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Analysing Nurse Talent Management: A 6-Year Study Before and During COVID-19 Using the McKinsey 9-Box Matrix

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ABSTRACT

Purpose – Talent management plays a pivotal role in shaping the quality and efficacy of health care organizations, with particular significance in nursing.
Aims(s) – This research delves into the assessment of talent management for nurses, using the McKinsey 9-Box Matrix, both pre- and post COVID-19 pandemic.
Design/methodology/approach – Employing a retrospective design spanning six years, this study encompasses 1319 nurses evaluated using the McKinsey 9-Box Matrix. This method involves performance and potential evaluations, incorporating face-to-face interviews with the Directorate of Nursing Services executive team.
Findings – Significant variations in nurse positions, department distributions, and educational backgrounds were observed before and during the COVID-19 pandemic. Noteworthy shifts in McKinsey 9-Box Matrix assessments indicated pandemic-induced changes in nurse categorization. Approximately one-third of nurses were classified as B2: Core Working Group, which is crucial for workforce stability. Gender did not yield significant differences in the McKinsey 9-Box Matrix evaluations. Although variations were noted in categories A1, A2, and B1 before and during COVID-19, employment status did not significantly impact these assessments.
Limitations of the study – Findings aweredrawn from a private health care group, potentially limiting generalizability to diverse settings, populations, or contexts.
Practical implications – This study provides invaluable insights into the evolving landscape of nursing during the pandemic. It illuminates shifts in education levels, positions, departments, leadership potential, and specific evaluation categories among nurses.
Originality/value – Contributing significantly to the existing literature, this study provides a nuanced analysis of talent management practices among nurses. The insights garnered offer a fresh perspective, informing health care organizations' 'talent management strategies, especially considering the evolving health care landscape shaped by the pandemic.

KEY WORDS

Talent management, nurses, nursing, leadership, personnel management

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1 INTRODUCTION

Before the pandemic, the global nursing shortage was a known problem. The shortage of nurses is a critical problem for health systems worldwide. This refers to a situation where there are not enough qualified nurses to meet the health demands of a population. The lack of nurses has significant impacts on hospital care because it can lead to longer wait times, poor quality of care, and increased stress on existing health care workers (Berlin et al., 2023; Buchan & Cotton, 2023; International Council of Nurses, 2020; Marć et al., 2019; Rege & Curnow, 2020; Tamata & Mohammadnezhad, 2023; World Health Organization, 2020, 2023) .

It is known by the whole world that the last few years have been challenging for nurses. Studies indicate that many factors contribute to nurses leaving their profession or changing roles. Some of these include burnout and stress, deficiencies and high patient rates, career progression, work-life balance, educational opportunities, lack of recognition, health concerns, and retirement (Abuzeid, 2023; Berlin, Essick, et al., 2022; Berlin, Lapointe, et al., 2022; World Health Organization, 2023).

The COVID-19 pandemic, which began in early 2020, has further intensified the demands placed on the global nursing workforce. However, many countries have not been successful in increasing these growing needs in the nursing workforce. Assessing the performance and potential of nurses is of paramount importance in their competence and effectiveness across diverse health care settings. The evaluation of nursing potential entails a comprehensive examination of nurses' capabilities in various aspects of health care delivery. Likewise, appraising nurse performance is a pivotal element in ensuring the provision of high-quality patient care and enhancing health outcomes. The scrutiny of nurses' performance and potential holds immense significance in upholding the standard of health care delivery (Buchan & Cotton, 2023; Cabral et al., 2019; International Council of Nurses, 2020; Marć et al., 2019; Tamata & Mohammadnezhad, 2023; Van Zyl et al., 2017).

Talent management in the context of nursing deficiency is a critical and strategic approach that health care organizations adopt to effectively address deficit issues. Talent management strategies are important for reducing the effects of nursing deficiency. These strategies not only help attract and retain nursing professionals but also contribute to improving patient care and the overall quality of health care (Haines, 2013; King, 2015; Nojedeh & Ardabili, 2015; Saksena, 2015; Sun, 1994; Zhang, 2021).

In XX Health care Group hospitals, the McKinsey 9-Box Matrix method has been employed in talent management, performance, and potential assessment since 2017. This method is used to evaluate the potential of employees and their likelihood of succeeding in senior positions in the future. Moreover, the results of these assessments influence the decision-making process for promotions to higher positions within the organization this strategic approach to talent management assists in identifying and nurturing individuals with the capacity to drive the organization's success eventually.

This study aims to present the outcomes of our assessment of talent management for nurses using the McKinsey 9-Box Matrix evaluation, conducted both before and during the ongoing COVID-19 pandemic.

2 LITERATURE REVIEW

2.1 NURSING SHORTAGE

Although three years have passed since the onset of the pandemic, numerous reports have been published regarding its effects on the nursing workforce. The COVID-19 pandemic erupted in early 2020, and the State of the World's Nursing (SOWN) report, published by the World Health Organization (WHO), estimated that the global nursing workforce was 27.9 million, with a global shortfall of 5.9 mil-lion nurses. Evidence showed that 89% of these nurse shortages were concentrated in low- and lower-middle-income countries, with significant gaps in countries within the African, Southeast Asian, and Eastern Mediterranean WHO regions. With the ageing nursing workforce, it was projected that 17% of nurses globally would retire within the next ten years, requiring 4.7 million additional nurses to main-tain the current workforce numbers, let alone address the shortages. In total, 10.6 million additional nurses would be needed by 2030 (Abuzeid, 2023; World Health Organization, 2020).

The COVID-19 pandemic has amplified and exacerbated the long-standing global nursing shortage, imposing heightened risks on the healthcare workforce. This includes increased rates of occupational infections, elevated stress levels, and a surge in burnout among nurses who have been at the forefront of caring for COVID-19 patients. A December 2020 survey conducted by the International Council of Nurses (ICN) found that nearly 90% of responding nurses were somewhat or extremely concerned that heavy workloads, insufficient resourcing, burnout, and stress were driving them to leave the profession (Buchan & Cotton, 2023; Heilmann, 2010; International Council of Nurses, 2020, 2023).

The COVID-19 pandemic provided an opportunity to re-evaluate the contribution and value of the nursing workforce, but it also exacerbated existing nurse shortages and added new pressures on individual nurses and health care systems. A Health Affairs study published in 2022 found that the RN workforce had decreased by nearly 100,000 by the end of 2021. This is a much larger decline than has been observed in the last forty years (Abuzeid, 2023; Berlin et al., 2023; Buchan & Cotton, 2023; Downey et al., 2023; World Health Organization, 2023).

