	1	0.82%	2	1.64%	6	4.92%	39	31.97%	74	60.66%	3.50	.74

4. I remain unaffected when someone close to me is happy. (R)	0	0.00%	8	6.56%	21	17.21%	42	34.43%	51	41.80%	3.11	.92
5. I enjoy making other people feel better.	0	0.00%	1	0.82%	7	5.74%	36	29.51%	78	63.93%	3.57	.64
6. I have tender, concerned feelings for people less fortunate than me.	2	1.64%	10	8.20%	27	22.13%	46	37.70%	37	30.33%	2.87	1.00
7. When a friend starts to talk about their problems, I try to steer the conversation to something else. (R)	1	0.82%	2	1.64%	21	17.21%	26	21.31%	72	59.02%	3.36	.88
8. I can tell when others are sad, even when they do not say anything.	0	0.00%	2	1.64%	30	24.59%	56	45.90%	34	27.87%	3.00	.77
9. I find that I tune into other people's moods.	2	1.64%	7	5.74%	57	46.72%	45	36.89%	11	9.02%	2.46	.80
10. I do not feel compassion for people who cause themselves serious illnesses. (R)	1	0.82%	7	5.74%	26	21.31%	33	27.05%	55	45.08%	3.10	.98
11. I become irritated when someone cries. (R)	2	1.64%	4	3.28%	18	14.75%	45	36.89%	53	43.44%	3.17	.92
12. I am not really interested in how other people feel. (R)	0	0.00%	0	0.00%	10	8.20%	35	28.69%	77	63.11%	3.55	.64
13. When I see someone who is upset, I feel a strong urge to help.	0	0.00%	1	0.82%	17	13.93%	59	48.36%	45	36.89%	3.21	.71
14. When I see people being treated unfairly, I do not feel pity for them. (R)	3	2.46%	5	4.10%	24	19.67%	35	28.69%	55	45.08%	3.10	1.02
15. I find it silly for people to cry out of happiness. (R)	1	0.82%	10	8.20%	10	8.20%	16	13.11%	85	69.67%	3.43	1.00
16. When I see someone being taken advantage of, I feel somewhat protective toward them.	2	1.64%	5	4.10%	26	21.31%	50	40.98%	39	31.97%	2.98	.92

Table 6. Multidimensional Attitudes Scale Toward People with Disabilities - MAS

Emotions	Not at all		A little		Moderately		Very much		Extremely		Total	
	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
1. Tension	29	23.77%	27	22.13%	47	38.52%	11	9.02%	8	6.56%	2.52	1.14
2. Stress	23	18.85%	28	22.95%	34	27.87%	20	16.39%	17	13.93%	2.84	1.30
3. Despair	64	52.46%	25	20.49%	21	17.21%	3	2.46%	9	7.38%	1.92	1.21
4. Nervousness	27	22.13%	38	31.15%	26	21.31%	18	14.75%	13	10.66%	2.61	1.28
5. Shame	63	51.64%	18	14.75%	22	18.03%	7	5.74%	12	9.84%	2.07	1.35
6. Relaxation	24	19.67%	36	29.51%	44	36.07%	13	10.66%	5	4.10%	2.50	1.05
7. Serenity	26	21.31%	31	25.41%	40	32.79%	19	15.57%	6	4.92%	2.57	1.13
8. Calmness	20	16.39%	29	23.77%	36	29.51%	26	21.31%	11	9.02%	2.83	1.20
9. Depression	71	58.20%	24	19.67%	17	13.93%	8	6.56%	2	1.64%	1.74	1.03
10. Fear	44	36.07%	30	24.59%	28	22.95%	12	9.84%	8	6.56%	2.26	1.23
11. Distress	41	33.61%	29	23.77%	24	19.67%	15	12.30%	13	10.66%	2.43	1.35
12. Guilt	53	43.44%	33	27.05%	20	16.39%	7	5.74%	9	7.38%	2.07	1.22
13. Inhibition	43	35.25%	36	29.51%	36	29.51%	4	3.28%	3	2.46%	2.08	1.00
14. Pity	36	29.51%	30	24.59%	33	27.05%	14	11.48%	9	7.38%	2.43	1.23
15. Disgust	82	67.21%	14	11.48%	14	11.48%	6	4.92%	6	4.92%	1.69	1.16
16. Alertness	15	12.30%	17	13.93%	36	29.51%	35	28.69%	19	15.57%	3.21	1.23
Thoughts/Perceptions	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
1. This person seems interesting	8	6.56%	15	12.30%	46	37.70%	36	29.51%	17	13.93%	3.32	1.07
2. This person seems okay	5	4.10%	10	8.20%	39	31.97%	38	31.15%	30	24.59%	3.64	1.07
3. We may get along as people	3	2.46%	8	6.56%	48	39.34%	36	29.51%	27	22.13%	3.62	.98
4. This person seems friendly	4	3.28%	2	1.64%	45	36.89%	40	32.79%	31	25.41%	3.75	.96
5. I like meeting new people	4	3.28%	6	4.92%	33	27.05%	46	37.70%	33	27.05%	3.80	1.00
6. This person will be glad to have met me	5	4.10%	8	6.56%	52	42.62%	34	27.87%	23	18.85%	3.51	1.01

7. I can discuss matters of common interest with this person	3	2.46%	8	6.56%	39	31.97%	40	32.79%	32	26.23%	3.74	1.00
8. I can make this person feel more comfortable	4	3.28%	6	4.92%	36	29.51%	40	32.79%	36	29.51%	3.80	1.03
9. Why not get to know this person better?	3	2.46%	9	7.38%	37	30.33%	41	33.61%	32	26.23%	3.74	1.01
10. This person would appreciate it if I started a conversation with them	3	2.46%	8	6.56%	36	29.51%	41	33.61%	34	27.87%	3.78	1.01
Behaviors	N	N%	N	N%	N	N%	N	N%	N	N%	M	SD
1. Move away	35	28.69%	40	32.79%	37	30.33%	5	4.10%	5	4.10%	2.22	1.04
2. Get up and leave	50	40.98%	29	23.77%	33	27.05%	5	4.10%	5	4.10%	2.07	1.10
3. Read a newspaper or talk on the mobile phone	34	27.87%	29	23.77%	38	31.15%	16	13.11%	5	4.10%	2.42	1.15
4. Continue whatever this person was doing	19	15.57%	28	22.95%	46	37.70%	21	17.21%	8	6.56%	2.76	1.11
5. Find an excuse and leave	43	35.25%	30	24.59%	36	29.51%	7	5.74%	6	4.92%	2.20	1.14
6. Move to another table	54	44.26%	35	28.69%	26	21.31%	7	5.74%	0	0.00%	1.89	.94
7. Start a conversation if this person does not make the first move	11	9.02%	19	15.57%	39	31.97%	36	29.51%	17	13.93%	3.24	1.15
8. Start a conversation	5	4.10%	13	10.66%	42	34.43%	35	28.69%	27	22.13%	3.54	1.08

Table 7. Correlations between variables

			Empathy	GR-NDI-35	Clinical Work	Patient Needs	Calmness-related emotions	Thoughts and Perceptions		Behaviors
Spearman's rho	Empathy	Rho	1.000	-.096	-.228	-.098	-.022	.164	.307	-.045
		p	.	>.05	<.05	>.05	>.05	>.05	<.05	>.05
		N	122	122	122	122	122	122	122	122
	GR-NDI-35	Rho		1.000	.808	.902	-.051	-.027	-.285	.033
		p		.	<.05	<.05	>.05	>.05	<.05	>.05
		N		122	122	122	122	122	122	122
	Clinical Work	Rho			1.000	.715	-.038	-.032	-.302	-.035
		p			.	<.05	>.05	>.05	<.05	>.05
		N			122	122	122	122	122	122
	Patient Needs	Rho				1.000	-.104	.015	-.262	.035
		p				.	>.05	>.05	<.05	>.05
		N				122	122	122	122	122
	Calmness-related emotions	Rho					1.000	-.433	.247	-.061
		p					.	<.05	<.05	>.05
		N					122	122	122	122
	Affect-related emotions	Rho						1.000	-.136	.257
		p						.	>.05	<.05
		N						122	122	122
	Thoughts and Perceptions	Rho							1.000	-.159
		p							.	>.05
		N							122	122
	Behaviors	Rho								1.000
		p								.
		N								122

Regarding the assessment of empathy, it was initially estimated that participants demonstrate strong empathy in many situations. Specifically, almost half of the sample (48.36%) agreed that they usually become excited when someone else is excited, while most did not disregard other people's misfortunes (58.19%). In addition, the majority (92.63%) reported that they are upset by the mistreatment of other people, while the willingness to help others was also significant, as 93.44% stated that they enjoy making others feel better. Empathy is also strengthened in the case of close persons, with 76.23% agreeing that they are affected by their friends' happiness. However, the tendency to steer the conversation to other topics when friends talk about their problems (80.33%) was less common, while participants also recognized others' sadness (73.77%). In addition, they displayed significant empathy toward people who cause themselves serious illnesses (72.13%); 80.33% did not express irritation when someone cried, while 91.80% stated that they always care about how others feel. Regarding support, 85.25% reported that they feel a strong urge to help when they see someone upset, 73.77% stated that they feel pity for those who are treated unfairly, while most participants (82.78%) did not consider it silly for people to cry out of happiness (Table 5).

Regarding the Multidimensional Attitudes Scale toward people with disabilities, it was initially estimated for affect-related emotions that the majority of students recorded low levels of tension (84.42%), stress (69.67%), despair (90.16%), nervousness (74.59%), shame (84.42%), depression (91.80%), fear (83.61%), distress (77.05%), guilt (86.88%), and disgust (90.17%), while alertness was observed to a significant degree by 44.26% of the students in the study. Regarding calmness-related emotions, it was estimated that the majority of students experienced relaxation (85.25%), serenity (79.51%), and calmness (69.67%) at low to moderate levels.

The results from the Thoughts/Perceptions scale show a generally positive attitude among participants toward meeting and interacting with new people. Specifically, 55.74% of participants estimated that the person seems okay and 58.20% considered that the person appears friendly. However, the perception of whether the person seems interesting showed greater variation, with 56.56% of participants expressing moderate or low agreement. The predisposition toward communication also appeared positive, with 59.02% agreeing that they could discuss matters of common interest with the person and 59.84% stating that they would like to get to know the person better. It is noteworthy that 61.48% considered that the person would appreciate an approach for conversation, while 62.30% believed they could make the person feel more comfortable. Finally, the majority, at 64.75%, expressed a positive attitude toward social interactions, agreeing that they like meeting new people.

Regarding the Behaviors scale, participants appeared to avoid distancing or indifference in social situations to a large extent. More specifically, 91.81% agreed to a low degree with the idea of moving away or getting up and leav-

ing (91.80%), while 94.26% did not choose to go to another table, indicating that they do not prefer isolation. In addition, 82.79% did not show willingness to read a newspaper or talk on the mobile phone, while 76.22% rejected the option of continuing what they had previously been doing. Moreover, 89.35% did not prefer the tactic of finding an excuse and leaving, while there was a greater willingness to communicate, with 43.44% stating that they would start a conversation if the other person did not do so, and 50.82% choosing to begin a conversation.

The overall behavior of the scales and subscales of the study, empathy was estimated to be at moderate levels, while the nursing care assessment scale, including the Clinical Work and Patient Needs subscales, was on average at significant levels. Finally, the subscales of calmness-related emotions, affect-related emotions, and behaviors were on average at neutral to low evaluation levels, in contrast to thoughts and perceptions, whose results placed them at neutral to high levels (Table 6).

Analyzing the correlations among the scales, it was estimated that as empathy increases, clinical work tends to be considered increasingly important and thoughts and perceptions about people with disabilities also tend to be strengthened; at the same time, thoughts and perceptions are strengthened as the importance of the overall evaluation of nursing care increases, and vice versa. In addition, the more important clinical work and patients' needs are considered, the more thoughts and perceptions about people with disabilities tend to be strengthened. Also, the stronger the calmness-related emotions, the more affect-related emotions tend to weaken, while thoughts and perceptions about people with disabilities are strengthened. Finally, the stronger the affect-related emotions, the more behaviors toward people with disabilities tend to be strengthened (Table 7).

According to the above results, students' empathy is partly positively correlated with their attitudes toward people with disabilities, as a statistically significant positive relationship exists only with the Thoughts/Perceptions subscale, whereas it is not correlated with calmness-related emotions, affect-related emotions, or behaviors. In addition, students' perceptions of nursing care are partly negatively correlated with their attitudes toward people with disabilities, as the Thoughts/Perceptions subscale shows a statistically significant negative correlation with both the Clinical Work subscale and Patient Needs, whereas the subscales of calmness-related emotions and affect-related emotions, as well as behaviors, are not correlated with the attitudes under examination.

Furthermore, students' empathy is partly negatively correlated with students' perceptions of nursing care, as it is negatively correlated with the Clinical Work subscale and is not correlated at all with Patient Needs. Finally, the existence of a correlation among empathy, attitudes toward people with disabilities, and perceptions of nursing care is confirmed on a case-by-case basis, since the statistically significant correlations, whether positive or negative, appeared in specific combinations of variables and not across

the full set of possible combinations.

Investigating the effect of demographic characteristics on the scales and subscales of the study, it was initially estimated that the factor of students' personal or professional contact with people with disabilities did not affect empathy, the subscales of attitudes toward people with disabilities, or the evaluation of nursing care. On the other hand, empathy was estimated to be affected by gender, with women showing higher mean and median levels of empathy than men, and by year of study, where increasing year of study tended to be associated with decreasing levels of empathy, with students in the 3rd and 4th or later years showing homogeneous behavior.

In addition, empathy is affected by employment status, with students who are not working showing higher mean and median levels of empathy compared with students working part-time; it is also affected by enrollment in a volunteering program or participation in activities related to the care of people with disabilities, where students who are enrolled in a volunteering program or have participated in activities related to the care of people with disabilities present higher levels of empathy compared with those who have not participated in such activities.

Finally, area of residence affects calmness-related emotions, with residents of semi-urban areas showing the highest levels, followed by residents of urban areas, while residents of rural areas were estimated last; residents of urban and semi-urban areas tend to show homogeneous behavior. According to the above results, gender, year of study, employment status, and enrollment in a volunteering program or participation in activities related to the care of people with disabilities affect only empathy, while they do not affect nursing students' attitudes toward people with disabilities or their perceptions of nursing care.

In addition, area of residence partly affects nursing students' attitudes toward people with disabilities through the calmness-related emotions subscale, while it does not affect empathy or nursing students' perceptions of nursing care. Finally, contact (personal or professional) with people with disabilities affects neither empathy, nor nursing students' attitudes toward people with disabilities, nor their perceptions of nursing care.

DISCUSSION

The findings of the study highlight important trends in nursing students' views, behavior, and empathy toward people with disabilities, as well as the importance they attach to aspects of care. Empathy was identified at moderate to high levels, with high levels of agreement in statements reflecting a humanitarian attitude, confirming the findings of the study by Eren and Gürhan (2021). However, its further development appears to require targeted interventions and experiential learning. Demographic factors such as gender, year of study, and involvement in volunteering mainly affect empathy, but not attitudes or perceptions of care, which appear to be shaped more deeply by social factors. Area of residence appears to partly affect attitudes, possibly due to differences in social inclusion. Personal

or professional contact with people with disabilities does not appear to be statistically related to the variables under study. This divergence may be explained by the fact that contact that does not occur under appropriate conditions - that is, without guidance, equality, a shared purpose, and a reflective framework - does not automatically transform attitudes, but may sometimes perpetuate passive or uncritical interaction (Pettigrew & Tropp, 2006).

Empathy, although high in some subgroups (e.g., women, volunteers), does not appear to be sufficient to change attitudes without ethical and critical processing. In other words, empathy needs to be transformed into critical empathy, capable of influencing moral judgment and professional attitude (Wear & Zarconi, 2008). The "cognitive-emotional distance" and the absence of a coherent culture of care in educational environments appear to require reflective interventions. Women showed higher empathy than men, in agreement with other studies (Kim et al., 2004; Ward et al., 2012), while empathy decreases in the later years, possibly because of repeated exposure to stressful clinical experiences and the gradual "desensitization" to human experience through daily contact with pain and illness. This phenomenon has also been highlighted in relevant studies (Ward et al., 2012; Williams et al., 2015), which emphasize the need to strengthen empathy throughout the course of studies, with emphasis on holistic and person-centered education. Students appear to recognize basic aspects of care (e.g., privacy, active listening), but less so emotional and spiritual needs. The technical approach appears to prevail. This finding is supported by the study by Dugué et al. (2021), which reports that training based on emotional development is rare in nursing education programs. This appears to agree with a study reporting that the ethos of most health professional curricula typically uses biomedical models that focus mainly on the teaching, training, and practice of clinical medicine, with less emphasis on patients' psychosocial well-being (Draper & Louw, 2007). Patients' needs and perceptions should be taken into account in every strategic decision concerning nursing staff allocation. Understanding these differences will allow any existing gap to be bridged, so that the nursing care provided ensures patient satisfaction (Alikari et al., 2022).

Students' attitudes toward people with disabilities are positive, with low expression of negative emotions, in contrast to other studies that report negative attitudes or emotions (Linto et al., 2023; Yilmaz & Kitis, 2024). Students appear willing to interact, although they may have difficulty recognizing their feelings. At the same time, 59.02% state that they can discuss common interests with people with disabilities, as also supported by other studies which conclude that nursing students have good communication skills and that more than half showed a positive attitude toward people with disabilities (Atia et al., 2022).

The literature appears to be divided regarding the effect of gender on attitudes (Ozdemir & Karadag, 2021; Subay et al., 2022), but a generally positive effect of experience and

education is evident. In our study, only 12.30% had been involved in relevant volunteering activities despite their expressed empathy, suggesting possible “moral distancing”, whereby positive attitudes are not translated into active social involvement (Darling & Heckert, 2010). Perception of care is partially negatively related to attitudes toward disability, indicating the dominance of a technocratic approach. The concept of care, as formulated in Watson’s theory (2008), is not limited to the functional dimension of nursing work but includes humanistic, cultural, and ethical empathy. Correspondingly, high empathy is not always correlated with a person-centered perception of care. In the study by Evans et al. (2023), educational interventions aimed at strengthening empathy contributed decisively to changing students’ attitudes and to recognizing the importance of the person-centered dimension of care. The study by Geçkil et al. (2017), in which nursing students participated in targeted empathy activities, confirms that strengthening empathy leads to more positive attitudes toward people with disabilities, since students not only changed their perceptions theoretically but also developed a deeper emotional understanding of the everyday life of people with disabilities.