The 'Sustain and Retain in 2022 and Beyond' report (Buchan, Catton & Shaffer, 2022)focuses on the global nursing workforce profile and pressures. Due to existing nursing shortages, the ageing nurs-ing workforce, and the growing impact of COVID-19, the International Council of Nurses (ICN) esti-mates that up to 13 million nurses may be needed to fill the global nursing shortage gap in the future (World Health Organization, 2023).

In 2022, an analysis of the health care workforce, encompassing various health sectors, was conduct-ed across 53 countries in the WHO European Region. Concerns were expressed a regarding the aging of certain components within the health care workforce. Additionally, a report on European health sys-tems in 2022 highlighted the challenges posed by nurse shortages and policy difficulties, as emphasized by the OECD (Downey et al., 2023; World Health Organization, 2023).

In a study conducted in 2023 with more than 3,000 nurses using the Incredible Health platform in the USA, it was stated that the lack of personnel continues to be the most important problem. Many nurses (93%) reported that staffing shortages worsened in 2022. Seventy-three percent stated that their biggest concern in the sector was insufficient staffing, and 55% stated that they were not satisfied with the number of staff available in their facilities (Abuzeid, 2023). To retain frontline nurses and help address widespread staff shortages over time, healthcare leaders design and implement strategies focused on supporting the workforce (Berlin et al., 2023; Berlin, Lapointe, et al., 2022).

2.2. NURSES TURNOVER OR ARE LEAVING THE PROFESSION

The consequences of high nurse turnover are multifaceted. Notably, elevated turnover rates compromise an organization's ability to meet patient needs and maintain high standards of care(Gandhi et al., 2021; Kaddourah et al., 2018). This deficiency in staffing resulting from nurse turnover can exacerbate workloads and diminish job satisfaction among the remaining nursing staff. Moreover, the ripple effect of turnover includes lower work satisfaction, reduced productivity, and increased stress levels among nurses (Çamveren et al., 2020; Dawson et al., 2014).

In a systematic review encompassing various studies, it is evident that nurse turnover driven by a complex interplay of factors. Approximately 44% of these studies attribute nurse turnover to issues such as the professional perception of nursing, lack of adequate social support, heavy workloads, and reduced job satisfaction (Gandhi et al., 2021; Ohunakin et al., 2018; Tamata & Mohammadnezhad, 2023). Another 21% of the studies emphasize the significance of inadequate salaries, stagnant wage structures, and unfavorable working conditions as reasons prompting nurses to exit their positions (Tamata & Mohammadnezhad, 2023).

Nurses leave the profession either entirely or transition to different employers or roles. For instance, in one study, 35% of registered nurses (RNs) who planned to leave their current roles indicated a desire to remain in the workforce but in roles not directly related to patient care (e.g., pursuing alternative career paths). An additional 20% expressed their intention to exit the workforce completely, often through retirement or prioritizing family commitments. Notably, the probability of nurses leaving their positions involving direct patient care has fluctuated. For instance, in one study, the likelihood of nurses leaving such roles was 22% in February 2021, increasing to 32% in 2022(Berlin, Essick, et al., 2022; Berlin et al., 2023; Berlin, Lapointe, et al., 2022). The remaining nurses cited diverse reasons, such as transitioning to alternative career paths, pursuing additional training, or exiting the workforce altogether (Berlin et al., 2023).

While specific data on nurse retention or intention to leave during the pandemic vary by country, international studies indicate an upward trend in nurses reporting their intention to leave, with some already having left their positions. The International Council of Nurses (ICN) has highlighted high intentions to leave the profession during or post-pandemic across various countries (International Council of Nurses, 2020; Marć et al., 2019).

Given these challenges, there is a growing need to develop and sustain a long-term talent pool in the nursing profession (Berlin & Burns, 2023). To address the projected shortage of registered nurses, it is crucial to both retain the existing nursing workforce and plan strategically (Berlin et al., 2023). Gender differences were also noted in nurse turnover rates. One study found that the turnover rate among male nurses was higher than that among female nurses (Lee, 2019). This underscores the importance of considering gender-specific factors when addressing nurse turnover in health care organizations.

2.3 TALENT MANAGEMENT IN NURSING

Talent, in its multifaceted nature, pertains to an individual's inherent potential to excel across various domains. When scrutinizing the definitions of talent, it becomes evident that this concept is intrinsically linked to behavioral traits. Talent encompasses the potential capacity to excel, is influenced by hereditary factors, encompasses both mental and physical capabilities, exhibits adaptability, and fundamentally represents an innate prowess (Altınoz M., 2018; Sun, 1994; Zhang, 2021).

Talent management, as a strategic management process, is predicated on the objective of enhancing an organization's performance. It achieves this by systematically identifying, nurturing, motivating, and retaining the talents of both current and prospective employees in alignment with the overarching strategic objectives of the organization (Budhwar & Mellahi, 2007; Cabral et al., 2019; Mitosis et al., 2021; Sun, 1994). In its broader context, talent management embodies the process of meticulously planning and preparing the workforce that an organization requires to optimize the services it offers, with a particular emphasis on selecting and nurturing employees who best align with the organization's goals (Aizat Ramli et al., 2018; Budhwar & Mellahi, 2007; Fisher et al., 2022; King, 2015; Mitosis et al., 2021). In the 1970s, health care settings introduced clinical advancement programs (CAPs), colloquially known as clinical ladders, with an initial focus on enhancing nurse retention through the identification and rewarding of the highest level of clinical competence (Tomaszczuk et al., 2022). The significance of motivating nurses to attain their fullest potential within the ambit of talent management was underscored (Ali Taha et al., 2015; Tomaszczuk et al., 2022). Remarkably, while over 70% of front-line workers aspire to ascend within their organizations, only a mere 4% manage to ascend to corporate roles (Bonnie Dowling, 2023). "Promotability" emerges as a critical factor in assessing an employee's capacity and aspiration to excel at higher echelons of employment, with job performance evaluation constituting a decisive component. For nurses aspiring to transcend career plateaus, it is imperative to proactively seek expanded roles, embrace new responsibilities, acquire additional skills, and cultivate robust workplace relationships (Abdel Azem Mostafa et al., 2021). Leadership selection in nursing represents a pivotal process that demands meticulous consideration of diverse factors. Leadership attributes exhibited by nursing unit managers play a pivotal role in shaping a positive work environment, elevating job satisfaction, and ensuring employee retention (Duffield et al., 2011).