Study limitations

The present study has certain limitations that should be taken into account when interpreting the results. First, the use of a quantitative methodology may not capture in depth the personal experiences, internal processes, and sociocultural contexts of participants. The electronic questionnaire may have affected the authenticity and accuracy of responses, as it presupposed participants’ understanding of the questions. Finally, it was not possible to ensure balanced representation of different years of study and sociodemographic characteristics, which limits the generalizability of the findings to the wider population of nursing students.

CONCLUSIONS

In conclusion, nursing students recorded moderate to high empathy and positive attitudes toward people with disabilities, with limited evidence of negative emotions,

positive cognitive evaluation, and encouraging behavioral intention, while their attitude toward the care provided was oriented more toward technical and communication-related characteristics. At the cognitive level, participants expressed acceptance and openness toward people with disabilities. Agreement rates for statements related to intention to communicate were relatively high, indicating not only cognitive acceptance but also a predisposition toward active involvement in social integration processes.

The majority of participants stated that they were willing to start a conversation and make the person with a disability feel comfortable, while rejecting practices of distancing or social withdrawal. Students’ evaluation of nursing care showed emphasis on the technical and functional aspects of clinical work, such as protecting privacy, measuring vital signs, and observing the effects of medications. Communication skills emerged as particularly important, whereas aspects related to patients’ psychosocial or spiritual needs were recorded as less important. Statistical analysis showed that empathy is positively associated with attitudes toward people with disabilities, while perceptions of nursing care are partly negatively correlated with these attitudes. In addition, empathy is partly negatively correlated with students’ perceptions of nursing care. Finally, case-specific correlations were observed among empathy, attitudes, and perceptions. Gender, year of study, employment status, and enrollment in a volunteering program or participation in activities related to the care of people with disabilities affect only empathy, while they do not affect nursing students’ attitudes toward people with disabilities or their perceptions of nursing care. Area of residence also partly affects nursing students’ attitudes toward people with disabilities, while it does not affect empathy or nursing students’ perceptions of nursing care. Finally, contact (personal or professional) with people with disabilities affects neither empathy, nor nursing students’ attitudes toward people with disabilities, nor their perceptions of nursing care.

Future research could focus on evaluating the effectiveness of educational interventions aimed at improving nursing students’ empathy and attitudes toward people with disabilities.

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Exploring the Impact of Mindfulness on Nurses' Job Performance

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ABSTRACT

Introduction: Mindfulness is a state of conscious attention to the present moment. In essence, it is the intentional awareness and consciousness of each present moment.

Aim: The aim of this study was to explore the impact of mindfulness on nurses' job performance, focusing on the dimensions of daily performance, adaptability, and counterproductive behavior.

Methodology: This was a descriptive correlational study. Participants were nurses with at least six months of clinical experience. The Mindful Attention and Awareness Scale was used to assess the level of mindfulness, while the Individual Work Performance Questionnaire was selected to assess job performance. Data was collected through electronic questionnaires distributed via an online platform, ensuring anonymity and confidentiality. The study also assessed the relationship of mindfulness with nurses' age, professional experience, and position of responsibility.

Results: The sample included 320 nurses from 19 hospitals in Athens and 11 hospitals in the rest of Greece. A total of 26.56% held a position of responsibility. The mean age was 47.66 ± 8.82 years old and the mean professional experience was 22.04 ± 9.85 years. Mindfulness was positively correlated with daily performance ($p < 0.01$) and negatively correlated with counterproductive behavior ($p < 0.01$). Nurses holding a position of responsibility had higher scores in mindfulness and daily performance, and lower levels of counterproductive behavior, than those without such a position.

Conclusions: The findings highlight the value of mindfulness as a tool for assessing and improving nurses' job performance, psychological resilience, and emotional well-being. At the same time, its integration into educational programs is recommended to strengthen the professional skills and job satisfaction of nursing staff.

Keywords: Mindfulness, Job Performance, Adaptability, Counterproductive Behavior.

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INTRODUCTION

Mindfulness refers to an individual's ability to maintain attention in the present moment without judgment and without being distracted by thoughts about the past or worries about the future. This practice has roots in Buddhist and meditation traditions, but in recent decades it has been widely adopted in psychology and the health sciences (Dakwar E., Levin F., 2009). According to Jon Kabat-Zinn, a pioneer in the Western application of mindfulness, it is 'the awareness that arises from paying attention, on purpose, in the present moment, and non-judgmentally' (Jon Kabat-Zinn JK, 2003).

Mindfulness is particularly important in health care, where health professionals work under high pressure and are called upon to make critical decisions that affect patients' well-being. Numerous studies show that the practice of mindful awareness can reduce stress, increase emotional resilience, and improve concentration and decision-making. It can also help reduce occupational burnout, which is particularly common in health care, through practices such as breathing-focused attention and meditation (Shapiro, S. L., Astin, J. A. et al., 2005).

Another important area is the quality of care provided. Health professionals who practice techniques that enhance mental presence demonstrate greater empathy, better communication with patients, and better responsiveness to patients' needs, thereby strengthening the therapeutic relationship and overall patient satisfaction. Studies have shown that mindfulness reduces cognitive overload and helps health professionals process information more effectively. Through the practice of careful, impartial observation of the present moment, nurses can gain greater awareness of the data in clinical situations and avoid impulsive or automatic reactions that may lead to adverse events (Smith S., 2014).

Clinical decision-making is one of the most demanding skills for nurses, as it directly affects quality of care and patient safety. Nurses are required every day to respond to complex and stressful situations, making decisions that involve crisis management, continuous adaptation to constantly changing conditions, and the need for effective communication with the wider medical team.

Research shows that mindfulness reduces cognitive overload and enhances clarity of thought in critical moments. A nurse's ability to remain present and focused on the current situation, while avoiding impulsive or mechanical reactions, can contribute to rational data analysis and evidence-based decision-making. At the same time, cultivating self-awareness helps manage stress, which often negatively affects decision-making. Under pressure, a frequent condition in hospital settings, stress can increase the risk of errors. Nurses who practice mindfulness are better able to remain calm and address

situations with objectivity and confidence (Wang F., Liu C., 2023).

Exploring the relationship between mindfulness, job performance, and clinical decision-making may lead to the development of targeted interventions that strengthen nurses' psychological resilience and professional effectiveness. This research is expected to contribute substantially to understanding how mindfulness can be used as a tool for improving quality of care and work experience in the health sector.

AIM

This study aimed to contribute to understanding the role of mindfulness in improving quality of care and work experience in the health sector. Its main objectives are:

- To explore mindfulness as a tool for promoting psychological well-being, with emphasis on reducing anxiety and increasing attention and concentration.
- To enhance job satisfaction and improve the resilience of nursing staff in response to the daily challenges of the profession.
- To evaluate the integration of mindfulness education programs as an innovative intervention strategy in health care, with the aim of protecting professionals' mental health and improving the quality of services provided.

Research Questions:

- Is there a correlation between mindfulness and nurses' job performance?
- To what extent does mindfulness affect job performance and clinical decision-making?
- To what extent are factors such as age, years of service, and position of responsibility related both to the level of mindfulness and to nurses' job performance?

METHODOLOGY

Study Design

This was a descriptive correlational study designed to analyze the relationship between mindfulness and the dimensions of job performance among nursing staff.

The research protocol included the use of two validated questionnaires: the Mindful Attention Awareness Scale (MAAS) for measuring mindfulness and the Individual Work Performance Questionnaire (IW PQ) for assessing job performance. Data were collected through an online platform (Google Forms), ensuring anonymity and voluntary participation.

The MAAS assesses mindfulness, that is, an individual's ability to be present and focused in the moment. The Greek translation of the MAAS instrument was used based on the study by Mantzios et al. (2013), which established the psychometric validity and reliability of the instrument in the Greek language. The translation was carried out with scientific accuracy, and written permission was obtained

from the authors for its use in the present study (Mantzios M. et al., 2013). It is a widely used tool for measuring mindfulness, assessing an individual's degree of attention and awareness in the present moment. The questionnaire includes statements that examine the individual's ability to remain consciously focused on everyday experiences without automatic reactions or judgmental thinking.

The MAAS (Mindful Attention Awareness Scale) is a Likert scale ranging from 1 to 6 to assess participants' mindfulness, with the purpose of measuring their ability to remain present and focused on their current activities. Participants are asked to rate the extent to which they agree with each statement, such as 'I am preoccupied with thoughts about the future or the past.' A score of 1 means 'almost always', whereas a score of 6 represents 'almost never'. The MAAS score is calculated by adding the scores for all items and then calculating the mean, which provides a general indication of the individual's level of mindfulness. A high mean score indicates high mindfulness, whereas a low mean score suggests difficulty with concentration and present-moment awareness (Mantzios M. et al., 2013).

The Individual Work Performance Questionnaire (IWPQ) is an instrument used to assess employees' job performance in various professional settings, including health care and nursing. The IWPQ enables the assessment of three key dimensions of job performance, which are critical for ensuring quality of care and the functioning of hospital units. These dimensions are (Galanis P., Katsiroumpa A. et al., 2024):

Daily Performance

This refers to the employee's ability to perform duties effectively and efficiently.

Adaptability This also includes employees' ability to be effective in different environments and to manage different schedules and working conditions without negatively affecting the quality of their work.

Counterproductive Behavior

This measures the frequency with which employees display negative or counterproductive behaviors, such as carelessness, errors, or reduced commitment to their professional duties.

Each dimension includes a series of questions in which participants rate the frequency of the specific behaviors on a Likert scale from 1 to 5, where 1 represents 'never' and 5 represents 'very often'. In the present study, the Greek translation of the questionnaire produced in the recent study by Galanis et al. (2024) was used; that study established the validity and reliability of the instrument in the Greek professional setting. In this case as well, use of the questionnaire was ensured through written permission from the authors (Galanis P., Katsiroumpa A. et al., 2024).

Study Sample

Population and Inclusion Criteria

The target population included active nurses working in public and private health-care organizations in Greece. Inclusion criteria were: (a) active professional employment in a hospital, clinic, or health center; (b) at least six months of professional experience; and (c) sufficient knowledge of Greek to understand the questionnaires. Individuals in administrative positions without direct clinical responsibility, as well as those on sick leave during the data collection period, were excluded.

Sample Size and Composition

A total of 320 nurses from various hospitals, clinics, and health centers participated in the study, mainly in Athens but also in regional areas, ensuring a substantial degree of diversity in terms of experience, age, and positions of responsibility. The majority of participants worked in nursing units in Athens (86.25%), while 13.75% worked in regional areas. Women accounted for 69.38% of the sample, and the mean age was 47.66 years. A total of 26.56% reported holding a position of responsibility, while the mean length of service was 22.04 years (Table 1).

Data Collection

Data was collected exclusively through an online questionnaire (Google Forms) between 1 January and 28 February 2025. The questionnaire was distributed via email, professional networks, and social media to achieve a higher response rate. Participants completed the questionnaires anonymously, ensuring the accuracy and sincerity of their responses. Google Forms enabled the automated recording of responses, the possibility of processing the data in statistical analysis software, and the protection of personal data, as no names or other personally identifiable information were requested.

Ethical and Deontological Issues

Electronic data collection through Google Forms enabled the rapid and secure storage of information in spreadsheets ready for statistical processing (descriptive and inferential analysis). Participation was voluntary, anonymous, and accompanied by the option to withdraw at any time. Participants were fully informed about the study's purpose and procedures, and all rules for ensuring anonymity and confidentiality were followed in accordance with the General Data Protection Regulation (GDPR).

Statistical Analysis

The study applied a strictly defined methodological approach to analyze the relationship between mindfulness and job performance among nurses. The statistical processing included the following stages: A descriptive analysis of the demographic and work-related

characteristics of the sample was performed.

This included:

Means and standard deviations for the questionnaire variables.

Frequency distributions for categorical variables such as sex, years of experience, work sector, and geographical distribution (Athens or regional areas).

Initially, the normality of the data was tested. The Shapiro-Wilk test was used to determine whether the data followed a normal distribution. Because some variables did not meet normality criteria, non-parametric methods, such as Spearman's correlation, were applied for correlations.

Correlations and group differences: Correlations (e.g., age with MAAS, age with IWPQ) and differences between groups (e.g., Athens vs. regional areas; position of responsibility vs. no position of responsibility) were examined with respect to the MAAS and IWPQ dimensions. Kruskal-Wallis or Mann-Whitney U tests were used depending on the comparison.

The SPSS V20 for Windows statistical package was used for statistical processing.

RESULTS

The internal consistency of the two questionnaires was assessed using Cronbach's Alpha reliability coefficient.

For the Mindful Attention and Awareness Scale (MAAS), Cronbach's Alpha was 0.731, indicating moderate but acceptable reliability. For the Individual Work Performance Questionnaire (IWPQ), Cronbach's Alpha was 0.821, corresponding to high reliability.

According to the literature, Cronbach's Alpha values above 0.7 are considered acceptable, whereas values above 0.8 reflect high reliability. Therefore, the IWPQ demonstrates high internal consistency, while the MAAS is at a marginally acceptable level of reliability.

The level of mindfulness was first estimated using the MAAS index. The sample mean was 4.55, with a standard deviation (SD) of 0.76, indicating relatively low dispersion of values around the mean. The minimum recorded value was 2.33, while the maximum value was 5.75, reflecting the range of participants' responses. In addition, the interquartile range (IQR) was calculated at 1.07, indicating that the data were concentrated around the mean and that no extreme deviations were observed (Table 2).

Table 1. Demographic Characteristics

Category	Value (%)	Mean (Standard Deviation)
Total Number of Participants	320.0	
Mean Age (years)		47.66 (8.82)
Mean Professional Experience (years)	-	22.04 (9.85)
Athens	276 (86.25%)	
Regional areas (%)	44.0 (13.75%)	
Without Position of Responsibility (%)	234 (73.17%)	
With Position of Responsibility (%)	85 (26.56%)	

Table 2. Overall Assessment of Mindfulness Level (MAAS Score)

Statistical Index	Mean	Standard Deviation (SD)	Minimum Value (Min)	Maximum Value (Max)	Interquartile Range (IQR)
Mindful Attention Awareness Scale (MAAS) Score	4.55	0.76	2.33	5.75	1.07

Participants in the study demonstrated moderate to high mindfulness, suggesting that nurses generally feel able to maintain attention to their activities and to remain present in their professional responsibilities.

The relationship between mindfulness (Mindful Attention Awareness Scale - MAAS) and demographic and professional factors among the nurses in the study was then examined (Table 3).

Table 3. Correlation of Mindfulness (MAAS Score) with Age, Position of Responsibility, and Place of Work

Variable		Mean Rank	p value
Position of Responsibility	YES	185	<0.01
	NO	146.2	
Place of Work	ATHENS	163.5	<0.05
	URBAN AREAS	149.9	
Age	Spearman correlation		p > 0.05

Table 4. Assessment of the Three Dimensions of Job Performance (IWPQ)

	Mean	Standard Deviation
1. Daily Performance		
1. I plan what I will do at work so that I can complete it on time	4.412	0.905
2. I plan my actions in the best possible way	4.319	0.852
3. I keep in mind the goals I need to achieve	4.328	0.857
4. I can distinguish important from less important tasks	4.412	0.923
5. I complete my tasks using the least possible time and effort	3.669	1.061
2. Adaptability		
1. I seek to take on additional responsibilities beyond those assigned to me	3.388	1.164
2. I start new projects after completing previous ones	3.878	0.989
3. I take on interesting tasks when they are available	3.638	1.086
4. I try to keep my knowledge up to date	3.922	0.997
5. I seek to continuously improve my skills and abilities	4.231	0.938
6. I find creative solutions to new problems that arise	4.016	0.942
7. I seek new challenges in my professional field	3.559	1.078
3. Counterproductive Behavior		
1. I actively participate in professional meetings	3.747	1.095
2. I complain about unimportant issues in the workplace	2.128	1.085
3. I tend to exaggerate problems that arise	1.894	1.021
4. I focus on the negative aspects of work rather than the positive ones	2.319	1.136
5. I discuss the negative aspects of the professional environment with my colleagues	3.309	1.115
6. I mention negative aspects of work when speaking with people outside my professional circle	2.819	1.239

1. Correlation between MAAS and Position of Responsibility

Nurses holding a position of responsibility had a significantly higher mean rank (185.6) compared with those who did not hold such a position (146.2), with $p < 0.01$.

This suggests that nurses in administrative or leadership roles demonstrate higher levels of mindfulness, which may be related to increased demands for self-regulation, concentration, and decision-making.

2. Correlation between MAAS and Geographical Work Location

Nurses working in Athens had a higher mean rank (163.5) than those working in regional areas (140.9), with $p < 0.05$, indicating a statistically significant difference. This difference may be attributable to different work rhythms, education, or the availability of mindfulness training programs in large urban centers.

3. Correlation between Age and MAAS

Spearman's analysis showed no statistically significant correlation ($\rho = 0.05$, $p > 0.05$) between age and MAAS score. This means that nurses' age does not appear to significantly affect their mindfulness, suggesting that the ability to pay attention and maintain awareness does not depend directly on age-related experience, but possibly on other factors such as education or working conditions.

Assessment of the Three Dimensions of Job Performance

Table 4 presents the results of the analysis of nurses' job performance as assessed by the Individual Work Performance Questionnaire (IWPQ). Specifically, it presents both the overall values and the means and standard deviations for each individual item composing the three main dimensions of job performance.

Daily performance was the dimension with the highest mean score ($M = 4.09$). This result indicates that nurses have a positive perception of their ability to perform

their daily duties effectively. In addition, the high score reflects time management and organizational abilities and may contribute to reducing work-related stress and strengthening professional well-being.

Adaptability had a slightly lower mean score ($M = 3.87$) compared with daily performance, indicating some difficulties in adapting to new working conditions. Limited adaptability may be attributed to gaps in training programs or to the need to strengthen skills related to flexibility and coping with unpredictable situations. Counterproductive behavior had the lowest mean score ($M = 2.70$), indicating that nurses rarely display behaviors that negatively affect the workplace. The low values for counterproductive behavior in the study results reflect a positive work climate and a high level of professionalism among participants.

Levels of Mindfulness and Their Correlation with Job Performance

The analysis results show that mindfulness is significantly related to the three dimensions of nurses' job performance (Table 4). Specifically, a positive correlation was observed with daily performance ($r = 0.44$, $p < 0.01$), indicating that higher levels of mindfulness are associated with greater effectiveness in performing everyday professional duties.

In addition, mindfulness showed a negative correlation with counterproductive behavior ($r = -0.34$, $p < 0.01$), suggesting that nurses with higher levels of awareness and self-regulation tend to exhibit fewer dysfunctional or disruptive behaviors in the workplace. Finally, the correlation with adaptability was moderate ($r = 0.34$, $p < 0.05$), suggesting that mindfulness may contribute to improving the ability to adapt to new or demanding working conditions, although this relationship is not as strong as with the other two dimensions.

These findings strengthen the theoretical basis supporting the role of mindfulness in improving professional performance and preventing dysfunctional behaviors in health-care settings.

Table 5. Correlation of Mindfulness with Job Performance

Dimension	Correlation (r)	Statistical Significance (p)
MAAS and Job Performance	0.44	$p < 0.01$
MAAS and Adaptability	0.34	$p < 0.05$
MAAS and Counterproductive Behavior	-0.34	$p < 0.01$

Table 6. Correlation of Age with Job Performance

Dimension	Correlation (r)	Statistical Significance (p)
Age and Job Performance	0.20	$p < 0.05$
Age and Adaptability	0.06	$p > 0.05$
Age and Counterproductive Behavior	-0.30	$p < 0.05$

Table 7. Correlation of Position of Responsibility with Job Performance

Dimension	Position of Responsibility: Yes	Position of Responsibility: No	p value
MAAS Score	4.72	4.38	$p < 0.05$
Job Performance	4.25	4.05	$p < 0.05$
Adaptability	3.95	3.79	$p < 0.05$
Counterproductive Behavior	2.50	2.85	$p < 0.05$

Relationship between Age and Job Performance

Age appeared to influence certain dimensions of job performance. Specifically, a positive correlation with daily performance was observed ($r = 0.20$, $p < 0.05$), suggesting that older nurses have developed abilities that allow them to perform their duties with greater effectiveness. By contrast, age did not appear to be related to adaptability ($r = 0.06$, $p > 0.05$), indicating that the ability to adapt to changing working conditions does not necessarily depend on age.

In addition, a negative correlation was recorded between age and counterproductive behavior ($r = -0.30$, $p < 0.05$), which may reflect greater professional maturity and experience among older nurses (Table 5).

Position of Responsibility and Job Performance

Nurses holding a position of responsibility showed higher levels of mindfulness ($M = 4.72$ vs. 4.38 , $p < 0.05$), daily performance ($M = 4.25$ vs. 4.05 , $p < 0.05$), and adaptability ($M = 3.95$ vs. 3.79 , $p < 0.05$). At the same time, they showed lower levels of counterproductive behavior ($M = 2.50$ vs. 2.85 , $p < 0.05$). Table 6 presents the results of the correlation between job performance and the presence or absence of a position of responsibility.

DISCUSSION

The present study highlighted the significant relationship between mindfulness and job performance among nurses, using the Mindful Attention Awareness Scale (MAAS) to assess mindfulness and the Individual Work Performance Questionnaire (IWPQ) to measure performance in the dimensions of daily work, adaptability, and counterproductive behavior. The findings underline the positive role of present-moment awareness in improving effectiveness and preventing dysfunctional behaviors.

The positive correlation between this skill and daily performance ($r = 0.44$, $p < 0.01$) confirms theoretical approaches that emphasize its contribution to improving concentration, self-regulation, and decision-making (Dane E., Brummel B., 2014; Huelshager U. R., 2013). In nursing, where professionals manage complex clinical situations, the ability to focus on the present moment contributes to better decision-making, reduced anxiety, and fewer errors (Lomas T., Medinas J. et al., 2018).

Research has shown that the development of this ability increases empathy and emotional resilience, facilitating interactions with patients and colleagues (Shapiro, S. L., Astin, J. A. et al., 2005). Similarly, the negative correlation

with counterproductive behavior ($r = -0.34$, $p < 0.01$) confirms the hypothesis that mindful awareness reduces the manifestation of dysfunctional behaviors, such as carelessness, negligence, or tension in the workplace (Glomb T., Duffy M. et al., 2011). In addition, it may reduce levels of occupational burnout, which is a major issue in nursing, by improving the ability to manage stress (Reb J., Sim S. et al., 2015).

Further studies show that mindfulness training programs reduce occupational exhaustion and increase job satisfaction, contributing to the prevention of professional withdrawal (Kersemakers W., Ruprecht S. et al., 2018).

However, the moderate correlation with adaptability ($r = 0.34$, $p < 0.05$) shows that, although mindfulness strengthens resilience under demanding conditions, adaptation to change requires additional strategies, such as continuing education and guidance from senior professionals (Malinowski P., Lim H., 2015). Nurses' capacity for adaptation may also depend on organizational culture, work autonomy, and opportunities for skill development (Coo C., Salanova M., 2018). The study showed that nurses holding positions of responsibility had higher levels of self-awareness, a finding that confirms studies on the increased capacity for concentration and emotional self-regulation among workplace leaders (Boyatzis R., McKee A. et al., 2013).

Mindfulness at all levels of management can serve as a tool for strengthening the decision-making process, reducing the risk of abrupt reactions under pressure. Employees in positions of responsibility, because of increased demands, appear to maintain higher levels of self-awareness, which helps them manage stress and emotional challenges (Good D., Lyddy C. et al., 2016).

Geographical work also affects the level of this ability, as nurses in Athens had higher scores than those in regional areas ($p < 0.05$). Greater access to educational programs and support mechanisms in urban centers probably contributes to this difference (Shapiro S., Astin J. et al., 2006).

It is noteworthy that nurses had high scores in work planning and in the ability to distinguish important from less important tasks, a finding consistent with previous research highlighting the importance of experience, particularly in critical care departments. These skills appear to be strengthened among leaders or more experienced nurses, who receive intensive training in emergency management (International Council of Nurses, 2021).

The absence of a significant relationship between age and adaptability suggests that the ability to accept and adapt to change depends more on individual attitudes, organizational culture, and continuing education than on age. Employees' flexibility and adaptability are closely linked to opportunities for further training and to their willingness to adopt new technologies and procedures (International Council of Nurses, 2016).

In contrast, the positive relationship between age and daily performance and the negative relationship between age and counterproductive behaviors indicate that clinical and professional experience may strengthen the quality of work and emotional stability.

Based on the above, the present study supports the view that the ability to concentrate and manage thoughts is related to fewer errors and the maintenance of a positive work climate, while also providing evidence that relevant educational interventions can benefit nurses regardless of age or position. In addition, it highlights the need for targeted training for younger nurses, who may face increased challenges at the beginning of their careers. Creating an appropriate work environment that encourages innovation, feedback, and team-based problem solving can contribute to the development of these skills.

The study results reinforce the need to integrate educational programs of this kind into nursing education, as they can improve the quality of health services provided by reducing errors and strengthening health professionals' emotional resilience (Panagiotopoulou, K., & Koukia, E., 2012).

The integration of mindfulness programs into nursing institutions represents an innovative approach to improving the mental health and job performance of health professionals. According to the study by Kersemaekers W., Ruprecht S. et al., implementation of these programs has already shown positive results by strengthening emotional resilience, reducing anxiety, and improving employees' overall quality of life (Kersemaekers W., Ruprecht S. et al., 2018).

Study limitations

The main limitations of the study include:

- Self-reported questionnaires: The research was based on self-reported questionnaires, which may affect the reliability of responses because of social desirability bias.
- Possible underestimation or overestimation of responses: Some participants may have underestimated negative behaviors or states of reduced mindfulness, while others may have exaggerated positive aspects, presenting a more ideal professional image.
- Need for a larger and more representative sample: The sample limitations highlight the need for future studies with larger and more heterogeneous

populations.

CONCLUSIONS

Nurses' professional performance is a critical factor in the quality of health care provided, while cognitive and emotional skills are central regulators of effectiveness in the workplace. Concentration, self-regulation, and adaptability form a system of dynamic interactions in which individual performance is directly linked to the work environment, organizational structures, and educational opportunities.

The constant change in the demands of the nursing profession, combined with the increased cognitive and emotional demands of the role, makes it necessary to develop strategies that support the maintenance of attention and self-awareness. The contemporary workplace requires the ability to adapt to constantly changing conditions, while also demanding high levels of alertness and cognitive control to avoid errors and optimize performance.

Self-regulation and cognitive flexibility play a central role in managing work-related stress, making critical decisions, and maintaining a positive work climate. Promoting a culture of continuous learning, providing educational opportunities, and ensuring organizational support are key pillars for strengthening these skills, contributing to the reduction of counterproductive behaviors and the empowerment of professional resilience. Management of job performance cannot be limited to isolated interventions; it requires a holistic approach that integrates both individual and organizational factors.

Leadership skills, emotional intelligence, and the ability to concentrate create a framework within which nurses can respond effectively to the demands of their role, while investment in continuing education is a strategic tool for the sustainability of professional development.

The theoretical interpretation of the findings highlights the need to develop targeted programs to strengthen cognitive and emotional skills, enabling nurses to respond effectively to the challenges of the modern health-care environment. The implementation of such interventions contributes not only to the individual development of professionals, but also to the overall improvement of the quality of health services.

In conclusion, the present study lays the foundation for further research that could examine in greater depth the causal relationships between concentration and the different dimensions of professional behavior.

Future studies may investigate the effectiveness of various educational interventions and their long-term impact on occupational well-being and quality of care. The development of evidence-based intervention strategies is expected to play a decisive role in improving nurses' professional resilience and ensuring high-quality health services.

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Acceptance of Artificial Intelligence in Healthcare Services: The Role of Trust, Risk, and Human Oversight among Healthcare Professionals and Service Recipients

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ABSTRACT

Introduction: The rapid development of artificial intelligence (AI) in healthcare highlights not only issues of functional acceptance but also fundamental aspects of trust, perceived risk, and human oversight. The ‘acceptance’ of AI is not limited to intention to use or technological familiarity; rather, it constitutes a multidimensional phenomenon shaped through evaluations of reliability, assessments of potential risks, and perceptions regarding its ethical implementation. Understanding these parameters is a prerequisite for the responsible and human-centered integration of AI systems into healthcare services.

Aim: The study explores the attitudes, intention, and determining factors that influence AI acceptance in healthcare, using the theoretical framework of the Technology Acceptance Model (TAM), enriched with variables of trust, perceived risk, human oversight, openness to change, and conceptual understanding of AI.

Material and Methods: A quantitative study was conducted using a structured six-point Likert-scale questionnaire in a sample of 240 participants, consisting of 120 healthcare professionals and 120 healthcare service recipients, with a response rate of approximately 84%. Data collection took place during October–November 2025. Statistical analysis was performed using SPSS software (version 29) and included reliability testing, descriptive and inferential statistics, with the aim of investigating relationships and differences among key variables and groups.

Results: The results show that AI acceptance is not formed uniformly. Among healthcare professionals, intention to use was significantly strengthened by perceived ease of use, whereas among healthcare service recipients, openness to change played a decisive role. In both groups, conceptual understanding of AI was a strong positive predictor, while perceived risk emerged as the most important negative factor in adoption intention.

Conclusions: The findings suggest that AI acceptance is closely linked to users level of understanding and to their concerns regarding the safety and reliability of AI applications. Attitudes toward the use of AI in healthcare are shaped through a continuous negotiation between technological capabilities and human values. Trust, transparency, and adequate information are not merely prerequisites, but fundamental conditions for human-centered and ethically sustainable integration, as also foregrounded in the framework of the Artificial Intelligence Act (AI Act).

Keywords: Artificial intelligence, technology acceptance, healthcare professionals, healthcare service recipients, Artificial Intelligence Act (AI Act).

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INTRODUCTION

Artificial intelligence uniquely combines strong elements of interest and concern, making it one of the most widely discussed phenomena of our time. From a science-fiction tool in the 1950s, it has evolved into an everyday reality, with influences now comparable to those of electricity or the internet. Artificial intelligence, however, is not simply another technological innovation; it is a transformative force that is reorganizing fundamental aspects of social and economic life, from the way we work and communicate to the way we understand knowledge itself (Xu et al., 2021).

Its importance is reflected in international forecasts, as global organizations converge on the estimate that AI will have a catalytic effect on innovation, productivity, and the reconfiguration of services. Studies by major international consulting organizations estimate that its contribution to the global economy could reach 15.7 trillion dollars by 2030, making it one of the most important drivers of growth in the coming decade (PwC, 2017).

Among its fields of application, healthcare holds a special place, as a field of high social sensitivity and strict regulatory requirements, while also emerging as an area with impressive potential for AI utilization. In clinical practice and research, AI contributes to improved diagnostic accuracy through imaging algorithms, prediction of clinical outcomes, and the development of new drugs and therapeutic approaches. It also strengthens personalized medicine, is used in robotic surgery, and, through biosensors and telemedicine, expands the possibilities for monitoring and managing chronic diseases (Alowais et al., 2023).

At the level of healthcare system administration and management, AI is applied to optimize workflows and resource management, to support the electronic and digital organization of individual health portfolios, and through chatbots that support communication with healthcare service recipients (Holden & Karsh, 2010). It is also used to monitor and supervise healthcare systems, enhancing transparency, effectiveness, and reliability in administrative procedures. The contemporary scientific literature shows that AI has the potential to transform clinical practice, research innovation, and organizational functioning in healthcare simultaneously (Jiang et al., 2021).

Although the integration of AI applications in healthcare is accompanied by high expectations for improving efficiency and quality of care, it raises important concerns. Issues of interpretability, transparency, and accountability limit trust, while concerns are recorded regarding the loss of the human dimension of care and the ethical consequences of algorithmic decisions (Jobin et al., 2019). Maintaining human oversight and understanding the limits of technology are critical prerequisites for strengthening

trust, while the energy footprint of AI systems adds an additional sustainability dimension that requires attention (Morley et al., 2020).

At the European level, the Artificial Intelligence Act (AI Act, 2024) seeks to create a framework of trust for the development and use of AI systems, setting requirements for transparency, data quality, human oversight, and accountability, with particular emphasis on high-risk systems. In combination with the General Data Protection Regulation (GDPR, EU 2016/679, 2018) and the regulatory framework for medical devices (MDR EU 2017/745, IVDR EU 2017/746), it forms an institutional environment that defines the conditions for safe and responsible adoption (European Parliament and Council, 2024; Edwards, 2023; Floridi, 2023). The successful implementation of these regulations, however, depends on the degree of acceptance and trust among healthcare professionals and healthcare service recipients, making it necessary to investigate the organizational and social factors that shape it.

The development of an expanded model of artificial intelligence acceptance in healthcare requires reference to the classic theoretical frameworks of technology acceptance. The Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) have served as the main interpretive tools for studying the relationship among perceived usefulness, ease of use, and adoption intention. Despite their importance, the complexity and social sensitivity of the healthcare field make it necessary to enrich them with additional dimensions that reflect the organizational, ethical, and psychosocial aspects of technological acceptance.

In this context, trust (Trust) emerges as a decisive factor, as users are asked to trust not only the technology itself, but also the institutional framework, the professionals who use it, and the organizations that provide it (Sagona et al., 2025). Similarly, perceived risk (Perceived Risk), which is associated with possible diagnostic errors, leakage of personal data, or excessive dependence on algorithmic systems, acts as an inhibitory factor in the formation of positive intention (Cocosila & Trabelsi, 2016).

Openness or resistance to change (Openness/Resistance to Change) reflects the degree of receptiveness of an organization and its members toward innovations, directly influencing the dynamics of adoption. It does not simply refer to refusal, but to a multidimensional attitude that combines cognitive, emotional, and behavioral elements (Armenakis & Bedeian, 1999; Piderit, 2000), while organizational readiness for change has been found to strengthen the acceptance of technologies such as AI (Boyaci & Soyuk, 2025).

In addition, conceptual understanding of artificial intelligence (Artificial Intelligence Literacy) is becoming increasingly important, as understanding how the

technology works, as well as its capabilities and limitations, contributes to strengthening trust and reducing skepticism (Gille et al., 2020). Information and education regarding the basic principles of AI can act as catalysts for the smooth integration of the technology into clinical and administrative practice.

Despite the continuous expansion of the literature, empirical studies that systematically examine the acceptance of artificial intelligence in healthcare remain limited, especially when attempting to capture simultaneously the attitudes of healthcare professionals and service recipients through a single analytical

framework. The present study seeks to address this gap by using an expanded theoretical model based on TAM and its extensions and by incorporating critical parameters related to understanding, oversight, and the safe implementation of AI systems, in line with the principles of the AI Act. In this way, the study aims to generate findings that can support evidence-based policies and practical strategies for implementation in healthcare. Adopting the above theoretical framework and seeking to empirically investigate the relationships among the individual factors, the present study formulates the research hypotheses shown in Table 1.

Table 1. Study Hypotheses

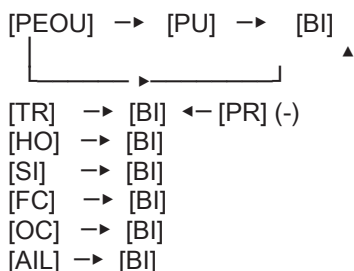
Code	Hypothesis Description	Expected Relationship
H1	Perceived Usefulness (PU) positively influences intention to adopt artificial intelligence (Behavioural Intention - BI).	+
H2	Perceived Ease of Use (PEOU) positively influences intention to adopt artificial intelligence (BI).	+
H3	Perceived Ease of Use (PEOU) positively influences Perceived Usefulness (PU).	+
H4	Trust (TR) positively influences intention to adopt artificial intelligence (BI).	+
H5	Perceived Risk (PR) negatively influences intention to adopt artificial intelligence (BI).	-
H6	Human Oversight (HO) positively influences intention to adopt artificial intelligence (BI).	+
H7	Openness to Change (OC) positively influences intention to adopt artificial intelligence (BI).	+
H8	Social Influence (SI) positively influences intention to adopt artificial intelligence (BI).	+
H9	Facilitating Conditions (FC) positively influence intention to adopt artificial intelligence (BI).	+

According to the model, perceived usefulness (PU) and perceived ease of use (PEOU) are expected to directly influence adoption intention (BI), with PEOU also exerting an indirect effect through PU. At the same time, trust (TR) and human oversight (HO) are considered to strengthen positive attitudes toward AI, while perceived risk (PR) acts as an inhibitor. In addition, social influence (SI) and

facilitating conditions (FC) function as external catalysts that shape the degree of acceptance, while openness to change (OC) expresses the capacity to adapt to innovation within the environment.

Figure 1 depicts the proposed relationships among the key factors of the theoretical model, which are empirically examined in the context of the study.

Figure 1. Conceptual Model of Variables



The proposed model aims at a systemic understanding of the cognitive, emotional, and organizational parameters that influence the acceptance of artificial intelligence in healthcare, in order to highlight both the technological and human factors that determine its successful integration.