Leadership potential within nursing holds paramount importance in the identification of leaders essential for managing nursing personnel, enhancing operational processes, improving patient care, and effectively responding to evolving health care needs. Assessments of leadership potential can empower nurses to develop development plans and engage in targeted leadership training, thereby contributing to the enhancement of health care service delivery through the refinement of their leadership competencies (Abdulla Al Hammadi Mohd Asri Bin Mohd Noor Asso, 2020; Cabral et al., 2019; Glassman & Withall, 2018; Hammadi & Noor, 2020; Harmon, 2018; World Health Organization, 2020).

Within the nursing context, a nurse leader represents an individual who provides guidance, coordination, motivation, and direction in the realms of nursing practice and patient care. Such leaders assume the mantle of clinical leadership for either individuals or teams and actively contribute to the overarching goals of health care organizations by steadfastly pursuing excellence in patient care. In the contemporary landscape of the 21st-century, talent management emerges as a principal instrument wielded by human resources professionals to bolster employee satisfaction. Extensive studies probing the nexus between talent management and job satisfaction have underscored that talent management significantly influences and augments job satisfaction (Dzimbiri & Molefi, 2021; King, 2015; Shen et al., 2020; Sun, 1994).

Furthermore, talent management serves as an instrumental mechanism for organizations to retain latent talent within their ranks. The McKinsey 9-Box Matrix is a pivotal tool for the comprehensive assessment of both employee performance and potential within an organizational framework. This matrix excels in its capacity to discern, evaluate, and appraise the multifaceted dimensions of employee contributions, thereby facilitating informed talent management decisions (Jain, 2020; Oladimeji et al., 2023; Saksena, 2015; Sarkar, 2014).

This research will present the outcomes of our assessment of talent management using the McKinsey 9-Box Matrix evaluation, conducted both before and during the COVID-19 pandemic.

Hypotheses:

In the McKinsey 9-Box Matrix assessments, a comparison was made between assessments conducted before and during the COVID-19 pandemic.

H1: Gender-specific variation in nurse categorisation

a) Across the 6-year period, there will be variations in nurse categorization based on gender.

b) Significant differences in nurse categorization between the periods before and during the COVID-19 pandemic will be observed based on gender.

H2: Influence of Education Level on Nurse Categorization

a) Over the six-year timeframe, variations in nurse categorization will be evident based on education level.

b) Significant differences in nurse categorization, concerning education level, will be observed between the periods before and during the COVID-19 pandemic.

H3: Impact of Job Position on Nurse Categorization

Differences in nurse categorization will exist based on job positions across the 6-year study period and between assessments conducted before and during the COVID-19 pandemic.

H4: Departmental Effects on Nurse Categorization

Variations in nurse categorization will be present based on working departments over the 6-year period and between assessments conducted before and during the COVID-19 pandemic.

H5: Overall Variations in Nurse Categorization

There will be significant overall variations in nurse categorization across the 6-year study period and between assessments before and during the COVID-19 pandemic.

H6: Differences in Nurse Potential Levels Before and During COVID

There will be significant differences in nurses' potential levels between assessments conducted before and during the COVID-19 pandemic.

H7: Employment Status Impact on Nurse Categorization

a) Employment status differences will be observed in nurse categorization over the 6-year study period.

Significant differences in nurse categorization based on employment status will be observed between the periods before and during the COVID-19 pandemic.

H8: Temporal Differences in Nurse Categorization (for A1, A2, and B1 employees)

Differences in nurse categorization (for A1, A2, and B1 employees) will be significant across the 6-year study period and between assessments before and during the COVID-19 pandemic.

H9: Gender-specific differences in nurse categorisation (for A1, A2, and B1 employees)

Gender-specific differences in nurse categorization (for A1, A2, and B1 employees) will be significant across the 6-year study period and between assessments before and during the COVID-19 pandemic.

H10: Employment status impact on nurse categorisation (for A1, A2, and B1 employees)

Employment status differences in nurse categorization (for A1, A2, and B1 employees) will be significant across the 6-year study period and between assessments before and during the COVID-19 pandemic.

3 METHODOLOGY

3.1 STUDY DESIGN

This study adopts a descriptive retrospective design, spanning a six-year period from 2017 to 2022, encompassing periods before (2017-2019) and during (2020-2022) the COVID-19 pandemic.

3.2 POPULATION, SAMPLE AND SAMPLING

The study was conducted within a prominent private health institution with a presence across 16 locations in Turkey. The study population consisted of 3902 actively employed nurses within a group of private health hospitals between 2017 and 2022. The sample comprised 1319 nurses who were assessed using the McKinsey 9-Box Matrix, with 731 (55.4%) assessed before COVID-19 and 588 (44.6%) assessed during this period.

3.3 INSTRUMENTS

3.3.1 MCKINSEY 9-BOX MATRIX

The McKinsey 9-Box Matrix was employed to assess nurses' performances and potential. Originating in the late 1960s, this matrix categorizes employees on the basis of performance and potential, providing a framework for talent management. It consists of a 3x3 table, intersecting three potential levels (high, medium, low) and three performance levels (successful, average, poor), resulting in nine categories.

McKinsey introduced the "Talent Wars" study were the classification of employees as A, B and C. This classification is rooted in employees' performance and potential and guides companies in talent management.

Class A employees: These high performers possess significant potential. Organizations are advised to nurture. Advance and promote them. Customized career paths and opportunities should be extended to this group.

Class B employees: These individuals demonstrate satisfactory performance and a certain level of potential. Organizations can provide diverse training and development initiatives to enhance their performance and unlock their potential.

Class C employees: Representing low performers with limited potential. this group might have diminished organizational value. Their roles may undergo changes or even termination based on performance.

The McKinsey 9-Box Matrix is a framework used by organizations to assess and categorize their employees. This matrix helps organizations shape their talent management, development, and promotion strategies by analysing employees' current performance and future potential. The McKinsey 9-Box Matrix consists of a 3x3 table, representing three different potential levels (high, medium, low) and three different performance levels (successful, average, poor). The intersection of these two axes places employees into different categories (Figure 1).

The McKinsey 9-Box Matrix assists organizations in categorizing employees into the following groups:

A1: Future Leaders - High-performing employees with significant potential. It is important to support, develop, and promote them.

B1: Effective and High Performance - Employees with good performance and potential. Various training and development opportunities can be provided to further enhance their performance.

C1: Trusted Professional - Reliable but not high-potential employees. They play specific roles and tasks; however, there may not be high expectations for promotions.

A2: Evolving Employee - Employees with potential but not currently performing at a high level. They can achieve higher performance through development opportunities and support.