METHODOLOGY

Design

The study adopted a quantitative, cross-sectional design, with the aim of empirically investigating the factors that influence the intention to adopt artificial intelligence (AI) in healthcare. The proposed conceptual model, based on the

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METHODOLOGY

Design

The study adopted a quantitative, cross-sectional design, with the aim of empirically investigating the factors that influence the intention to adopt artificial intelligence (AI) in healthcare. The proposed conceptual model, based on the expanded framework of the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), incorporates additional variables that reflect critical social and organizational dimensions, such as trust (TR), perceived risk (PR), human oversight (HO), openness to change (OC), and conceptual understanding (AIL).

Study sample

Sampling was carried out using convenience sampling. The sample included two distinct groups of participants:

1. Healthcare professionals, such as physicians, nurses, psychologists, physiotherapists, occupational therapists, and administrative staff, working in public or private healthcare structures.
2. Healthcare service recipients, namely individuals with recent experience of contact with healthcare services or providers.

Data collection

Data collection took place in healthcare settings in Attica, including one public healthcare service, one private healthcare provider, eight private medical practices, and four pharmacies. Two structured closed-ended questionnaires were used for data collection, one for healthcare service recipients and one for healthcare professionals, both based on the same conceptual framework and the same theoretical variables. The reliability of the subscales was assessed using Cronbach's alpha, with 0.70 as the acceptable threshold (Hair et al., 2021). As part of the reliability testing, corrected item-total correlations and the means of the composite scores were also examined in order to confirm the internal consistency of the measurements.

The questionnaires were based on established and validated scales (Davis, 1989; Venkatesh et al., 2003), with adaptations from contemporary studies (Pan et al., 2019), and included two sections:

1. Demographic and professional data (gender, age, education, and role for healthcare professionals).
2. A main body of 35 statements, organized according to the variables of the conceptual model and evaluated on a 6-point Likert scale (1 = Strongly disagree

to 5 = Strongly agree, 6 = Do not know / Not applicable). The DK/NA option was added to reduce bias and was excluded from the analyses, while the reversed (REV) items were pre-coded.

It should be noted that the two questionnaires retain a common factor structure but are not completely identical in all items, as certain statements were adapted to the context and role of each group. Therefore, comparisons between groups are conducted at the factor/scale level and not at the level of fully identical questions. The comparison concerns the variation of the conceptual constructs and not item-by-item correspondence.

Ethical considerations

The questionnaire was distributed in printed form during October-November 2025 in settings related to the healthcare sector. Participation was anonymous and voluntary, and all participants were informed in advance about the purpose of the study, the use of the data, and the right to withdraw, in accordance with the principles of the General Data Protection Regulation (GDPR, EU 2016/679). The study was conducted in compliance with the Declaration of Helsinki (World Medical Association, 2013) and the Code of Ethics for Research of the University of Patras, and approval for distributing the questionnaire was obtained from the competent bodies.

Statistical Analysis

Before the main data collection phase, a pilot application was conducted with 40 participants (20 healthcare professionals and 20 healthcare service recipients), aiming to test the clarity of wording and the appropriateness of the measurement scale.

Data collection was completed when the predetermined target of 120 valid questionnaires per group was reached. The sample size is considered sufficient for applying parametric statistical techniques, such as correlation analyses and multiple regression (Green, 1991; Hair et al., 2021). Based on the relevant guideline ($N \geq 50 + 8m$), the final sample size meets the minimum criteria for statistical power.

The following were excluded from the analysis: (a) four questionnaires with >30% DK/NA responses, and (b) three cases with an incorrect response to the attention-check item. These exclusions were applied to ensure data quality and strengthen the validity of the inferential analyses.

Data analysis was performed using IBM SPSS Statistics 29 and included: (a) reliability testing and descriptive statistics, (b) Exploratory Factor Analysis (EFA) using Principal Axis Factoring (PAF) with Promax rotation, and (c) hypothesis testing through correlations and multiple regressions. This methodology was considered appropriate for investigating the relationships among the theoretical dimensions, as well as for the comparative analysis between healthcare service recipients and

healthcare professionals.

The reliability of the scales was tested using Cronbach's alpha. In addition, to test for possible multicollinearity, Tolerance and VIF indicators, as well as Collinearity Diagnostics, were examined in accordance with the guidelines of Hair et al. (2021). All theoretical dimensions of the model were included as independent variables in the regression models, with adoption intention (BI) as the dependent variable.

Finally, the theoretically predicted relationship between perceived ease of use (PEOU) and perceived usefulness (PU), as described in the TAM model, was also examined. For this purpose, Pearson correlations were calculated between the corresponding composite indicators, separately for each group of participants, allowing assessment of the degree to which the predicted relationship between PEOU and PU is reflected in the empirical data of the study.

RESULTS

The sample consisted of 240 participants (120 healthcare professionals and 120 healthcare service recipients). The

majority of participants were women (~62%) and belonged to the 35-54 age group (~49%). A large proportion (~76%) had post-secondary or higher education (values 3 and 4 in the education variable), indicating a relatively high educational level in the total sample. The healthcare professionals group included representatives of all main professional roles in the healthcare system, according to the categorization used in the 'work role' variable, with a relatively balanced distribution. The detailed demographic characteristics of the sample are presented in Table 2.

The main descriptive indicators, reliability values (Cronbach's alpha), and correlations among the variables are summarized in Table 3. The reliability indicators of all factors ranged within acceptable levels (alpha $\approx$.79-.90) for both participant groups, confirming the high internal consistency and stability of the individual scales. Most variables showed correlations in the expected direction (positive among supportive dimensions and negative between perceived risk and intention), confirming the theoretical coherence of the proposed model and justifying continuation of the inferential analysis.

Table 2. Demographic characteristics of the sample by participant group

Variable	Category	Healthcare service recipients (N=120)	Healthcare professionals (N=120)
Gender	Male	40 (33.3%)	47 (39.2%)
	Female	78 (65.0%)	70 (58.3%)
	Other	2 (1.7%)	3 (2.5%)
Age	18-34	38 (31.7%)	22 (18.3%)
	35-54	52 (43.3%)	67 (55.8%)
	55+	30 (25.0%)	31 (25.8%)
Education	Compulsory	8 (6.7%)	0 (0.0%)
	Secondary	38 (31.7%)	12 (10.0%)
	Post-secondary / Tertiary	55 (45.8%)	64 (53.3%)
	Postgraduate/Doctoral	19 (15.8%)	44 (36.7%)
Role	Medical staff	-	28 (23.3%)
	Nursing staff	-	22 (18.3%)
	Paramedical staff	-	23 (19.3%)
	Mental health professionals	-	25 (20.8%)
	Administrative staff	-	22 (18.3%)

Table 3. Descriptive statistics, reliability, and correlations among variables (N = 240)

Factor	Mean (M)	SD	Alpha	r(BI)	p
Perceived usefulness (PU)	3.84	0.71	0.88	0.62	< .001
Perceived ease of use (PEOU)	3.91	0.69	0.86	0.58	< .001
Trust (TR)	3.76	0.73	0.89	0.65	< .001
Perceived risk (PR)	3.12	0.82	0.83	-0.56	< .001
Human oversight (HO)	3.58	0.77	0.80	0.41	< .01
Social influence (SI)	3.47	0.81	0.84	0.12	> .05 (.214)

Facilitating conditions (FC)	3.55	0.74	0.79	0.10	> .05 (.168)
Openness to change (OC)	3.64	0.69	0.85	0.38	< .01
Conceptual understanding (AIL)	3.71	0.67	0.82	0.43	< .001
Adoption intention (BI)	3.88	0.72	0.90	—	—

Note: All variables were measured on a 6-point Likert scale (1 = Strongly disagree to 5 = Strongly agree, 6 = Do not know/Not applicable; ignored in the analysis). Pearson correlations with adoption intention (BI) are statistically significant at the $p < .01$ level and in the expected direction (positive for the supportive factors and negative for perceived risk - PR), with the exception of SI and FC ($p > .05$).

In order to confirm the structural validity of the scales before the inferential analysis, an Exploratory Factor Analysis (EFA) was conducted, which showed that, in both the healthcare service recipient sample and the healthcare professional sample, the items loaded satisfactorily on the expected theoretical dimensions of the model (TAM/UTAUT). The KMO index was .736 for recipients and .625 for professionals, values considered good to acceptable for the social sciences. Bartlett's test was statistically significant ($p < .001$) in both samples, confirming the suitability of the data for factor analysis. Total explained variance ranged between 72% and 73%, indicating satisfactory convergent validity.

Mean values showed differences between the two groups. Healthcare professionals displayed higher levels of perceived usefulness (PU, $M = 4.09$) and openness to change (OC, $M = 3.74$), while healthcare service recipients showed higher perceived risk (PR, $M = 3.41$) and greater emphasis on human oversight (HO, $M = 3.97$). Mean intention to adopt AI (Behavioral Intention - BI) was moderate for both groups ($M \approx 3.0$), indicating a neutral to moderately positive attitude toward the use of artificial intelligence in healthcare.

Pearson correlations among the main factors showed distinct patterns of relationships by group. For healthcare service recipients, perceived risk (PR) was strongly and negatively correlated with adoption intention (BI) ($r = -.83$, $p < .001$), while positive correlations were identified between openness to change (OC) and intention ($r = .55$, $p < .001$), as well as between conceptual understanding of AI (AIL) and intention ($r = .65$, $p < .001$). The remaining factors (PU, PEOU, TR, HO, FC, SI) did not show statistically significant relationships with BI ($p > .05$).

For healthcare professionals, the correlations were milder but followed a similar direction: perceived risk (PR) was negatively related to intention ($r = -.65$, $p < .001$), while conceptual understanding (AIL) was strongly and positively correlated with intention ($r = .75$, $p < .001$). In addition, a positive correlation was observed between perceived ease of use (PEOU) and perceived usefulness (PU) ($r = .45$, $p < .001$), a finding that aligns with the theoretical basis of

TAM.

To investigate the factors that influence intention to adopt artificial intelligence (BI), multiple linear regression analyses were performed, with BI as the dependent variable and all theoretical factors (PU, PEOU, TR, PR, HO, SI, FC, OC, AIL) as independent variables.

Among healthcare service recipients, the model was statistically significant ($F(9,110) = 41.89$, $p < .001$) and explained 77.4% of the variance in intention ($R^2 = .774$). As shown in Table 4, perceived risk (PR) exhibited the strongest negative effect on intention ($\beta = -.618$, $p < .001$), while openness to change (OC) ($\beta = .150$, $p = .006$) and conceptual understanding of AI (AIL) ($\beta = .255$, $p < .001$) showed positive and statistically significant effects. The remaining factors (PU, PEOU, TR, HO, FC, SI) were not statistically significant ($p > .05$).

Among healthcare professionals, the corresponding model was also significant ($F(9,110) = 32.23$, $p < .001$) and explained 72.5% of the variance in intention ($R^2 = .725$). Conceptual understanding (AIL) ($\beta = .596$, $p < .001$) emerged as the strongest positive factor, followed by perceived ease of use (PEOU) ($\beta = .120$, $p = .038$). In contrast, perceived risk (PR) ($\beta = -.335$, $p < .001$) and facilitating conditions (FC) ($\beta = -.191$, $p < .001$) had a negative effect on adoption intention. The remaining variables (PU, TR, HO, SI, OC) were not statistically significant ($p > .05$).

In the unified model ($N = 240$), the results showed very good fit ($R^2 = .673$, $F(9,230) = 52.50$, $p < .001$). The factors found to be statistically significant were perceived risk (PR) ($\beta = -.556$, $p < .001$), conceptual understanding (AIL) ($\beta = .336$, $p < .001$), and human oversight (HO) ($\beta = .103$, $p = .009$). Perceived usefulness (PU) showed a small but statistically significant negative contribution ($\beta = -.115$, $p = .006$). The negative contribution of PU in the unified model is likely due to suppression effects resulting from partial overlap with PEOU and AIL and should not be interpreted as a substantive reduction in the importance of usefulness. Social influence (SI) and facilitating conditions (FC) did not show a statistically significant effect in the unified model ($\beta \approx .02$ and $\beta \approx .00$, respectively, $p > .60$).

In addition, two specific factors that differ by participant group were examined. For healthcare professionals, the work security index (WRK) had a mean value of $M = 3.62$ ($SD = 0.87$), indicating moderate concern regarding the limitation of the professional role or the possibility of job loss due to AI. Its correlation with adoption intention (BI) was not statistically significant ($r \approx -.14$, $p > .10$; $\beta \approx -.07$, $p > .25$). Correspondingly, among healthcare service

recipients, the social impact perception index (SYS) recorded a mean value of $M = 3.58$ ($SD = 0.91$), indicating relative agreement with the view that AI may imply a 'perception' of job losses. However, the variable did not show a statistically significant relationship with acceptance intention (BI) ($r \approx -.11$, $p > .20$). These findings suggest that concerns about the possible social and professional impact of AI do exist, but they do not directly influence individual attitudes toward the adoption of AI systems. Beyond these specific indicators (WRK / SYS), the overall comparisons between professionals and recipients regarding the main

factors of the model are presented in Table 5.

The multicollinearity test did not reveal issues that would affect the estimation of coefficients. Tolerance values ranged from .66 to .89, while the corresponding VIF values ranged between 1.12 and 1.52, substantially below established thresholds. The maximum Condition Index was 16.91, well below the threshold of 30, without clustering of high variance proportions in the same dimension (Table 6). These findings confirm that there is no substantive multicollinearity among the independent variables and that the model is estimated stably and reliably.

Table 4. Multiple regression results for intention to adopt AI (BI) and model-fit indicators

Factor	Unified model (N = 240)	Healthcare professionals (N = 120)	Healthcare service recipients (N = 120)
Perceived usefulness (PU)	-0.115 ($p = .006$)	-0.047 ($p = .435$)	0.000 ($p = .998$)
Perceived ease of use (PEOU)	-0.024 ($p = .553$)	0.120 ($p = .038$)	0.014 ($p = .760$)
Trust (TR)	0.055 ($p = .155$)	0.050 ($p = .364$)	0.055 ($p = .241$)
Perceived risk (PR)	-0.556 ($p < .001$)	-0.335 ($p < .001$)	-0.618 ($p < .001$)
Human oversight (HO)	0.103 ($p = .009$)	-0.013 ($p = .799$)	0.068 ($p = .150$)
Facilitating conditions (FC)	0.002 ($p = .965$)	-0.191 ($p < .001$)	-0.008 ($p = .866$)
Social influence (SI)	0.019 ($p = .628$)	0.055 ($p = .319$)	-0.013 ($p = .776$)
Openness to change (OC)	0.075 ($p = .074$)	0.015 ($p = .779$)	0.150 ($p = .006$)
Conceptual understanding of AI (AIL)	0.336 ($p < .001$)	0.596 ($p < .001$)	0.255 ($p < .001$)
Fit index R^2	0.673	0.725	0.774

Note: beta values represent standardised regression coefficients. p values $< .05$ indicate statistically significant effects.

Table 5. Mean differences between healthcare professionals and healthcare service recipients (t-test)

Factor	M(HCPs)	SD(HCPs)	M(Rec.)	SD(Rec.)	t(238)	p
Perceived usefulness (PU)	4.09	0.70	3.77	0.72	1.96	.052
Perceived ease of use (PEOU)	3.88	0.68	3.94	0.71	-0.72	.472
Trust (TR)	3.82	0.74	3.70	0.72	1.13	.261
Perceived risk (PR)	3.28	0.81	3.41	0.83	3.21	.001
Human oversight (HO)	3.44	0.76	3.97	0.78	-2.58	.011
Social influence (SI)	3.49	0.82	3.45	0.80	0.36	.719
Facilitating conditions (FC)	3.56	0.74	3.54	0.75	0.15	.883
Openness to change (OC)	3.74	0.69	3.50	0.68	2.86	.005
Conceptual understanding (AIL)	3.68	0.67	3.74	0.66	-0.71	.478
Adoption intention (BI)	3.09	0.71	3.03	0.73	0.67	.504

Note: Values of $p < .05$ indicate statistically significant differences.

Table 6. Multicollinearity indicators (Tolerance, VIF) for the unified regression model (N = 240)

Variable	Tolerance	VIF
Perceived usefulness (PU)	.89	1.12
Perceived ease of use (PEOU)	.87	1.15
Trust (TR)	.72	1.39
Perceived risk (PR)	.66	1.52
Human oversight (HO)	.82	1.22
Facilitating conditions (FC)	.74	1.35

Variable	Tolerance	VIF
Social influence (SI)	.74	1.35
Openness to change (OC)	.78	1.28
Conceptual understanding of AI (AIL)	.79	1.26

Note: No Tolerance value was $< .20$ and no VIF value was > 5 . The maximum Condition Index was 16.91, confirming the absence of multicollinearity.

In examining the theoretical relationship between PEOU and PU, Pearson correlations showed differentiated patterns between the two groups. Among healthcare service recipients, the relationship between perceived ease of use and perceived usefulness was not statistically significant ($r = .053$, $p = .568$), indicating that ease of use was not associated with the degree of perceived benefit of AI applications. In contrast, among healthcare professionals, a significant and positive correlation was observed between PEOU and PU ($r = .451$, $p < .001$), a finding consistent with the core mechanism of the TAM model.

The above results outline the main mechanisms associated with the intention to adopt artificial intelligence. Overall, the theoretical framework was partially supported, revealing a mixture of expected and unexpected relationships, which reflects the complex nature of AI acceptance in healthcare services.

DISCUSSION

The findings of the study demonstrate that the intention to adopt artificial intelligence in healthcare is a multidimensional and differentiated phenomenon, influenced by cognitive, functional, and psychological factors, while also differing significantly between healthcare professionals and healthcare service recipients. This differentiation reflects the specific needs and experiences of the two groups, confirming that AI acceptance is not a uniform process (Venkatesh et al., 2003).

Among healthcare professionals, perceived ease of use (PEOU) emerged as a significant positive factor, in line with the theoretical basis of TAM, according to which functional simplicity strengthens adoption intention (Davis, 1989). The effect of conceptual understanding of artificial intelligence (AIL) was equally strong, a finding consistent with contemporary studies indicating that understanding how AI systems work and what their limits are reduces uncertainty and strengthens intention to use (Longoni et al., 2019). In contrast, perceived risk (PR) acted as an inhibitor of adoption intention, due to concerns regarding the safety and reliability of AI applications, aligning with the literature on the risks of opaque use of algorithmic systems (Cabitza et al., 2017).

The negative effect of facilitating conditions (FC), although not consistent with predictions of models such as UTAUT, may reflect the 'critical-user effect', whereby professionals with higher familiarity evaluate deficiencies in infrastructure and resources more strictly

(van der Vaart et al., 2022). This finding suggests that the recording of functional limitations does not necessarily reflect technophobia, but may instead indicate increased expectations among users with high technological readiness.

Among healthcare service recipients, perceived risk (PR) was the strongest inhibitory factor, confirming that concerns about errors, loss of control, protection of personal data, and restriction of human judgement strongly influence acceptance (Lee & See, 2004). In contrast, conceptual understanding (AIL) strengthened adoption intention, a finding consistent with evidence suggesting that understanding and transparency improve citizens' attitudes toward AI (Wang et al., 2020). Openness to change (OC) also contributed positively, confirming that general attitudes toward innovation influence behavioral intention (Rogers, 2003).

The comparison of the two groups highlighted two stable and critical dimensions: conceptual understanding (AIL) consistently strengthens intention, while perceived risk (PR) limits it in both groups. This bipolarity forms the core of the dynamics of AI acceptance and reflects contemporary perspectives according to which the successful integration of AI requires a combination of understanding and effective risk management (Amann et al., 2020). At the same time, the findings suggest the existence of two distinct acceptance mechanisms: one that is more functional for professionals and one that is more psychological/value-based for recipients.

The interpretation of the unified model requires caution, as perceived usefulness (PU) appeared with a negative sign, possibly as a result of statistical suppression due to high overlap among cognitive variables (Cohen & Cohen, 1983). The PU-PEOU-AIL interaction may lead to artificial sign reversals; therefore, interpretation of the effects is safer when based on the separate models by group.

It is worth noting that human oversight (HO) showed a mild but statistically significant effect on intention (BI) in the unified model, without emerging as an independent predictor in the separate models by group. This suggests that its role is mainly supportive and operates in combination with other cognitive evaluations.

Social influence (SI) was not found to significantly influence intention (BI), suggesting that in healthcare settings, adoption decisions are shaped less by social norms and more by endogenous evaluations of the technology. In the same context, trust (TR), although strongly correlated with intention (BI), did not show an

independent effect in the final model, suggesting that its contribution may be embedded in broader judgements of reliability and safety.

Overall, the study highlights knowledge, understanding, and safety as fundamental axes for strengthening the acceptance of artificial intelligence in healthcare. The effect of perceived risk is consistent with the requirements of the Artificial Intelligence Act (AI Act), which emphasizes transparency, accountability, and human oversight in high-risk systems. The differentiation between professionals and recipients underscores the need for targeted information, education, and support strategies so that AI can be integrated responsibly and in a socially acceptable manner.

Study limitations

The present study was based on a cross-sectional design, which limits the ability to draw causal conclusions and captures only one temporal 'snapshot' of attitudes toward artificial intelligence. In addition, convenience sampling and the geographical concentration of the sample in the Attica region may have led to selection bias, while overrepresentation of participants with post-secondary or higher education was also observed. Although the size and characteristics of the sample are adequate for the statistical analyses applied, they limit the generalizability of the findings. Therefore, the results cannot be extended to the general population or to all healthcare professionals, but concern the specific sample and the conditions under which the data were collected.

Furthermore, data collection was carried out exclusively through a self-reported Likert questionnaire, which constitutes a single-method approach and may increase common method variance. Self-reporting may also have been affected by socially desirable responses or participants' subjective evaluations. Finally, the exclusively quantitative design does not allow in-depth exploration of complex concepts, such as organizational culture, ethical concerns, or workload conditions, which may substantially influence the acceptance of artificial intelligence.

CONCLUSIONS

The findings of the study show that the acceptance of artificial intelligence in healthcare services is shaped by different priorities among professionals and recipients, but rests on two stable pillars: knowledge and safety. The importance of these factors reflects the increased requirements of the healthcare field for transparency, accountability, and human oversight, in line with the high-risk approach also adopted in the regulatory framework of the AI Act.

At the theoretical level, the study findings show that traditional technology acceptance models (TAM/UTAUT) are not sufficient to fully explain the dynamics of adopting AI systems in healthcare. Acceptance of AI

applications appears to be shaped less by functional or social facilitators and more by deeper cognitive and psychological mechanisms, such as understanding of how the technology works, openness to change, and the management of perceived risks.

At the practical level, the results indicate the need for healthcare organizations to invest in targeted information strategies with emphasis on the AI Act regulatory framework, the strengthening of transparency, and the promotion of conceptual understanding of AI among both healthcare professionals and service recipients. Similarly, the existence of human oversight mechanisms can strengthen recipients' trust, while strengthening organizational readiness and training in user-friendly environments can support the smooth integration of AI into everyday practice. The differentiation between the two groups indicates that interventions should be tailored to their specific needs and concerns, as professionals appear to approach AI through functional and technocratic assessments, whereas recipients rely mainly on psychological and value-based evaluations.

Future research could use larger and more diverse samples, as well as longitudinal designs that capture the evolution of attitudes toward AI over time. The application of advanced multivariate models, such as PLS-SEM, could strengthen understanding of the relationships among variables and allow testing of more complex theoretical structures. In addition, the use of mixed-method approaches would facilitate an in-depth understanding of motivations, perceptions, and inhibitions that are not always evident in quantitative measurements. It would also be useful for future analyses to examine more targeted AI use scenarios (e.g., diagnostic imaging, clinical decision-support tools, chatbots), as acceptance may vary substantially depending on the application context. Overall, further research in the field will allow a more comprehensive understanding of the factors that shape AI acceptance in healthcare.

Concluding remarks and practical recommendations:

- Strengthening understanding / information about AI and the regulatory framework (AI Act).
- Transparency actions and documentation of the operation of AI systems, aiming to reduce perceived risk among all users.
- A safeguarding mechanism for the operational implementation of the expected human oversight, so that it functions as a guarantee of appropriate and controlled AI use.
- Support for organizational readiness for responsible and smooth AI integration.

Researchers' contribution:

A.S.: study design, data collection and analysis, as well as the drafting of the article. I.S.: supervision, methodological review, provision of guidance and revision suggestions.

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The State of Mental Health in Greece compared with Europe: A Reflective View of the Completion of Psychiatric Reform

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ABSTRACT

Mental health constitutes a fundamental social good and an inalienable human right. Its status is systematically evaluated through specific public health indicators that reflect both the prevalence of mental disorders and the adequacy of mental health services. Globally, approximately one in eight individuals experiences mental health problems, while in Greece the corresponding prevalence in 2019 approached one in five people. Both the World Health Organization and the European Union consistently emphasize every individual's right to accessible, high-quality mental health care, encompassing prevention, treatment, rehabilitation, and social reintegration. Mental health is not solely a concern for mental health service users, but also for healthcare professionals, policymakers, and society as a whole. A comparative review of Greece's mental health indicators against those of other European countries over the past decade provides important insights into the impact of the economic crisis, the COVID-19 pandemic, and the current post-pandemic period on the mental health landscape in Greece. These findings underscore the urgent need for systematic epidemiological monitoring of mental health and for the completion of psychiatric reform in the country. During the years of economic crisis, Greece experienced a significant increase in the prevalence of mental disorders, particularly depression, while the pandemic period further intensified unmet mental health needs and exposed persistent structural weaknesses within the system. Over the past 25 years, Greece has undergone an ongoing process of mental health reform that has led to substantial changes, primarily focusing on deinstitutionalization and the transition toward community-based care. Despite important progress, however, the reform process has not fully achieved its objectives due to economic constraints, structural deficiencies, and unforeseen social and public health challenges. Within this context, Law 5129/2024, which aims to complete psychiatric reform in Greece, is expected to establish a new administrative framework for mental health service provision, address long-standing deficiencies, and facilitate the transition to a more integrated, holistic, community-oriented, and effectively organized mental healthcare model.

Keywords: Health indicators, mental health, Law 5129/2024, psychiatric reform

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INTRODUCTION

The precise conceptual definition of health has long concerned both researchers and those working in the broader field of health. Over time, various models have been developed to describe the term/concept of health, with the most prevalent being the one formulated by the World Health Organization (WHO) in 1947, which defines health as «a state of complete physical, mental, and social well-being and not merely the absence of disease or disability» (Lachana 2020).

Based on the WHO model of health, mental health is one of the three pillars of health and is an integral and important component of the concept of health. By extension, mental health differs from the mere absence of mental illness or disability. According to the WHO, mental health conceptually reflects a state of well-being in which individuals recognize their abilities, can cope effectively with the normal stresses of daily life, can be productive in work or learning, and are able to contribute to and belong to their community. Mental health is a fundamental condition for people's collective and individual capacity to think, feel, interact with others, be economically independent, and enjoy life (WHO 2022). The definition of mental health also includes every person's right to the highest attainable level of mental health and, by extension, the right to prevention, treatment, and integration into the community.

As stated on World Mental Health Day in 2023, mental health is a core and universal human right. This includes the right to protection from risks to mental health, the right to high-quality treatment, and the right to freedom, independence, and inclusion in the community (WHO 2023). In 2024, special emphasis on World Mental Health Day was placed on work. Given that 60% of the world's population works, there is an urgent need for measures and actions that will both limit mental health risks and protect and support mental health at work (WHO 2024a).

As European Commission President Ursula von der Leyen emphasized in 2022, the Commission is committed to promoting mental health in the Member States, with emphasis on prevention, education, mental health awareness, improved access to health services, combating social stigma, supporting young people, and promoting mental health among vulnerable population groups (European Commission 2022).

Health indicators are units for measuring and recording various aspects of the health of a specific population during a specific period of time. They are classified as positive health indicators, negative health indicators, indicators of sanitary conditions, indicators of administrative activities and health services, and socio-demographic indicators (Varaklioti 2020).

This article provides an extensive description of the health indicators through which mental health can be assessed. It then presents the situation in Greece with regard to mental health indicators over the last decade,

in comparison with other European countries. Finally, it offers a descriptive and critical overview of the content of Law 5129/2024 (Hellenic Republic 2024).

MENTAL HEALTH INDICATORS

As with health in general, mental health is measured and recorded over time and across countries with the help of specific mental health indicators. According to Sergentanis (2020):

1. Subjective indicators of positive health, such as self-reported well-being and quality of life.

2. Prevalence, a negative health indicator, describes the number of people who are ill in general or with a specific disease (e.g., a specific mental illness) at a specific point in time or during a specific period, divided by the total population at the same point in time (point prevalence) or during the same period (period prevalence). For example, the prevalence of depression on 10.10.2022 (self-reported or recorded) in Greece = the number of patients who suffer from or report depression on 10.10.2022 / the total population of the country on 10.10.2022 - point prevalence.

Prevalence is also calculated as the product of the incidence rate (described below) and the average duration of the disease.

3. Incidence rate, a negative health indicator, is a measure of the rate at which new cases occur. The incidence rate (IR) equals the quotient of new cases of a disease during a specific period divided by the total person-time of follow-up. For clarification, person-time of follow-up is the product of the number of people followed and the number of years.

4. Cumulative incidence equals the quotient of new cases of a disease during a specific period, with the denominator being the number of people followed.

5. Mortality, a negative health indicator, describes the number of deaths per 1,000 inhabitants, both overall and by disease. It is distinguished into: - crude mortality rate (annual), which equals the quotient of deaths in a given year, regardless of cause, divided by the mid-year population in that year; and - cause-specific mortality rate (annual), calculated as the quotient of deaths from a specific cause in a given year divided by the mid-year population in that year.

Mortality is also the product of the incidence rate and case fatality.

6. Case-fatality rate is the quotient of the number of deaths from a disease divided by the number of people suffering from that disease.

7. Disability/disability prevalence, for example among individuals with impaired mental health.

8. Administrative and economic indicators, such as: - per capita health expenditure; - health expenditure as a percentage of GDP; - number of hospital beds (psychiatric beds) per 100,000 inhabitants; - number of physicians/nurses specialized in mental health, or with knowledge

of mental health (general practitioners), per 100,000 inhabitants; - use/consumption of medicines/psychotropic medicines; - insurance coverage; - days of hospitalization; - outpatients; - average disposable income per household; - unemployment rate.

MENTAL HEALTH IN GREECE AND EUROPE OVER A DECADE

According to WHO data, it is estimated that one in eight people worldwide experiences mental health problems (WHO 2022).

Regarding mental health and its specific aspects in Greece compared with Europe, it is useful to distinguish two periods: (a) the period of the economic crisis in Greece (2010-2020) and (b) the period of the pandemic (2020-2023).

At a broad glance over the decade 2010-2020, the main mental disorders among the Greek population during the economic recession were depression and anxiety disorders, accompanied by a more general increase in mental disorders.

According to OECD data (European Observatory on Health Systems and Policies 2023), in Greece in 2019, in the aftermath of the economic crisis and at the threshold of the pandemic (then still unknown), almost one in five Greeks - 19% of the population - experienced mental health problems, the third highest percentage in Europe. The most common mental disorders were depression (7%), anxiety disorders, and disorders arising from drug or alcohol dependence. The European average stood at 17%.

During the later period of the pandemic, risks for mental illness increased rapidly, and 25% of unmet needs in the field of health concerned mental health (OECD 2023).

There is a failure of early and timely diagnosis of mental illness and, by extension, of timely treatment. Evidence indicates that 50% of people with mental illness in European countries remain without diagnosis and treatment at the level of primary health care (Souliotis et al. 2017). The pandemic period began in 2020, with repeated stay-at-home restrictions and increased mental health needs among the population. The prevalence of depression among university students in Greece during quarantine periods is estimated at 12.43% (Patsali et al. 2020).

According to the EHIS-3 survey, during the period 2018-2020, the point prevalence of clinically relevant depressive symptoms in Europe was 6.54%. There was a range of prevalence across countries, with Greece at 1.85% (the lowest among the countries examined) and Sweden at 10.72% (the highest percentage). Differences were observed between men and women, with women having higher prevalence (7.78% versus 5.16% for men). Between the periods 2013-2015 (EHIS-2) and 2018-2020 (EHIS-3), the prevalence of depressive symptoms increased by 1.11 percentage points. Older citizens, citizens with low income,

chronic conditions, and low educational level were more vulnerable (Arias-de la Torre et al. 2023).

The consumption of antidepressant medicines, measured as daily doses per 1,000 people at two time points, 2010 and 2020, varies across European countries. During the decade, all countries except Denmark recorded an increase in daily antidepressant consumption. Conclusions also emerge from comparing the various countries of Europe with one another. In brief, Greece showed a notable increase in antidepressant consumption in 2020 compared with 2010 and occupied an intermediate position in relation to other European countries (Euronews 2023).

The prevalence of mental disorders in various European countries from 2010 to 2022 also shows considerable variation. It is worth noting that sufficient data are not available for all years and all countries. Broadly speaking, the wider European area shows stability in the prevalence of mental illnesses during the decade 2010-2019 and a mild upward trend during the pandemic period 2020-2023. In Greece, a very low prevalence rate is recorded up to 2017 compared with European countries, while after 2017 no data are available (WHO 2024b).

PSYCHIATRIC REFORM

Historical overview

The provision of psychiatric care in Greece has passed through many different stages. Broadly, three periods can be distinguished (Madianos 2019): (a) the period of institutionalization, up to 1983; (b) the transitional period, 1984-1998; and (c) the reform period, from 1999 to the present.

Regarding the most recent reform period, four (4) time intervals can be distinguished (Madianos 2019; Anargyros et al. 2021):

- 1999-2001: through the Psychargos I programme, deinstitutionalization was achieved, and the first transition of mental health services to the community took place.
- 2001-2010: through the Psychargos II programme, deinstitutionalization continued, resulting in the reduction of public psychiatric hospitals by five.
- 2011-2020: Psychargos III / period of the economic crisis and pandemic, followed by a dramatic reduction in health-sector expenditure and the obstruction of any further reform.
- 2021-2030: the national action plan for mental health, with the announcement of Law 5129/2024 on the completion of mental health reform as a key milestone.

The course of mental health reform in Greece faced difficulties and challenges. After the completion of the Psychargos II program, the country entered the economic crisis, which resulted in underfunding at an insurmountable and dramatic level in the health sector. This obstructed any progress and further reform in the field of mental health as well (Loukidou et al. 2013).

It is also worth noting that in Greece there have been,

and still are, weak points in the field of mental health, such as insufficient organizational policy at both central and regional levels, lack of effective management, and unequal distribution of specialized personnel between urban and less urban areas. In addition, stigma and the insufficient preparation of society and the community to absorb and reintegrate people who have received mental health care constitute chronic weaknesses of the system. High out-of-pocket costs for pharmaceutical and psychotherapeutic treatment in a population where 25% live below the poverty line, and finally the capacity and availability of a health and mental health system to respond more effectively in the future to challenges such as the COVID-19 pandemic, are all areas in need of improvement (Souliotis et al. 2017; Madianos 2019; Stylianidis 2024).

Law 5129/2024

The main objective of the new law is, on the one hand, to optimize and promote citizens' mental health by improving the prevention, diagnosis, treatment, and rehabilitation of mental health disorders, and, on the other hand, to ensure the unhindered access of all citizens to all mental health services regardless of economic, social, and professional status or geographic distribution. In addition, the law aims to eliminate inequalities among mental health service users, combat social stigma, and inform society. It seeks to continue the effort toward deinstitutionalization and to promote psychosocial rehabilitation and more community-based mental health care, as well as to facilitate social reintegration. Finally, the new law guarantees continuous care for citizens who need mental health treatment, as well as strengthening and protecting the rights and dignity of these patients.

Under the new law, mental health services (MHS) are fully integrated into the National Health System (NHS), provided free of charge and on an equal basis to the entire population of the country through the National Network of Mental Health Services (NNMHS). Through the NNMHS, the law provides for the organization, at national and local level, of bodies intended to achieve deinstitutionalization and to provide mental health care outside hospitals, at community level. Importance is attached to early diagnosis, care, and treatment of mental disorders, the provision of emergencies and specialized inpatient mental health care, and home nursing services. The law also seeks integrated and continuous psychiatric care, as well as occupational reintegration and community reintegration for mental health service users.

Special reference is made to the prevention of mental disorders in children and adolescents and to the connection of mental health structures and services with the educational system. A priority of the new Law is to improve the provision of health services to children and adolescents with mental disorders, autism, neurodevelopmental disorders, and learning difficulties. Support is also provided

for adults with psychiatric disorders, adults with dementia and neurodegenerative disorders, patients with chronic conditions that burden mental health, and, of course, vulnerable groups of the population.