B2: Core Employee Group - Employees with moderate performance and medium potential. Efforts can be made to improve their development and performance.

C2: Efficient Employee - Efficient but not high-potential employees. They perform specific tasks effectively; however, there may not be high expectations for promotions.

A3: Transition Period - Potentially high-performing employees currently going through an uncertain period.

B3: Unstable - Employees with moderate performance but uncertain future potential.

C3: Failed - Low-performing employees with limited potential. They may have limited value to the organization (Figure 2-3).

The McKinsey 9-Box Matrix helps organizations shape their talent management strategies and manage their employees more effectively (Effy, 2022; Garrow & Hirsh, 2008; Haines, 2013; Jain, 2020; King, 2015; Nojedeh & Ardabili, 2015; Saksena, 2015; Sarkar, 2014; Zhang, 2021).

Since the McKinsey 9-Box Matrix was developed in the late 1960s, many of the world's leading companies have used it as a strategic tool for evaluating employee performance (Mitosis et al., 2021).

Fig 1. Talent Modelling and Employee Performance

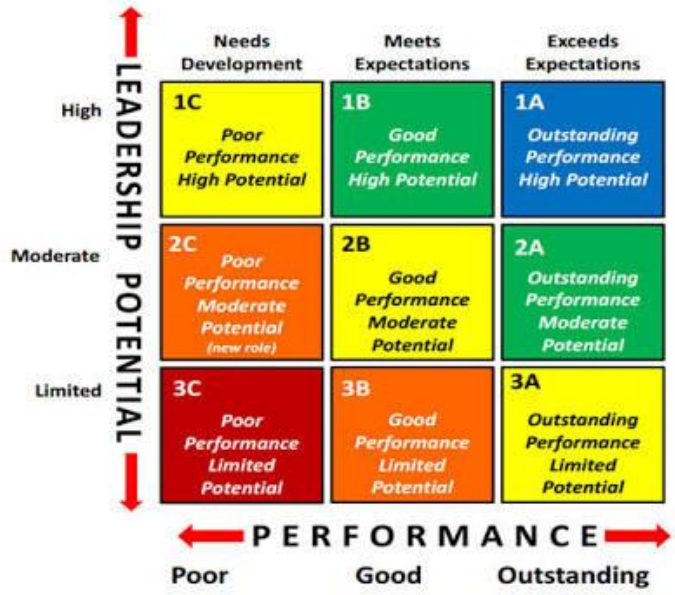
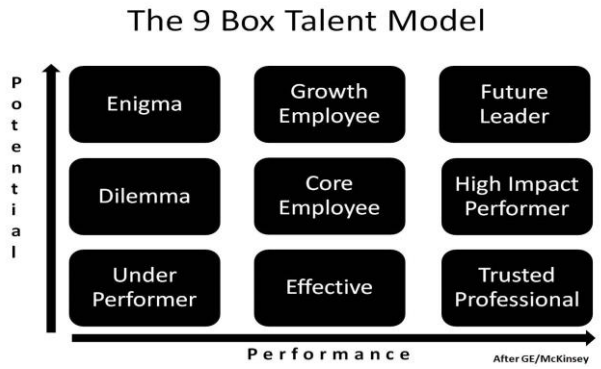
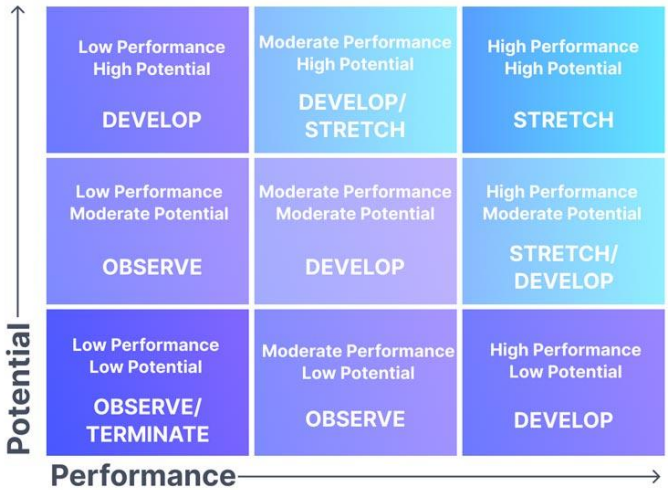


Figure 2: The McKinsey 9-Box Talent Model



Source (Saksena, 2015)

Figure 3: The McKinsey 9-Box Talent Model Action



Source (Effy, 2022).

3.3.2 *LEADERSHIP POTENTIAL EVALUATION FORM*

Leadership potential was assessed using a 10-item questionnaire designed by the institution. This instrument comprehensively measured short-term and long-term advancement opportunities, skills,

leadership qualities, interdisciplinary interaction, alignment with the company's perspective, adaptability, and the use of learning opportunities. In addition, potential levels are categorized as high, medium, and low.

3.4 PROCEDURE

The implementation of the McKinsey 9-Box Matrix framework involved a meticulous procedure aimed at informing talent management, development, and strategic planning decisions within the organization.

Before initiating the McKinsey 9-Box Matrix evaluation, a comprehensive introduction and explanation were provided to the managers of the relevant departments. The nuanced categorizations offered by the matrix were elaborated upon, emphasizing its role in talent management and strategic planning.

Subsequently, all managers were informed about the 10-question "Leadership Potential Evaluation Document." This step ensured that managerial personnel were equipped with the necessary tools and understanding to effectively assess their team members.

All potential new nurses underwent performance and ability evaluation by their respective managers at the conclusion of their first 6 months of employment. This initial assessment set the foundation for future talent management decisions.

The Nursing Services Directorate played a pivotal role in identifying potential candidates for evaluation. Titles such as Team Leader (TL), Charge Nurse (CN), Clinical Training Nurse (CTN), Specialist Nurse (SN), Patient Care Specialist (PCS), and Service Nurse (SN) were considered for evaluation, aligning with the organization's focus on leadership and specialized roles.

The Leadership Potential Evaluation Form, which is assessed by the institution's manager, serves as a crucial component in the decision-making process. Face-to-face interviews were conducted with the general directorate team of the Nursing Services Directorate to ensure a comprehensive understanding of each candidate's potential.

Upon the completion of evaluations across all locations, the results were compiled and reported. This information facilitated strategic planning within the human resources department, enabling the identification of employees with the potential for success in senior positions.

The human resources department collaborated with the employees whose potential was evaluated. This collaboration predicted the likelihood of success in senior positions and included planning for further development and support.