The development of community-based health-service structures is provided for and planned, such as mobile units, day care, home care, day hospitals, and community mental health teams. A distinct and important point of structural change introduced through the new law is the establishment of the National Organization for the Prevention and Treatment of Addictions (EOPAE), into which all service-providing bodies in the field of addictions are integrated, such as the Organization Against Drugs (OKANA) and the Therapy Center for Dependent Individuals (KETHEA). The aim of this restructuring is to improve the quality of life of dependent individuals, to ensure citizens' unhindered and guaranteed access to different addiction-treatment programs, to reduce waiting times, to enable treatment to be adapted to different individual needs, and to avoid the interruption of addiction-treatment programs.

An effort is made to connect and encourage cooperation between public and supervised private non-profit or for-profit mental health service providers, as well as private physicians, for the co-management of cases. The law also introduces structural changes at the administrative level, establishes the position of deputy governor of the health region for mental health matters, and provides for the establishment of the Scientific Council for Mental Health (SCMH).

Furthermore, particular importance is given to the organization and management of future crises, support for research and innovation, and the establishment and operation of an information system for epidemiological monitoring and therapeutic management (Hellenic Republic 2024). The law on the completion of psychiatric reform came as the result of a reform course over at least the last twenty years, with long interruptions during the economic crisis and the pandemic.

Even before this law, reform policy had already borne fruit through the Psychargos I and II programs, reducing psychiatric hospitals from eight to three, transferring patient care and treatment from the institution to the community, and drastically increasing day-care units. Naturally, there are goals that were not achieved and that the new Law 5129/2024 is now called upon to carry out. Specifically, the unmet goals concern mental health centers for children, alcohol and drug addiction-treatment centers, and community mental health clinics. The major inequalities in the provision of mental health services between urban and rural areas also require reform. In addition, there is a need to train the staff who provide mental health services with regard to the goals of the reform, the new method of caring for mental health service users (deinstitutionalization), and a new model of integrated and more holistic care for these patients.

The new law is called upon to overcome administrative and organizational problems, such as the uncoordinated action of different bodies, the lack of a mechanism for evaluating the mental healthcare provided, deficiencies in epidemiological studies, and the need for financial support for the reform project. Through the law, therefore, most of the above-mentioned problems and deficiencies are expected to be overcome, specifically those relating to administration, control, and organization. An effort to include specialized psychiatrists in primary care is also apparent. The effort to eliminate social stigma and fully reintegrate mental health care recipients into the community continues. Particularly important is the new law's effort to care for the mental health of adolescents and young people through prevention, as well as through improvements in care, treatment, and rehabilitation. Finally, it is worth highlighting the aim of rationalizing the bodies responsible for the prevention and treatment of addictions.

Despite the radical changes attempted by the new law, certain points remain insufficiently clarified or do not provide for the management of existing deficiencies. The costly access of the Greek population to treatments, such as different forms of psychotherapy in the context of prevention and/or treatment of various mental disorders, is neither abolished nor financially supported. Moreover, no clarification is provided regarding the high rate of individual financial participation in pharmaceutical treatment.

Finally, given the limited funding in the health sector (limited ICU beds, a limited number of ambulances, restrictions on consumable materials, etc.), the attempt to implement radical reforms appears uncertain, as funding for the changes, and more generally funding for mental health, constitutes only a portion of the funding allocated to strengthening health. To achieve the objectives, it is necessary to secure and increase public expenditure in the field of mental health.

CONCLUSIONS

Mental health includes every person's right to the highest attainable level of mental health. The World Health Organization (WHO), the European Union, and individual states introduce measures and promote policies to protect and improve the mental health of the population.

The measurement and recording of mental health over time and across countries are carried out through specific health indicators defined by the WHO and/or the European Union. Such indicators include the prevalence of various mental disorders, the case-fatality rate, drug- or alcohol-related mortality, disability prevalence, and others. These indicators also provide the basis for evaluating the various policies concerning mental health.

The prevalence of mental disorders is high in Europe and worldwide. In our country, however, there is insufficient recording of data concerning mental health. Over the course of a decade, the mental health of the Greek population worsened due both to the economic and fiscal crisis and to the pandemic. A similar, but milder, deterioration was also observed across Europe.

Broad data show that the Greek population suffers from unmet needs in the field of mental health, stigma, and lack of reintegration into the community. For at least the last two decades, psychiatric reform has been attempted in our country with the aim of correcting deficits, promoting deinstitutionalization, and improving the mental health of the population at the levels of prevention, treatment, and reintegration. The new Law 5129/2024 provides for improved mental health service delivery. It introduces substantial measures and changes that will promote and improve, at multiple levels, the services provided in the field of mental health. However, there are points that remain unclear, such as insufficient funding for the entire undertaking, which raise doubts about the success of the ambitious and necessary plan for the radical restructuring of psychiatric reform.

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Economic Evaluation of Peripherally Inserted Central Catheters (PICC): Implications for Cost and Nursing Practice

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ABSTRACT

Introduction: Safe and efficient venous access is a key component of nursing care, particularly for patients requiring long-term intravenous therapy. Peripherally inserted central catheters (PICC) have emerged as a valuable alternative to traditional central venous catheters, offering both clinical and economic benefits.

Aim: This review aims to evaluate the economic effectiveness of PICC lines compared with other forms of central venous access, focusing on cost implications and nursing practice outcomes.

Methodology: A review of recent international and Greek literature was conducted, analyzing factors that influence total cost, such as insertion, maintenance, complications and length of hospitalization, while highlighting the role of nursing education in ensuring optimal catheter management.

Results: The findings indicate that PICC lines reduce hospitalization costs, minimize complications and enhance the quality of patient care.

Conclusions: The economic evaluation of PICC lines supports the importance of evidence-based nursing practice and the rational management of healthcare resources.

Keywords: PICC, economic evaluation, cost-effectiveness, nursing practice, venous access, Greek healthcare system

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INTRODUCTION

Peripherally inserted central venous catheters (PICC) are an important tool for venous access in patients receiving long-term intravenous therapy, particularly in oncology populations. Despite their clinical benefits, their use involves financial costs related to insertion, maintenance and the management of complications. Estimating this cost is critical for optimizing care and rationally allocating resources. The purpose of the present systematic review is to describe and analyze the international and Greek literature on the economic evaluation of PICC lines, with the aim of identifying key cost parameters and proposals for improving effectiveness in nursing practice.

METHODOLOGY

The present study is a literature review conducted to explore the economic evaluation of peripherally inserted central catheters (PICC) in relation to other forms of central venous access, as well as their impact on nursing practice.

Search Strategy

The literature search was carried out from January to September of 2025 in the following electronic databases: PubMed, CINAHL, Scopus, ScienceDirect and Google Scholar. In addition, Greek publications were searched through the National Archive of PhD Theses and the National Documentation Centre.

The following keyword combinations were used in English and Greek: «Peripherally Inserted Central Catheter», «PICC», «economic evaluation», «cost-effectiveness», «nursing practice», «venous access», «health economics», «hospital costs», «infection prevention», «Greece», «Greek National Health System», «nursing practice» and «economic evaluation».

The search was limited to articles published between 2014 and 2025 in order to reflect contemporary practice and the economic context of hospital services.

Inclusion Criteria

The review included studies that:

- Examined the economic or clinical-economic evaluation of PICC lines.
- Compared PICC lines with other forms of central venous access, such as subclavian, femoral or internal jugular access.
- Reported cost parameters, including insertion, maintenance, complications and length of hospital stay.
- Included nursing-related factors, such as care time,

education and the role of the nurse.

- Were published in reputable scientific journals with full text available in English or Greek.

Exclusion Criteria

The following were excluded:

- Studies focusing exclusively on pediatric or neonatal populations.
- Opinion articles, interviews and conference abstracts without full analysis.

Study Selection Process

The study selection process followed the basic steps of the PRISMA protocol (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). Initially, 284 publications were identified, of which 97 were excluded as duplicates. After reading titles and abstracts, 136 articles were excluded because their subject matter was unsuitable, while 51 studies were assessed in full text. Ultimately, 24 studies met the inclusion criteria and were included in the review (Flow diagram).

Data Analysis and Categorization

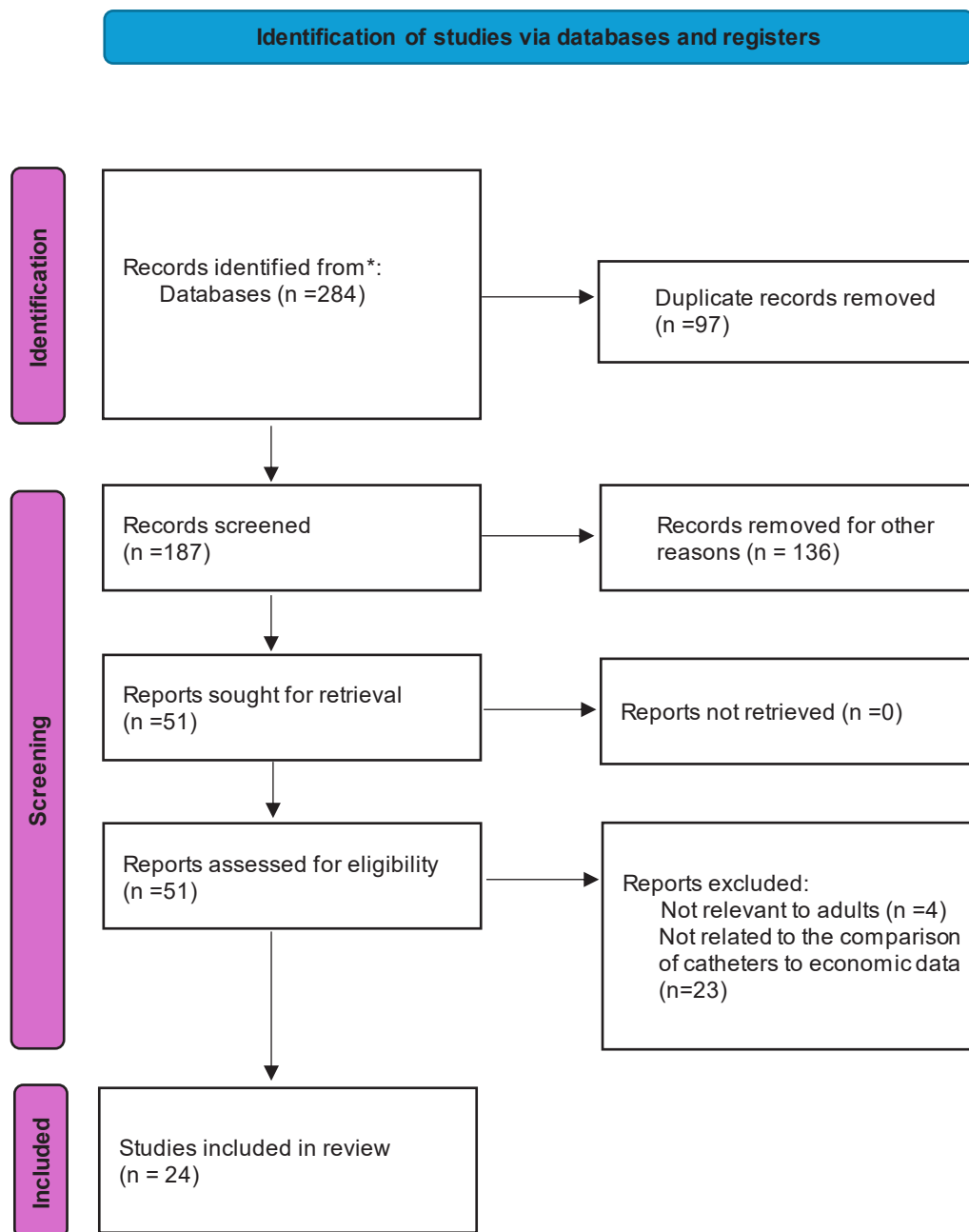
The findings were grouped into four main thematic sections:

- Cost of PICC insertion and maintenance
- Cost of complications and hospitalization
- Role of nursing practice and education
- Comparative economic evaluation in the Greek healthcare system

For each thematic category, a qualitative content analysis was performed in order to identify common findings and differences among the studies. The reliability of the sources was assessed on the basis of the journal impact factor, methodological quality (for example, type of cost-effectiveness analysis) and clarity in the presentation of economic data.

Ethical Considerations

As this was secondary research, approval by an ethics committee was not required. However, the principles of scientific integrity were followed, with full citation of sources and avoidance of plagiarism.



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

RESULTS

Cost of PICC insertion and maintenance

Most international studies converge on the conclusion that the initial cost of PICC insertion is lower than that of other central venous catheters, mainly because insertion is performed by trained nurses and not necessarily by physicians (Helm et al., 2019). The procedure for inserting a PICC requires fewer resources, minimal radiology equipment and can be performed in day-care units, thereby reducing the cost per case (Gorski et al., 2021). Indicatively, a study by Chopra et al. (2020) estimated the average cost of PICC insertion in the United States at 230-280 dollars, compared with 450-600 dollars required for a central catheter placed in the subclavian or jugular vein. Similarly, a European study (Van Donk et al., 2018) showed that the lifespan of a PICC can reach 8-12 weeks, reducing the need for reinsertion and therefore the total cost of materials.

In the Greek context, according to data from nursing departments in tertiary hospitals, such as GHA "Evangelismos" and GHTh "Papanikolaou", the average material cost for PICC lines is estimated at 150-180 euros, with the possibility of reusing ultrasound guidance equipment. Nursing autonomy in this procedure leads to savings in time and human resources (Vasileiou & Karagianni, 2022).

Cost of complications and length of hospitalization

The financial burden of complications associated with venous catheters is a critical factor in the overall evaluation. PICC lines have been associated with lower infection rates compared with conventional central catheters, especially when safety and training protocols are followed (O'Grady et al., 2017). Studies show that catheter-related bloodstream infections (CLABSI) occur, on average, at a rate of 1.1 per 1,000 catheter-days for PICC lines, compared with 2.5-3.0 for other types of central catheters (Mermel et al., 2020). Each infection can increase hospitalization costs by 7,000-15,000 euros per case (Zimlichman et al., 2013), making infection reduction highly significant from an economic perspective.

In addition, reducing complications such as thrombophlebitis, occlusion or the need for reinsertion leads to a shorter hospital stay. According to Goh et al. (2021), the use of PICC lines was associated with an average reduction of 1.5 hospital days compared with other venous access methods. A study by Buetti et al. (2022) notes that the use of PICC lines in oncology patients reduced the number of readmissions due to venous complications by 35%, resulting in substantial cost savings per nursing department.

Role of nursing practice and education

Nursing education and the initiative of specialized nurses in the insertion and care of PICC lines are recognized internationally as decisive factors for success

and economic efficiency (Infusion Nurses Society, 2021). Training in ultrasound techniques, aseptic technique and catheter maintenance reduces complications by up to 60%, according to a study by Moureau & Chopra (2016). At the same time, the integration of PICC care protocols into nursing departments improves compliance and reduces cost per case (Alexander et al., 2019).

In Greece, nurse education in PICC insertion remains limited, but pilot programs in hospitals in Athens and Thessaloniki indicate that a specialized team of nurses can effectively replace physician involvement, reducing both costs and waiting time. This reinforces the need to institutionalize the role of the «Vascular Access Nurse» in Greek hospitals.

Comparative economic evaluation in the Greek National Health System

The economic efficiency of PICC lines in the Greek National Health System depends on multiple factors, such as the availability of ultrasound equipment, staff education and the costing of procedures through the National Organization for Healthcare Services Provision (EOPYY). Although most Greek studies are based on limited samples, the data indicate that the use of PICC lines could reduce the average hospitalization cost by 10-15% per chronic patient case (Alexandrou et al., 2014). In addition, the implementation of nurse-led protocols for the rational use of PICC lines has the potential to limit excessive material consumption and reduce length of hospital stay.

The studies highlight the need for institutional support and education of nursing staff so that the economic efficiency of PICC lines can be translated into systematic benefit for the Greek National Health System.

DISCUSSION

The present review showed that peripherally inserted central catheters (PICC) are an economically and clinically efficient option for venous access in patients requiring prolonged intravenous therapy. The findings are consistent with international studies demonstrating the multiple benefits of PICC lines in terms of both cost and quality of care (Gorski et al., 2021; Moureau & Chopra, 2016).

The economic dimension of PICC lines

Cost-effectiveness analysis confirms that, although the material cost of a PICC may be slightly higher than that of a peripheral catheter, the overall treatment cost is lower because of:

- fewer complications,
- fewer reinsertions,
- reduced length of hospitalization.

As Chopra et al. (2020) report, the use of PICC lines may generate savings of up to 30% in total cost per patient, mainly through reductions in infections and treatment duration. Similarly, Goh et al. (2021) point out that the economic effectiveness of PICC lines increases in chronic

patients, for whom the cost of complications from other catheters is significantly higher.

The economic sustainability of PICC lines is strengthened by the possibility that they can be inserted by specialized nurses, reducing dependence on medical resources. In settings where an organized «Vascular Access Team» program is available, resource savings can reach up to 40% (Alexander et al., 2019).

Implications for nursing practice

The results of the review underline the decisive role of nurses in the successful implementation and economic utilization of PICC lines. Nurse education in ultrasound-guided insertion techniques, adherence to aseptic technique protocols and systematic monitoring of the catheter insertion site are associated with a significant reduction in complications (Helm et al., 2019).

In Greece, where PICC implementation remains limited, early experience indicates that strengthening the role of nurses in the insertion and care of venous catheters could significantly improve the efficiency of hospital services. Integrating this practice into the nursing skills mix is consistent with the international trend toward advanced nursing roles (Infusion Nurses Society, 2021). At the same time, the active participation of nurses in economic evaluations strengthens evidence-based nursing care. As Smith (2020) notes, nurses' involvement in resource allocation decisions leads to a better understanding of the cost-quality relationship in patient care.

Clinical-economic benefits and patient safety

Reducing complications associated with the use of PICC lines translates not only into economic benefit but also into improvements in patient safety and satisfaction. Catheter stability, the reduced need for reinsertion and the possibility of maintaining the catheter in home care are important factors for continuous and safe treatment (Moureau & Chopra, 2016). This is particularly important in the post-COVID-19 era, when reducing the length of hospitalization and relieving pressure on hospitals are major priorities for healthcare systems. PICC lines, as a long-term access solution, enable a smooth transition from hospital to home care, with direct economic and operational benefit (Moureau et al., 2015).

Greek context and prospects

Although the use of PICC lines is well established internationally, in Greece their implementation is uneven and often depends on the availability of specialized nurses or appropriate equipment. Karagianni and Vasileiou (2022) note that limitations in funding and staff education are key barriers to the universal implementation of PICC lines in the Greek National Health System.