For candidates placed in the A1, A2, or B1 boxes, an additional evaluation was conducted during the promotion period to further refine talent management decisions.

The evaluation results were simultaneously shared with the human resources training and development department. This step ensured ongoing support and follow-up on the personal development of individuals identified as having high potential within the organization.

3.5 DATA ANALYSIS

Data analysis was performed using SPSS 23.0. Descriptive data analysis, chi-square tests, and correlation analysis were employed to compare numbers, percentages, and means. This approach provided insights into the dataset characteristics and relationships, with a significance threshold of 0.05.

3.6 IDENTIFICATION OF THE RESEARCH GAP

To address the reviewers' feedback, it is crucial to explicitly identify the research gap. In this study, the research gap lies in the need for a detailed investigation of talent management practices among nurses, especially considering the evolving landscape during the COVID-19 pandemic. The unique contribution of this research is its in-depth analysis of the McKinsey 9-Box Matrix as a tool for talent management in the context of nursing, providing insights into the impact of the pandemic on nurse categorization and potential.

4 RESULT

4.1 SAMPLE CHARACTERISTICS

The study nurses had an average age of 33.403±7.2972 years. Among the participants 79.5% (n=1048) were female. Notably 42.6% (n=567) had both undergraduate and graduate education and 56.8% (n=749) were identified as team leaders. On average nurses had worked for average 8.089±4.7604 years (Table 1). It included more nurses as it was evaluated for the first time in 2017.

Table 1. Distribution of descriptive data by year

	Before COVID-19						During COVID-19							
	2017		2018		2019		2020		2021		2022		Toplam	
Gender	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Female	470	35.6	49	3.7	54	4.1	68	5.2	113	8.6	294	22.3	1048	79.5
Men	143	10.8	6	0.5	9	0.7	11	0.8	24	1.8	78	5.9	271	20.5
Education														
High School	280	21.2	20	1.5	9	0.7	22	1.7	65	4.9	148	11.2	544	41.2
Associate degree	87	6.6	9	0.7	13	1.0	16	1.2	21	1.6	62	4.7	208	15.8
Bachelor's degree	167	12.7	17	1.3	27	2.0	31	2.4	42	3.2	143	10.8	427	32.4
Graduate degree	79	6.0	9	0.7	14	1.1	10	0.8	9	0.7	19	1.4	140	10.6
Positions														
Team leader	320	24.3	35	2.7	37	2.8	46	3.5	96	7.3	215	16.3	749	56.8
Charge Nurse	244	18.5	10	0.8	12	0.9	10	0.8	16	1.2	35	2.7	327	24.8
Staff Nurse	3	0.2	4	0.3	-	-	10	0.8	11	0.8	97	7.4	125	9.5
Clinical Training Nurse	22	1.7	5	0.4	8	0.6	10	0.8	14	1.1	22	1.7	81	6.1
Nurse Specialist	11	0.8	-	-	5	0.4	3	0.2	-	-	3	0.2	22	1.7
Patient Care Specialist	13	1	1	0.1	1	0.1	-	-	-	-	-	-	15	1.1
Total	**613**	**46.5**	**55**	**4.2**	**63**	**4.8**	**79**	**6.0**	**137**	**10.4**	**372**	**28.2**	**1319**	**100.0**

Source: own research

H1: Gender-specific variation in nurse categorisation

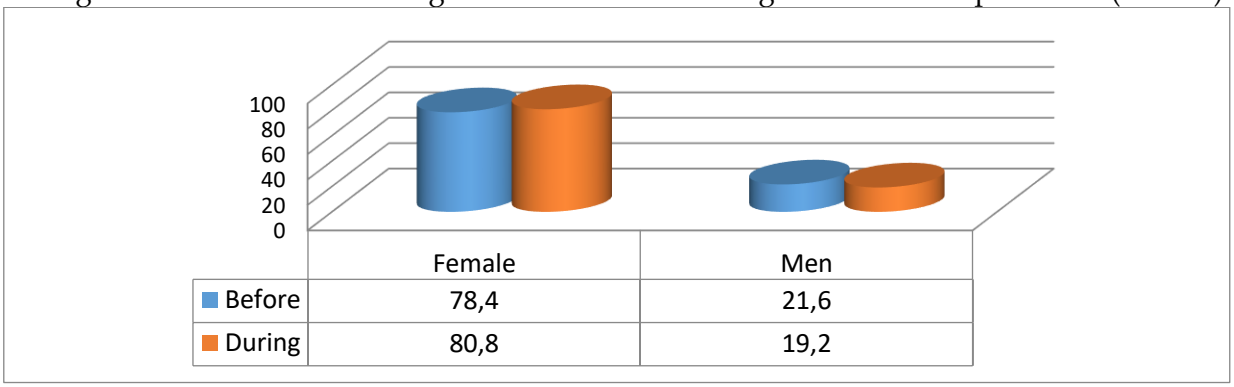
a) Gender-based comparisons:

The analysis investigated gender-specific variations in nurse categorization over a 6-year period. Contrary to our hypothesis, the results indicate no significant inequality between genders when considering the entire study duration, encompassing both pre- and during the COVID-19 pandemic assessments (χ^2 = 7.156, df = 5, p = 0.209, p > 0.05).

b) Gender distribution before and during COVID-19:

Figure 4 illustrates the gender distribution among nurses before and during COVID-19. Surprisingly, our analysis uncovered statistically significant differences in the gender distribution of nurses' job positions before and during the COVID-19 pandemic (χ^2 = 28.928, df = 5, p < 0.001). This unexpected finding prompts a deeper exploration of the specific roles and responsibilities undertaken by male and female nurses during these critical periods. Upon closer examination, the chi-square test revealed no statistically significant difference in the overall gender distribution of nurses before and during the COVID-19 pandemic (χ^2 = 53.926, df = 1, p = 0.284, p > 0.05). While the proportion of male and female nurses remained relatively consistent throughout the six-year study period, the unexpected variations in job positions by gender warrant further investigation. This nuanced observation challenges our initial assumption of gender stability in nurse categorization. Despite the overall gender balance in the nursing workforce, the presence of significant differences in job positions implies a more complex relationship between gender and nurse categorization during the pandemic. These unanticipated findings underscore the need for a more in-depth exploration of the experiences and roles of male and female nurses, especially in the context of the challenges posed by the COVID-19 pandemic. This aspect of the analysis may offer novel insights into the dynamic nature of gender-specific variations in nurse categorization.

Fig 4. Distribution of nurses' genders before and during the COVID-19 pandemic (n=1319)



	Female	Men
Before	78,4	21,6
During	80,8	19,2

Source: own research

H2: Influence of Education Level on Nurse Categorization

a) Education-Level Differences Over the Six-Year Period:

Our investigation into education-level differences among nurses revealed a compelling narrative of change over the six-year study period ($\chi^2 = 60.796$, df = 15, $p < 0.001$). The statistically significant differences in education levels highlight a noteworthy evolution in the educational backgrounds of nurses during this timeframe. This finding has implications for workforce planning, training, and talent management strategies within healthcare organizations, signalling the need for a dynamic and adaptable approach to nurse categorization.

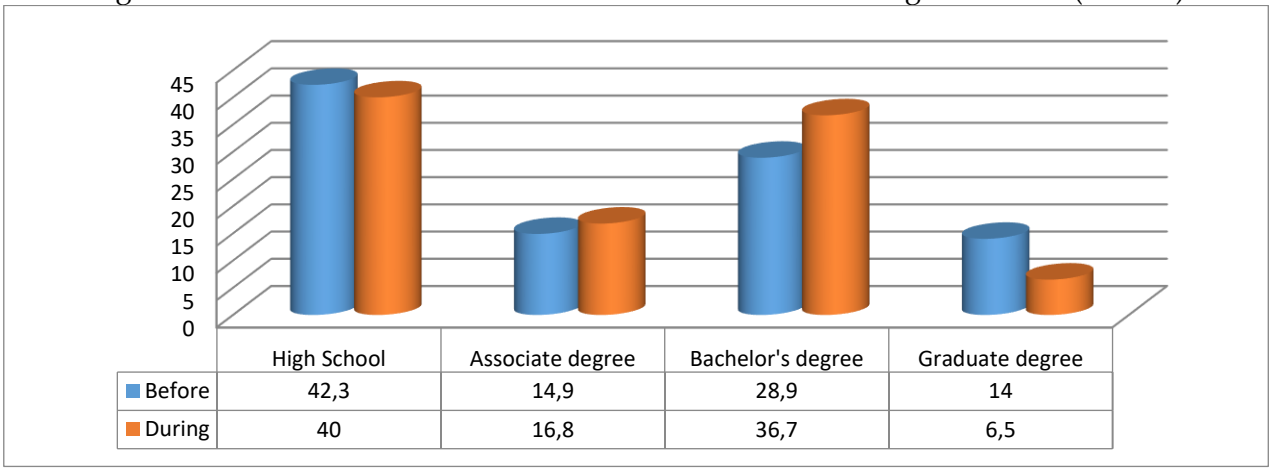
b) Education Level Differences Before and During COVID-19:

Figure 2 depicts the distribution of education levels among nurses both before and during the COVID-19 pandemic. Notably, high school graduates held the predominant rank before the pandemic. However, with the onset of the COVID-19 pandemic, a distinct shift in education levels became clear. Undergraduates witnessed a significant 7.8% increase, while the number of graduate nurses experienced a notable decrease in 7.5%. This shift in education levels among nurses during the COVID-19 pandemic was statistically significant ($\chi^2 = 24.649$, df = 3, $p < 0.001$). These findings underscore the impact of external factors, such as the COVID-19 pandemic, on the educational composition of the nursing workforce. The observed changes suggest a dynamic relationship between education levels and nurse categorization, necessitating a nuanced approach to talent management and development strategies within health care organizations.

H2 Conclusion:

In conclusion, the evidence supports the hypothesis that education levels exert a notable influence on nurse categorization both over the 6-year period and specifically between the periods before and during the COVID-19 pandemic. The dynamic nature of education-level differences among nurses calls for strategic considerations in talent management practices to ensure the resilience and adaptability of health care organizations in response to evolving educational trends within the nursing profession.

Fig 5. Distribution of nurses' education levels before and during COVID-19 (n=1319)



	High School	Associate degree	Bachelor's degree	Graduate degree
Before	42,3	14,9	28,9	14
During	40	16,8	36,7	6,5

Source: own research

H3: Impact of Job Position on Nurse Categorization

Our exploration of the impact of job positions on nurse categorization reveals compelling insights, particularly when examining the periods before and during the COVID-19 pandemic.

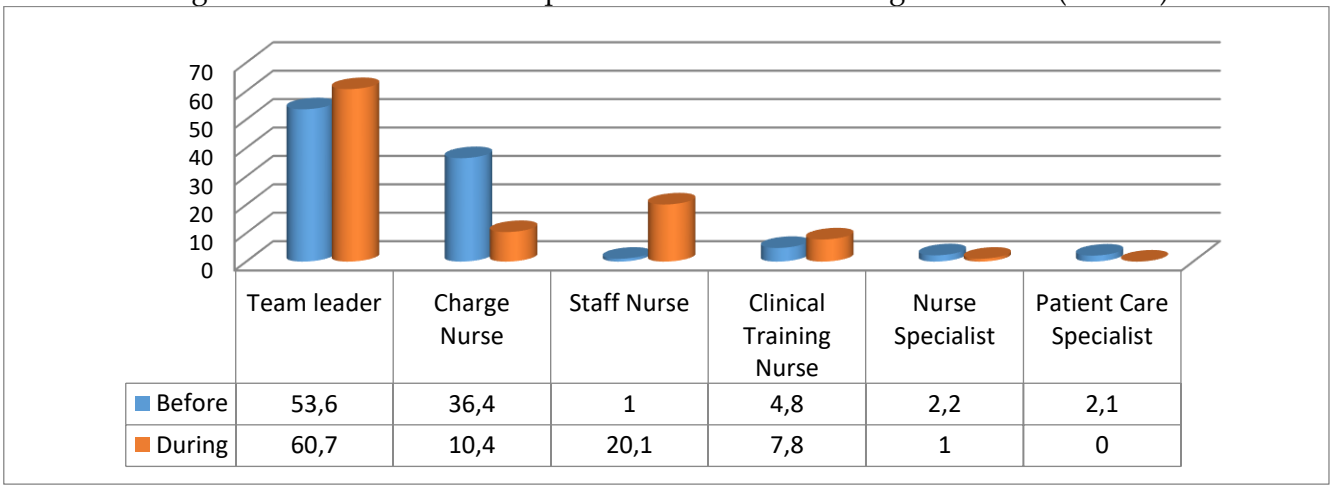
a) Position Differences Before and During COVID-19:

There was a striking and statistically significant difference in nurses' positions before and during the COVID-19 pandemic, as evidenced by a chi-square value of 237.042 with 5 degrees of freedom ($p < 0.001$) (Figure 5). This highly significant p-value underscores a substantial shift in the positions of nurses between these two crucial time periods. The pre-pandemic era primarily emphasized the role of charge nurses, ranking them as the second most evaluated group within our healthcare system. However, the landscape underwent a notable transformation during the COVID-19 pandemic. Staff nurses, particularly those in the intensive care units, garnered increased attention and received higher position evaluations. This shift is reflective of the unique challenges and demands imposed by the pandemic, with staff nurses playing a pivotal role in caring for critically ill patients. Their dedication, expertise, and tireless efforts did not go unnoticed, prompting an adaptation of our evaluation criteria to align with the evolving health care landscape during the pandemic.