The adoption of a national nurse education program in PICC insertion, combined with standardized protocols for

monitoring costs and complications, could strengthen the effectiveness and sustainability of the practice. Furthermore, the integration of economic quality-of-care indicators, such as cost per hospital day and complication rate per 1,000 catheter-days, would allow the objective evaluation of PICC performance in the Greek National Health System.

Study limitations

As in every literature review, the findings are affected by certain limitations:

- the heterogeneity of the studies in terms of cost criteria and methodology,
- the absence of extensive Greek cost data,
- the difficulty of comparing different healthcare systems.

Nevertheless, the consistency of the results across international and domestic sources strengthens the reliability of the conclusions.

Overall interpretation

In summary, the review demonstrates that:

- PICC lines offer a significant economic advantage by reducing direct and indirect costs.
- Nursing education is critical for ensuring effectiveness and safety.
- The integration of PICC lines into the Greek National Health System requires institutional support, education and continuous cost-benefit evaluation.

These results highlight the need to strengthen nursing autonomy and invest in expertise, so that venous access through PICC lines can become a key tool for improving the quality and efficiency of care.

CONCLUSIONS

The present systematic review documents that peripherally insert central catheters (PICC) are a safe, effective and economically efficient solution for long-term venous access. Their use leads to a significant reduction in the overall cost of care because of fewer complications, shorter hospitalization and improved patient experience.

The nursing contribution is decisive both in the insertion process and in the management and monitoring of the catheter. Specialized Vascular Access Teams, in which trained nurses participate, achieve cost reductions of up to 40%, highlighting the importance of continuing education and the professional empowerment of nurses.

In the Greek context, the systematic integration of PICC lines requires:

- standardized protocols and guidelines,
- nurse education in the use of ultrasound guidance,
- continuous cost-benefit evaluation and assessment of quality-of-care indicators.

Strategic investment in PICC technology and nursing education can become a key pillar for modernizing Greek hospitals, strengthening the efficiency of the Greek National Health System and patient safety.

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Nutrition education for elders and their caregivers for nourishment restoration: a systematic review

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ABSTRACT

Introduction: Nutrition education for carers and elders seems effective in improving health and malnutrition, though evidence is limited. This review aims to assess its impact on malnutrition and quality of life for both groups.

Material and Methods: A systematic literature search was conducted across three databases (Scopus, PubMed, Google Scholar). Studies in Greek or English published in the last 20 years were selected. Inclusion criteria focused on participants aged ≥ 65 years, at risk of or malnourished. The Registration Number is 216473013268.

Results: The initial search yielded 249 papers from PubMed and Scopus, and 12 from Google Scholar. After removing duplicates, 241 studies remained. The title, abstract, and participant criteria of each were checked, and studies not meeting the criteria were excluded. Ultimately, 9 studies remained. The search process is outlined in the PRISMA flowchart (Figure 1).

Conclusions: This review found that nutrition education has a dual effect, as it equips caregivers with the knowledge and skills to reduce malnutrition's impact on older adults and improve both caregivers' and elders' well-being.

Keywords: elders, malnutrition, caregivers, inadequate food intake, caregiver, nutrition, education.

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INTRODUCTION

Ageing is a condition associated with physical and emotional challenges for elder people, resulting in an increasing demand for carers (Moreira et al., 2018). Difficulty in eating is often recognized as a widespread issue among the elderly population, leading to issues such as weight reduction, inadequate dietary intake, suppression of the immune system which can enhance high vulnerability to diseases (Chang & Roberts, 2008). Malnutrition is described as «a condition resulting from insufficient food intake, which leads to changes in body composition such as reduced fat-free mass and cell mass, resulting in impaired physical and mental function, as well as clinical outcomes in the context of the disease» (Fernández-Barrés et al., 2017). It has been estimated that malnutrition currently affects more than 3 million people in the UK, with almost 1.3 million of those aged 65 years old and over living in community settings (Rea, Walters, & Avgerinou, 2019). The effects of malnutrition are manifold, including increased risk of falls, loss of autonomy, reduced quality of life, increased frequency of hospitalizations and presence of comorbidities and mortality (Fernández-Barrés et al., 2017). Among the elderly, malnutrition is a major challenge for the scientific society, especially for those elders diagnosed with dementia (Meyer, Gräske, Worch, & Wolf-Ostermann, 2015). Moreover, older people experience different levels of unmet nutritional requirements after leaving a healthcare facility and in combination with the inadequate educational resources for both patients and caregivers can lead to misconceptions, anxiety, fear, negative impact on health, and emotional disorders, including depression (Hestevik, Molin, Debesay, Bergland, & Bye, 2020; Hafsteinsdóttir, Vergunst, Lindeman, & Schuurmans, 2011). Furthermore, the lack of involvement of the elderly patient and family caregivers in care and planning processes, as well as insufficient support for self-management during discharge and subsequent home care, may have a negative impact on the quality of care provided (Hestevik, Molin, Debesay, Bergland, & Bye, 2020). The involvement of caregivers in the nutritional care team during rehabilitation offers a distinct opportunity to improve nutritional care and outcomes, since these interventions are tailored to the specific needs and preferences of patients, family members, or friends who provide most of the care (Marshall, Reidlinger, Young, & Isenring, 2016).

Taking into account all the changes that elders undergo due to ageing, they are more vulnerable to malnutrition and inadequate nutritional intake. Therefore, it is needed to provide both elders and their carers with personalized

nutritional education to prevent or treat the health burden of malnutrition; however, there is limited research on the effectiveness of nutrition education for both elders and their carers in improving health. Consequently, the aim of this systematic review is to evaluate the effects of nutrition education on treating malnutrition and improving the quality of life for both elderly individuals and their carers.

MATERIAL AND METHODS

Search strategy

The searches in the international literature were performed using the following keywords: malnourished patients, ageing, elders, caregivers, caregiver training, caregiver training program, malnutrition, insufficient food intake, using electronic databases such as Scopus, PubMed, Google Scholar. Moreover, the protocol that was followed for this systematic review was the PRISMA 2020 checklist and the Registration Number 216473013268. The search process for articles about training caregivers in malnourished patients yielded 249 papers from PubMed and Scopus and 12 from Google Scholar. After removing the duplicates ($n=20$) and remained 241 articles, the title, abstract and participants' criteria were checked for key words, for each study. The results of this process were to remain 190 articles of which 29 were excluded due to supplements consumption. Secondly, a full screening of articles was done by two reviewers – authors, independently, so as to confirm the relevance with the content of this systematic review. Lastly, only 9 of those matched with the criteria concerning population and intervention process and were selected to present in this study. Additionally, it should be underlined that any doubts or clarifications or miss elections were solved via discussion among the two authors-reviewers. Lastly, it should be mentioned that none changes were made to the study protocol or registration information after the study began. It should be highlighted that the review of the bibliography was carried out until November 2023.

Selection Criteria

In order to prevent the existence of heterogeneity and miss election of articles from bibliography, specific criteria for the selection or the exclusion of articles were implemented and are analyzed below. Inclusion criteria included: 1) participation of caregivers in the nutritional training program was observed 2) elder's participants' age was ≥ 65 years old 3) relative score of malnutrition (Mini Nutritional Assessment) ranged between 17-23.5 points, which is an indicator of the risk of malnutrition. 4) elderly participants who had difficulties performing daily

living activities and therefore needed to have a caregiver 5) studies that were published in the last 20 years.

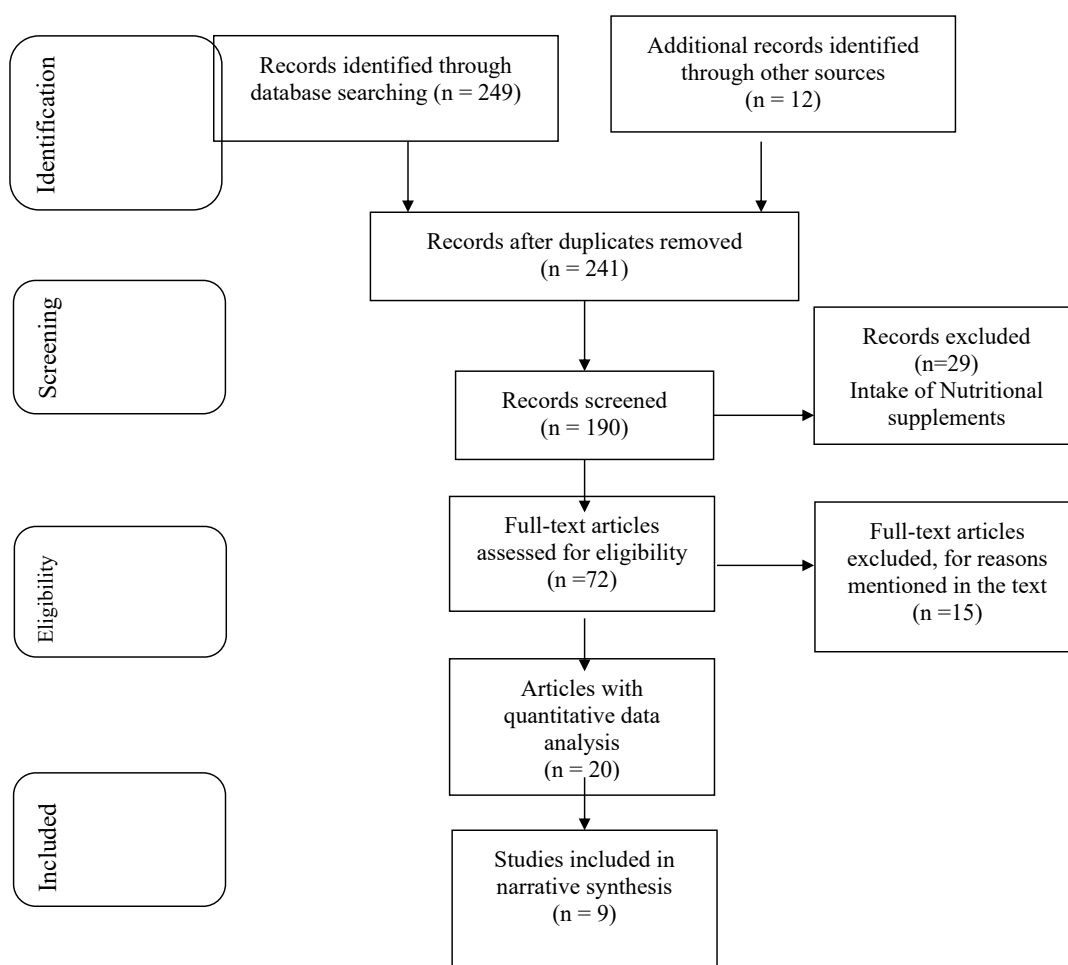
Studies were excluded if: 1) the score of the Mini Nutrition Assessment was outside the range of 17-23.5 points, since scoring under 17 points it indicates pre-existing, established malnutrition, whereas when the score is above 24 points, the elder is adequate nourished 2) cases where technical feeding was necessary, they were excluded 3) Studies included incidents suffering from severe swallowing disorders 4) any serious illness that progresses to malnutrition (e.g. cancer) 5) cases consuming vitamins and/or dietary supplements were involved in the study.

Data Synthesis

The data synthesis was carried out as follows: In the

first stage 261 titles and abstracts were found in the searches. After the first screening, the abstract was read for those papers which passed it and remained 190. Then, full-text was screened, for the articles that met the abstract's criteria. After completed all this procedure, the 9 articles that remain were chosen for this systematic review. Lastly, it must be mentioned that for the needs of this systematic review, only a narrative synthesis was carried out concerning the effects of elders' caregiver's educational interventions in the nutritional status, physical activity level and quality of life of older people. The reason of selecting a narrative - descriptive synthesis instead of conducting a meta-analysis was the high heterogeneity of the studies that made this accomplishment difficult. Figure 1 is the PRISMA flowchart showing the study selection process and the reasons for excluding articles.

Figure 1. PRISMA flowchart



Risk of bias

Studies that have high risk of bias can mislead the results of this systematic review. Firstly, in Chang et al. study as a risk bias can be considered that it includes small sample size, there is lack of a control group, there is short duration of the intervention and there is a possibility of not selecting all the eligible articles (Chang & Roberts, 2008). In Hestevik et al. qualitative study, the researchers are not sure about the validity of elders' responses (Hestevik, Molin, Debesay, Bergland, & Bye, 2020). Also, the WGQual study was funded by the German Federal Ministry of Education and Research as part of the funding line SILQUA-FH - Social innovation for the quality of life of older people. Additionally, another risk of bias in this research is that the number of caregiver participants was too small and inadequate in order to draw conclusions that can be generalized to the geriatric population (Marshall, Reidlinger, Young, & Isenring, 2016). The Rea, et al., 2018, systematic review refers that there is suspicion for the occurrence of risk

of bias concerning random sequence generation, in the allocation of participants, in the intentional report of some data and results and in incomplete outcomes (Rea, Walters, & Avgerinou, 2019). Subsequently, another study was funded by the Alzheimer's Society of Canada and the Université de Montréal and the authors state that there are no conflicts of interest (Silva, Kergoat, & Shatenstein, 2012).

RESULTS

Description of included studies

In most of the studies participated elderly people at risk of malnutrition or with established malnutrition along with their caregivers. The main goal was to evaluate the effectiveness of providing information concerning healthy nutrition, eating habits and physical activity, in elders' and their carers' well-being. The characteristics and results from all studies are presented in detail, in the above-mentioned Table 1.

Table 1. Description of the studies and interventions included in the review

Article	Study design	Sample characteristics & country	Intervention & duration	Assessment of malnutrition -other measures	Findings
Chang, 2008	Systematic review	71 articles, focusing on older adults with dementia experiencing feeding difficulties.	The study reviewed various interventions, including verbal cuing, music therapy, environmental modifications, and caregiver training. Duration varied across studies.	Tools like the Edinburgh Feeding Evaluation in Dementia (EdFED) scale and Eating Behaviour Scale (EBS) were used to assess feeding difficulties, nutritional intake, and caregiver burden.	Identification of the characteristics of feeding difficulty, its antecedents and consequences. The study developed a conceptual model of feeding difficulty to guide future research and evidence-based practice in the assessment and management of eating difficulties in older adults with dementia.
Fernández-Barrés, 2017	Randomised Control Trial (RCT)	10 Primary Care Centers in Spain of which 173 patients participated in the Home Care Program who were dependent and at risk of malnutrition (average score of 25.4 ± 3.7 points), older than 65, and had caregivers (intervention n = 101; control n = 72). - Mean age was 87.8 ± 8.9 years, 68.2% were women. Difference were found between the groups for Mini Nutritional Assessment test score change (repeated measures ANOVA, $F = 10.1$; $P < 0.001$).	- Intervention: 6 months Follow up: 12 months. All the measures were recorded in a schedule of 0–6–12 months. The nurses conducted initial educational intervention sessions for caregivers. - The nurses of the Home Care Program-ATDOM conducted an individual session and a 1-hour group session among several caregivers and further individual dietary monitoring of the patient in the presence of his caregiver. - Control group: visited once to complete an initial assessment and received regular Home Care visits, and the study-specific 6 months and 12 months visits.	- Nutritional status was assessed using the Mini Nutritional Assessment test (primary outcome), diet, anthropometry and biochemical parameters (albumin, prealbumin, hemoglobin and cholesterol) - Outcome measures: current medical history, Activities of daily living (Barthel test), cognitive state (Pfeiffer test), and mood status (Yesavage test)	- Intervention improved the Mini Nutritional Assessment test score of the participants in the intervention group. The egg consumption ($F = 4.1$; $P = 0.018$), protein intake ($F = 3.0$; $P = 0.050$), polyunsaturated fatty acid intake ($F = 5.3$; $P = 0.006$), folate ($F = 3.3$; $P = 0.041$) and vitamin E ($F = 6.4$; $P = 0.002$) showed significant group x time interactions. - Nutrition education program for caregivers prevented the progression of nutritional decline and lowered the risk of malnutrition in dependent elders.

Hafsteinsdóttir, 2011	Systematic review	21 cross-sectional or descriptive studies 15 quantitative studies, 5 qualitative studies and 2 used a combination of both designs. - Studies focused on the needs of patients, while 9 studies on the needs of caregivers and seven focused on the needs of both patients and caregivers. 6 studies were conducted in the UK, 5 in the USA, 3 in the Netherlands, 1 in Germany, 3 in Australia, 2 in South Korea, 1 in Hong Kong and 1 in New Zealand. - Sample: 1029 stroke patients, 749 caregivers	Duration varied across studies.	It does not specify the exact tools used to assess malnutrition.	- Educational needs of stroke patients and caregivers were about the clinical aspects of stroke, prevention, treatment and functional recovery. - The most commonly reported educational needs of caregivers involved patients' moving and lifting, exercises, psychological changes and nutritional challenges. - Patients and caregivers wanted information concerning their situation.
Hestevik, 2020	Qualitative study	- They interviewed face-to-face 15 older patients with malnutrition or malnourishment, two and five weeks after hospital discharge and nine family caregivers once during this period, in Norway. - Sample: The were 10 women and 5 men elders aged 74–97 years (mean age: 85 years) and among the caregivers there were 6 women and 3 men, which were the patients' spouses, children and grandchildren and were aged 52–86 years (mean age: 65 years).	33 semi-structured face-to-face interviews (25–90 minutes duration) with 15 older patients and 9 of their family members.	MNA	- The study found that nutritional care at home often lacks personalization. Participants reported problems related to communication and joint decision-making in the process of nutritional care. - The study concluded that the organization of nutritional care and the provision of food to the elderly and joint decision-making in the process of nutritional care.
Marshall, 2017	Longitudinal qualitative investigation	4 Australian female family carers of malnourished rehabilitation patients aged ≥65 years at risk of malnutrition were interviewed	Semi-structure, audiotaped interviews during their care-recipients' rehabilitation admission and again at 2 weeks post-discharge	MNA	- This guide was related to the recognition and support of family caregivers of malnourished patients, which can lead to improved perceived benefit of care and patient outcomes. - The study identified three key drivers: (1) the sense of responsibility of family carers in providing nutrition support, (2) the carers' personal beliefs and knowledge impacting their nutrition approach, and (3) the focus on improving the patient's quality of life, all of which influence carers' burden and patient outcomes in the context of malnutrition rehabilitation.