H3 Conclusion:

The evidence strongly supports the hypothesis that job positions significantly impact nurse categorization, both over the 6-year study period and specifically between the periods before and during the COVID-19 pandemic. The observed shift in nurses' 'positions underscores the dynamic nature of health care roles during times of crisis, emphasizing the need for adaptive evaluation criteria to recognize and reward the evolving responsibilities of nursing staff. This finding holds valuable implications for talent management strategies, indicating the necessity for a responsive approach to nurse categorization that aligns with the changing demands of health care delivery.

Fig 6: Distribution of nurses' positions before and during COVID-19 (n=1319)



	Team leader	Charge Nurse	Staff Nurse	Clinical Training Nurse	Nurse Specialist	Patient Care Specialist
Before	53,6	36,4	1	4,8	2,2	2,1
During	60,7	10,4	20,1	7,8	1	0

Source: own research

H4: Departmental Effects on Nurse Categorization

Our investigation into the effects of working departments on nurse categorization yields compelling evidence, shedding light on the nuanced dynamics both over the 6-year study period and specifically between the periods before and during the COVID-19 pandemic.

a) Working Department Differences Before and During COVID-19:

A statistically significant difference in the distribution of nurses across various departments emerged before and during the COVID-19 pandemic, illustrated by a chi-square value of 72.682 with 5 degrees of freedom ($p < 0.001$) (Figure 6). This finding emphasizes notable shifts in the allocation of nursing staff to different departments during the pandemic.

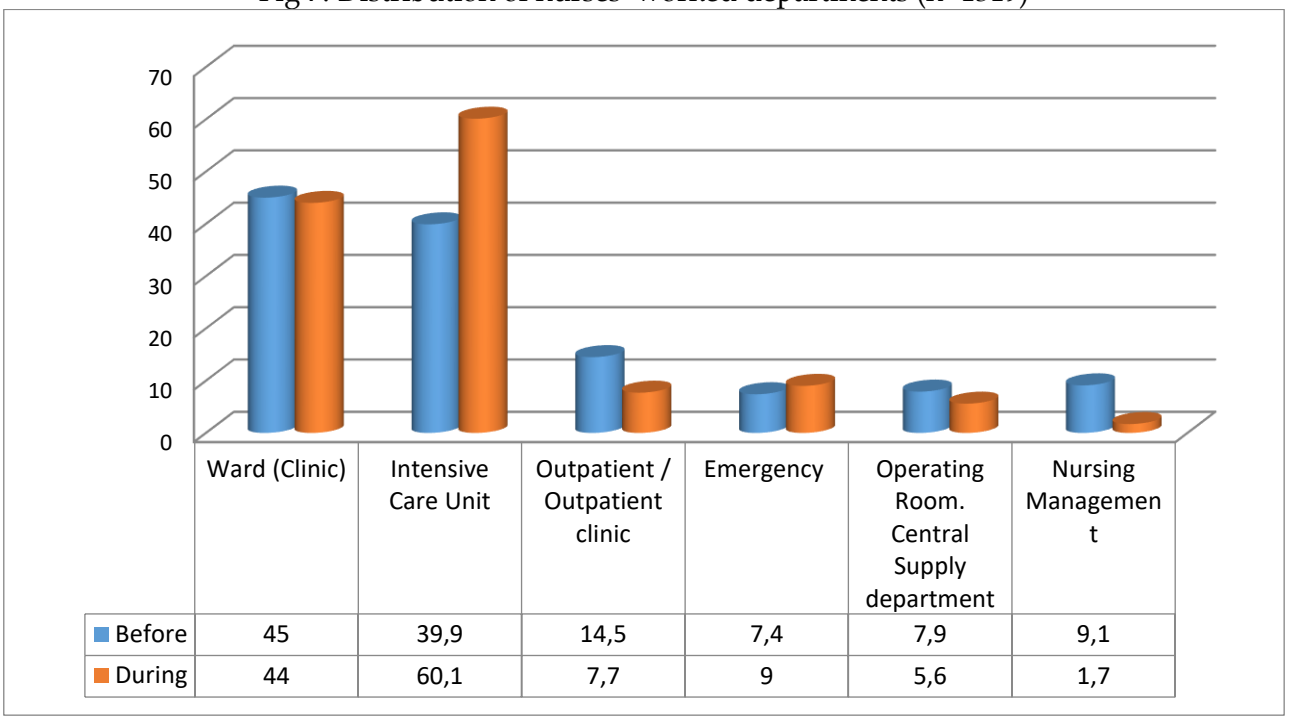
Figure 6 highlights that specific departments, including intensive care units and emergency departments, experienced increased demand for nursing services during the COVID-19 crisis, resulting in a notable surge in the number of nurses in these areas. Conversely, departments with lower demand may have witnessed a relative decrease in nursing staff. This observation underscores the dynamic nature of

healthcare delivery during a pandemic, requiring healthcare organizations to adapt swiftly to changes in departmental needs and ensure that staffing levels align with patient care requirements.

H4 Conclusion:

The findings strongly support the hypothesis that variations in nurse categorization are significantly influenced by working departments, both over the 6-year study period and specifically between the periods before and during the COVID-19 pandemic. This observation accentuates the need for healthcare organizations to adopt a flexible approach in resource allocation, responding effectively to the evolving challenges of healthcare delivery. The results underscore the pivotal role of departmental dynamics in shaping nurse categorization and have valuable implications for strategic talent management and resource allocation strategies within health care organizations.