Meyer, 2015	Longitudinal study	Conducted in Germany, the study included 45 residents (mean age: 78.4 years, 73.3% female) from shared-housing arrangements (SHA) in Berlin, with 88.9% diagnosed with dementia.	One-year observation of nutritional status.	- Malnutrition: Mini Nutritional Assessment (MNA) - Cognitive Capacity: Mini Mental State Examination (MMSE) - Daily Living Activities: Extended Barthel Index (EBI)	80.6% of participants were at risk of malnutrition at baseline. - The average MNA score declined over one year (from 20.8 to 19.7). - Malnutrition was linked to lower survival rates. - Regular nutritional screenings and flexible care structures in shared-housing arrangements are recommended to prevent malnutrition.
Moreira, 2018	Quasi-experimental study	- Conducted in Sobral, Ceará, Brazil. - Final Sample: 34 caregivers completed the intervention and evaluation. 47.82 years (range: 18–77). 85.4% were women. 68.3% were unemployed. 82.9% were unpaid caregivers. 56.1% were children of the older adults. 75.6% lived with the older adult	- Data collected from February to July 2015 - Intervention: Educational sessions for caregivers focused on improving knowledge, attitude, and practice (KAP) in caregiving. - Duration: 4-hour session with discussions, educational videos, simulations, and written guidelines. - Topics Covered: Relationship between caregiver and older adult / Feeding / Bathing and hygiene / Mobility and transportation	Main Assessment Tool: Knowledge, Attitude, and Practice (KAP) survey, developed by specialists.	- Statistically Significant Improvements in KAP Scores: Feeding: Knowledge ($p<0.001$), practice ($p=0.003$). Bathing & Hygiene: Knowledge ($p<0.001$), practice ($p<0.001$). - Mobility & Transportation: Knowledge ($p<0.001$), attitude ($p<0.001$), practice ($p<0.001$). - Attitude Improvement: Significant in caregiver-older adult relationship ($p=0.020$) and mobility ($p=0.001$). - Practice Improvement: Statistically significant in all caregiving domains. - High caregiver burden due to long care hours (average 19.56 hours/day).
Silva, 2013	Quasi-experimental pre-post nutritional intervention study	- Conducted at the Centre de recherche de the Institut Universitaire de Gériatrie de Montréal, Canada 33 caregiver-patient in the intervention group. 30 caregiver-patient dyads in the control group. 24 caregivers from the intervention group were interviewed for qualitative analysis. 58% of caregivers were aged 70 or older - Patients aged 70 or older.	- Duration: 6 months. - Group 1 (Intervention): Received individualized nutritional support from a dietitian. Intervention methods included personalized counseling, written materials, dietary recommendations, and follow-up sessions. - Group 2 (Control): Received regular healthcare.	- Zarit Burden Interview (ZBI): Assessed caregiver burden. Semi-structured Interviews: Collected qualitative data on dietary challenges, changes in food preferences, feeding difficulties, and coping strategies. - Nutritional Assessment: Evaluated patient dietary intake, including protein, calcium, vitamin D, vegetables, legumes, and fish consumption.	- Dietary Challenges: Changes in food preferences (50% of patients). Decreased food intake (46%) and appetite (29%). Increased dependency on caregivers for eating (63%). Forgetting meals (29%). - Caregivers' Coping Strategies: Motivating patients verbally. Preparing meals in advance. Using reminders (calls, written instructions). Monitoring food intake and meal safety.
Rea, 2019	Systematic review of randomized controlled trials (RCTs) and quasi-experimental studies	Included 8 studies with 772 participants from the U.S., Sweden, Canada, Spain, Finland, and Denmark. Participants were community-dwelling older adults (≥ 60 years), mostly at risk of malnutrition.	Nutrition education interventions varied in format (written materials, face-to-face, telephone, group sessions). Duration ranged from 3 weeks to 6 months.	Used tools like Mini Nutritional Assessment (MNA), self-reported dietary intake, and weight measurements. Other outcomes included physical performance, hospital readmission, and quality of life.	Some evidence suggested improvements in nutritional risk, dietary intake, and reduced hospital readmission. However, the overall quality of studies was low, with mixed results.

Specifically, Silva, et al., 2013 conducted a study which included 33 caregivers of patients with dementia in a non-institutional setting, based in Canada. They performed individual interviews via telephone calls, for a six-month period and they collected data which were analyzed for this qualitative study, highlighting issues related to dietary practices faced by caregivers. In this study, caregivers of elders with Alzheimer disease, had being interviewed about changes in food preference and reduce energy intake are commonly observed in patients with dementia (Silva, Kergoat, & Shatenstein, 2012). In one-year study that took place in Australia, Marshall et al., carried out interviews with female caregivers of malnourished elders at rehabilitation state, which were conducted in two phases one during the rehabilitation admission and the other one 2-weeks after. Furthermore, the aim of this study was to assess nutritional status, cognitive abilities, daily living activities, sociodemographic characteristics and supporting information needed, concerning nutrition in geriatrics (Marshall, Reidlinger, Young, & Isenring, 2016). Additionally, Hafsteinsdóttir, et al., 2011 systematic review consists of articles from different countries and its main goal is to analyze the type of educational needs that caregivers have especially when they take care of patients with stroke. The sample included 1029 patients with stroke and 749 caregivers from South Korea, Australia, United Kingdom and New Zealand (Hafsteinsdóttir, Vergunst, Lindeman, & Schuurmans, 2011). Chang et al., study is a systematic review with primary objective the analysis and synthesis of the existing bibliography concerning conceptual feeding difficulty model in older adults with dementia (Chang & Roberts, 2008). In a qualitative study, that was performed in Norway, 2020, Hestevik's et al., mentions psychological and physical factors that lead elders to malnutrition. In this study, participated 15 elders with a score in MNA, that listed them at risk of malnutrition. Moreover, it should be mentioned that not all elders had carers, so the final sample of caregivers was consisted of 9 people. The duration of this study was 5 weeks in which carers were interviewed about their perception concerning hospitals' meals, home-made meals and their thoughts and concerns about the transition from hospitalization to taking care elders alone at home (Hestevik, Molin, Debesay, Bergland, & Bye, 2020). In Meyer S et al., 2015, study took place in Germany, for 2 years. This study, at baseline had 45 participants in 28 share-housing arrangements and most of them were women with dementia. They used MNA to assess the nutritional status and others indexes to screen the cognitive and activity status of elders. The main goal of this study was to observe the changes in elders nutritional status, who live in share-

housing arrangement, within a year (Meyer, Gräske, Worch, & Wolf-Ostermann, 2015). In Rea, et al., 2019 systematic review, the mean age of the sample was above the 60 years old and it included only randomized clinical trials (RCTs). All the RCTs comprised 772 participants with some being the malnourished older people and the others being their caregivers. The RCTs were carried out mostly in European countries including Sweden, Denmark, Finland, Spain and a non - European country, Canada. The follow - up period for each RCT range from 1 month to 1 year and the way of dietary counseling was via telephone calls in some RCTs, by post in others or face-to-face individually or in groups for some others. The purpose of this systematic review was to find whether the nutritional education of caregivers could improve the nutritional status and quality of life in both elders and their caregivers (Rea, Walters, & Avgerinou, 2019). In Moreira, et al., 2018, experimental study, there was 82 carers involved in the first stage. At the following two stages only 34 people, in each phase, participated. At the first phase, nurses and researchers interviewed caregivers so as to collect data concerning their knowledge about elders' hygiene, nutritional and feeding needs, mobility and what they do in everyday practice so as to provide them in older people. The second stage, in group educational sessions that lasted 4 hours, instructed by nurses, they tried to provide caregivers information about elders' feeding, bathing, hygiene, mobility and transportation. They gave and written recommendations so as to facilitate the process. In the last phase, they performed interviews similar with those in the first stage so as to confirm the effectiveness of the educational intervention in caregivers (Moreira et al., 2018). Fernández-Barrés et al., is a multicenter randomized clinical trial that took place in Spain, 2017 consisted of 190 elders with caregivers participated in a six-month intervention and a twelve - month follow up. The sample in clinical trial was allocated in the intervention and control group randomly. The allocation ratio was 3:2 with more participants in the intervention group. The nurses that participated in the intervention group performed an individual session to inform caregivers about the causes and consequences of elders' malnutrition. Afterwards, they provided group educational sessions, lasting 1 hour, so as to give general recommendations about foods' composition in macro- and micronutrients, protein consumption, vitamins needs in elders and information about cooking techniques. It must be mentioned that they use MNA to screen elders that are at risk of malnutrition and they performed anthropometry biochemical test and food frequency questionnaire for the consumption of foods. On the other hand, the control group did not receive any nutritional support. Lastly, the main

purpose of this RCT was to confirm statistically the effect of caregivers' educational support in elders' nutritional status (Fernández-Barrés et al., 2017).

Nutritional knowledge and other nutrition-related effects

Chang et al., study presents that among the difficulties that an elder with dementia has there are included lack of motor and impairment in the cognitive system. All these lead to unrecognition of foods and eating tools, hardness of using these tools and difficulties in swallowing and chewing. All these result in reducing the ability of self-eating which affects their feeling of independence, their energy intake, increase risk of malnutrition and even increase the probability of choking or pneumonia aspiration. It refers, that caregivers and family members should be informed about these impairments of the dementia disease and be able to recognize them and take them into consideration when try to feed older people with dementia. Specifically, in case the elder can chew they should distinguish whether the elder needs someone to feed him or needs physical assistance or verbal cuing so as to eat. Moreover, refers that listening to music during meal time can reduce elders' resistance to eat their meals and might have a positive impact on increase their energy intake. Furthermore, it insists caregivers to create a friendly and family environment during the meal time and let elders try to eat alone, enhancing their feeling of independence. This study, includes Conye & Hoskins, 2017 study that was performed so as to analyze elders and caregivers feeding behaviours and concludes that their outcomes about improving both groups their eating behaviours via the use of behavioral strategies, is extremely important (Chang & Roberts, 2008). In this systematic review, stroke patients at the rehabilitation stage referred that there are questions about side effects of medication, the type of their stroke and ways to manage symptoms such as pain and loss of taste. Moreover, this study included researches about the educational needs of stroke patients' caregivers and found that many had questions about physical care, moving, nutritional matters, adequate energy intake and suitability of specific foods concerning swallowing safety. Concerning patients and caregivers, found that both of them have nutritional deficiencies as a consequence of lacking nutritional knowledge. Additionally, suggests that nurses should focus more on giving nutritional information in patients and caregivers so as to prevent malnutrition in both groups. Lastly, lack of caregivers education concerning moving and lifting elders leads to caregivers' injuries. Injuries along with nutritional issues result in poor quality of life for caregivers (Fernández-Barrés et al., 2017). In Silva 2013 study, caregivers were interviewed referred for elders

with Alzheimer and their changes in food preference and reduce energy intake. Moreover, in this experimental study for nutritional support, caregivers mentioned an increase in protein intake, foods rich in Vitamin D and calcium, fruits, vegetables and fishes due to the nutritional information that experts gave them. Concerning only caregivers' educational intervention, they reported that there was an increase in their awareness of high - quality and adequate eating benefits for their health. Also, caregivers reported that the nutritional information helped them be more confident with the selection and preparation of foods for patients with Alzheimer (Silva, Kergoat, & Shatenstein, 2012). At the one - year follow up study that was conducted in elders with dementia living in shared - house arrangements, the results indicates that their accommodation in these social structures, decrease the prevalence of adequate nutritional status and respectively increase the risk of malnutrition. According to the article, some explanations for this are that most of the participants had dementia which is a factor affecting nutritional intake via changes in food preferences and motor difficulties. So, it is suggested that caregivers and nurses should be informed about dementia's effects on nutritional status and should be educated to face them (Meyer, Gräske, Worch, & Wolf-Ostermann, 2015). In an RCT, concerning home care nutritional intervention in caregivers and patients, the results for the intervention group was increase in eggs, fruits consumption, protein, micronutrients, polyunsaturated fatty acids, folate and Vitamin E intake. Furthermore, at 6 - month follow - up the intervention group had a 9% prevalence of malnutrition whereas the control group had 22.6% malnourished elders. At 12 - month follow - up the prevalence of malnutrition in the intervention group was 4.8% while the control group was 35.4%, almost seven - fold higher. Regarding the educational effects of this intervention, the intervention group had improved his nutritional awareness by 1.5 points, according to the questionnaire they gave them. The numbers, confirm that educational intervention in caregivers improve nutritional status of elders and knowledge about nutritional issues in older people (Fernández-Barrés et al., 2017). In addition, the outcomes of Marshall et al., descriptive study, was that nutritional education of elders' carers enhancing the improvement in both carers' and elders' nutrition without an increase in stress and pressure that caregivers' feel, as the result of being responsible for nursing elders (Marshall, Reidlinger, Young, & Isenring, 2016). Moreover, Chang et al., educational intervention in carers, led to improvement in their knowledge concerning bathing, hygiene, mobility, lifting and feeding older people. At the end of this program, the knowledge of caregivers about these matters had raised.

The increase in carers' information about nursing elders' not only are important so as to improve elders' nutrition but also to facilitate the life of older people and secondly the caregivers' everyday life (Moreira et al., 2018). Outcomes from Rea's et al. systematic review showed that the nutritional training of carers reduced the risk of malnutrition in elder population of the sample. At the same time, nutritional counseling after hospital discharge reduced the likelihood of readmission (Rea, Walters, & Avgerinou, 2019). Hestevik's et al. descriptive study mentions psychological and physical factors that lead elders to malnutrition. Also, underlies the necessity to educate carers about the nutritional needs of older people, tailored to the particularities of each individual (Hestevik, Molin, Debesay, Bergland, & Bye, 2020).

Physical performance

The clinical trial, which took place in 2010 - 2012 and was a nutritional intervention program for carers, was the only study that assessed functional performance. The results showed no apparent effect in the intervention group since it maintained their baseline level of daily activities. Remarkable is the fact that the level of physical activity was slightly decreased in the control group (Fernández-Barrés et al., 2017). The data of Rea's et al. study were contradictory with those of the before-mentioned study, regarding the effect of nutrition education in improving the functional abilities of the elderly. In particular, the latter reported that the results were not particularly convincing and sufficient to prove a positive correlation (Rea, Walters, & Avgerinou, 2019).

Psychological effects

This systematic review, reports high prevalence of psychological issues in both patients with stroke and their caregivers. Although, from a meta-analysis, it is observed that there is a reduction in the severity of psychological symptoms when information and educational needs are given and answered (Hafsteinsdóttir, Vergunst, Lindeman, & Schuurmans, 2011). In Silva et al., nutritional intervention, carers referred that they were less stressed for the selection and preparation of foods so as to feed older people with Alzheimer. All this leads to reduction of psychological effects concerning the increased stress of caregivers about providing the suitable help for the elders that they take care of (Silva, Kergoat, & Shatenstein, 2012). In Marshall et al., qualitative study, women carers of older people mentioned that they feel extremely stressed since they have the whole responsibility for the nutritional care of their older relatives. Moreover, it was observed that wife carers felt less stressed for taking care of their older husband than their daughters

when they looked after their father. One explanation for this is the fact that wife carers think of taking care of their husband as an extension of their marital relationship (Marshall, Reidlinger, Young, & Isenring, 2016). In Rea's et al. systematic review about caregivers' nutrition education showed no effect in depression scores in the geriatric population measured by various indicators (Rea, Walters, & Avgerinou, 2019).

Quality of life

Regarding the improvement in general quality of life and well-being, Rea's et al. systematic review did not indicate any difference between the group that received information on the nutritional status of older people and the control group that received no education (Rea, Walters, & Avgerinou, 2019).

DISCUSSION

The following discussion examines the results of nine different research studies, each focusing on different aspects of nutrition, care and health of the elderly population. These studies offer valuable insights into the challenges faced by older people, particularly patients with dementia, stroke and malnutrition, and the caregivers who support them. Research covers a wide range of methodologies, from qualitative research to randomized controlled trials, contributing to the overall understanding not only of the anatomical and emotional changes that an elderly person undergoes but also the need to educate themselves and their caregivers in finding ways to cope with them. In particular, this study focuses on the significant feeding difficulties faced by older people with various comorbidities. Moreover, elders' feeding problems induce reduce energy intake resulting in malnutrition. Specifically, elders are a vulnerable population with high risk of malnutrition which is a matter of concern. Malnutrition in the geriatric population is an alarming phenomenon that seems to affect not only public health but also the global economy and the functioning of hospitals. For this reason, health professionals try to find the most effective solutions to face this global phenomenon. One solution that it has been analyzed in this systematic review is the attempt to provide nutrition training in both elders and their carers. The results from the included researches in this systematic review agree with those of other studies and RCTs. The outcomes highlight that education programmes for caregivers can raise awareness of the importance of older people's good nutrition (Volkert et al., 2019). Additionally, carers' training programs usually focus on imparting knowledge about nutrition, including the specific nutritional needs of the elderly population, key nutrients,

portion sizes and meal planning that are tailored to their loved one's health status which can help in the treatment of malnutrition [11, 12]. Also, these training programs can help in management of malnutrition's phenomenon by producing strategies to encourage the older person to eat and drink more efficiently. This could include creating a pleasant eating environment, helping during meals, and adapting feeding techniques for people with swallowing difficulties (Sauer, Li, Partridge, & Sulo, 2018). Lastly, when caregivers are better equipped with nutritional knowledge and caring skills, it is more possible to help elders increase their energy intake, treat or prevent malnutrition, enhance elders immune system and improve their general quality of life (Li et al., 2021). From another point of view, educational interventions can help caregivers recognize the signs of malnutrition in older adults. This early detection allows early intervention, preventing deterioration of their condition and possible hospitalizations (Muscaritoli et al., 2017). Last but not least, although this systematic review observed that nutrition training for carers can have positive effects only nutritional status further research should be carried out so as to confirm and effect in quality of life, physical activity level and psychological status in both elders and their carers.

Advantages and limitations

In general, systematic review is a powerful researching tool for reading several surveys with common themes but conflicting results and drawing conclusions based on literature review. However, this systematic review is based

on existing literature until February 2023 and therefore may not cover the most recent research findings. Furthermore, no digital tools were used during the review processes to confirm or facilitate the reviewers' choices. Additionally, this systematic review included limited range of studies, which can restrict the breadth of insights, applicability of the findings to broader contexts and generalizability of outcomes. Although, it is important to note that this systematic review is distinctive in its focus on nutrition education for older adults and their caregivers, an area in which research and systematic reviews remain limited.

CONCLUSION

In summary, these studies refer in the complex interactions between diet, care, and health in older adults. Also, they highlight the need for tailored interventions, education and support to address the unique challenges faced by this demographic group. The importance of holistic approaches to ensure the well-being and quality of life of the elderly population, especially those with special health conditions, as well as their carers has been underlined in this systematic review.

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