Fig 7. Distribution of nurses' worked departments (n=1319)



Source: own research

H5: Overall Variations in Nurse Categorization

Table 2. Distribution of the McKinsey 9-Box Matrix and Leadership evaluations by years

	Before COVID-19						During COVID-19							
Years	**2017**		**2018**		**2019**		**2020**		**2021**		**2022**		**Total**	
Category*	n	%	n	%	n	%	n	%	n	%	n	%	n	%
A1	23	1,7	1	0,1	6	0,5	1	0,1	-	-	52	3,9	83	6,3
A2	75	5,7	9	0,7	10	0,8	20	1,5	16	1,2	70	5,3	200	15,2
A3	27	2	8	0,6	6	0,5	9	0,7	18	1,4	14	1,1	82	6,2
B1	58	4,4	7	0,5	4	0,3	5	0,4	12	0,9	32	2,4	118	8,9
B2	185	14	15	1,1	12	0,9	28	2,1	45	3,4	147	11,1	432	32,8
B3	23	1,7	-	-	-	-	-	-	-	-	6	0,5	29	2,2
C1	70	5,3	3	0,2	19	1,4	4	0,3	26	2	20	1,5	142	10,8
C2	135	10,2	11	0,8	5	0,4	11	0,8	19	1,4	28	2,1	209	15,8
C3	17	1,3	1	0,1	1	0,1	1	0,1	1	0,1	3	0,2	24	1,8
Potential evaluation **														
High	150	11,4	6	0,5	19	1,4	16	1,2	24	1,8	106	8,0	321	24,3
Medium	369	28,0	43	3,3	39	3,0	60	4,5	106	8,0	260	19,7	877	66,5
Low	94	7,1	6	0,5	5	0,4	3	0,2	7	0,5	6	0,5	121	9,2
Total	**613**	**46,5**	**55**	**4,2**	**63**	**4,8**	**79**	**6,0**	**137**	**10,4**	**372**	**28,2**	**1319**	**100,0**

Source: own research

* *McKinsey 9-Box Matrix category*

** Leadership potential evaluation

Our analysis of nurse categorization within the McKinsey 9-Box Matrix reveals nuanced variations across critical dimensions, shedding light on the intricate interplay of years, education levels, gender, and the distinctive impact of the COVID-19 pandemic.

a) Variations in Nurse Categorization Based on Years:

A statistically significant difference emerged when examining the distribution of nurses across the McKinsey 9-Box Matrix categories over the six-year period ($\chi^2 = 210.225$, df = 40, p = 0.001). This underscores the dynamic evolution in nurse categorization, highlighting the need for adaptable talent management strategies. Of note is the impact of education, indicating that nurses with diverse educational backgrounds were differentially distributed across the matrix categories, underscoring the influential role of education in the talent assessment process.

b) Gender-Neutral Impact on Nurse Categorization:

In contrast, our analysis by gender did not reveal a statistically significant difference in the distribution of nurses across the McKinsey 9-Box Matrix categories ($\chi^2 = 10.611$, df = 8, p = 0.225). The matrix categories maintained a gender-neutral disposition, suggesting that gender did not significantly influence nurse categorization within the matrix.

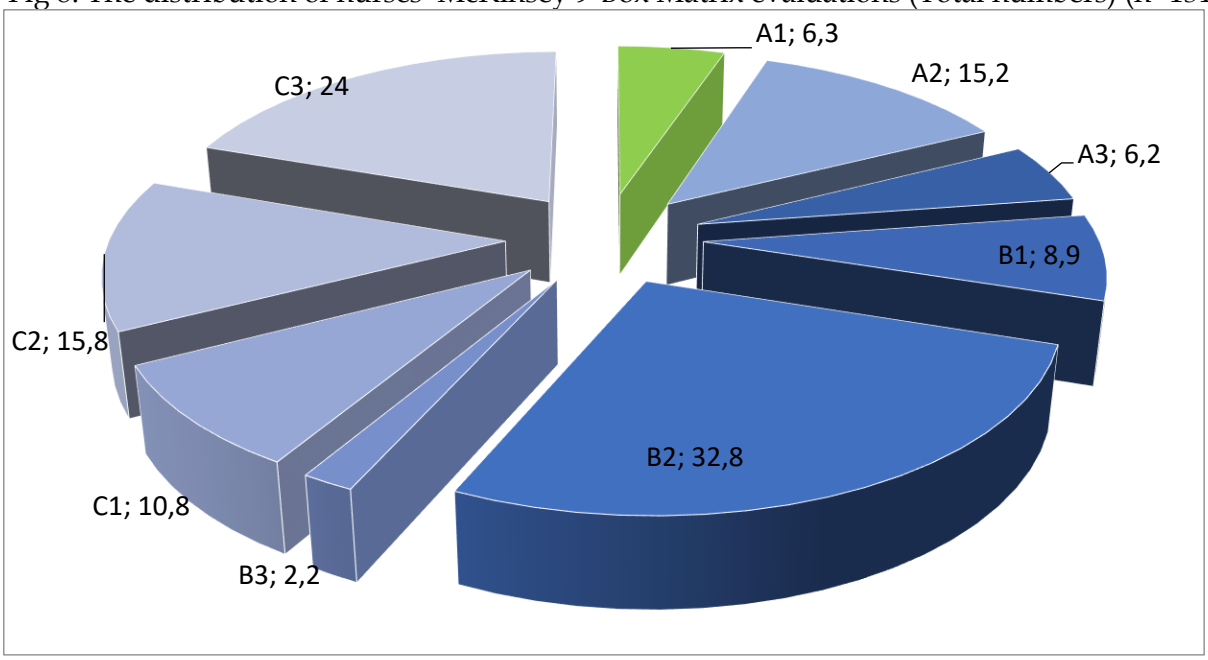
c) Changes in Nurse Categorization Before and During COVID-19:

Significant shifts in nurse categorization were observed when comparing assessments conducted before and during the COVID-19 pandemic ($\chi^2 = 67.863$, df = 8, p = 0.001). These findings highlight adaptive responses to the unique challenges posed by the pandemic. Notable changes include an increase in 'Future Leaders' (A1) and a significant decrease in the 'Unstable' (B3) category during COVID-19, reflecting strategic adjustments to maintain a resilient nursing workforce.

Conclusion - H5: Overall Variations in Nurse Categorization:

Our comprehensive examination concluded that there were significant overall variations in nurse categorization across the 6-year study period and between assessments before and during the COVID-19 pandemic. The fluid nature of these variations underscores the necessity for health care organizations to employ flexible talent management strategies. These findings contribute to a deeper understanding of the dynamic factors influencing nurse categorization, and providevaluable insights for strategic talent management and development initiatives within health care organizations.

Fig 8. The distribution of nurses' McKinsey 9-Box Matrix evaluations (Total numbers) (n=1319)



Source: own research

Figure 8 show the representation of the distribution of nurses in the McKinsey 9-Box Matrix evaluations for all categories is as follows:

A1: 83 nurses, A2: 200 nurses, A3: 82 nurses

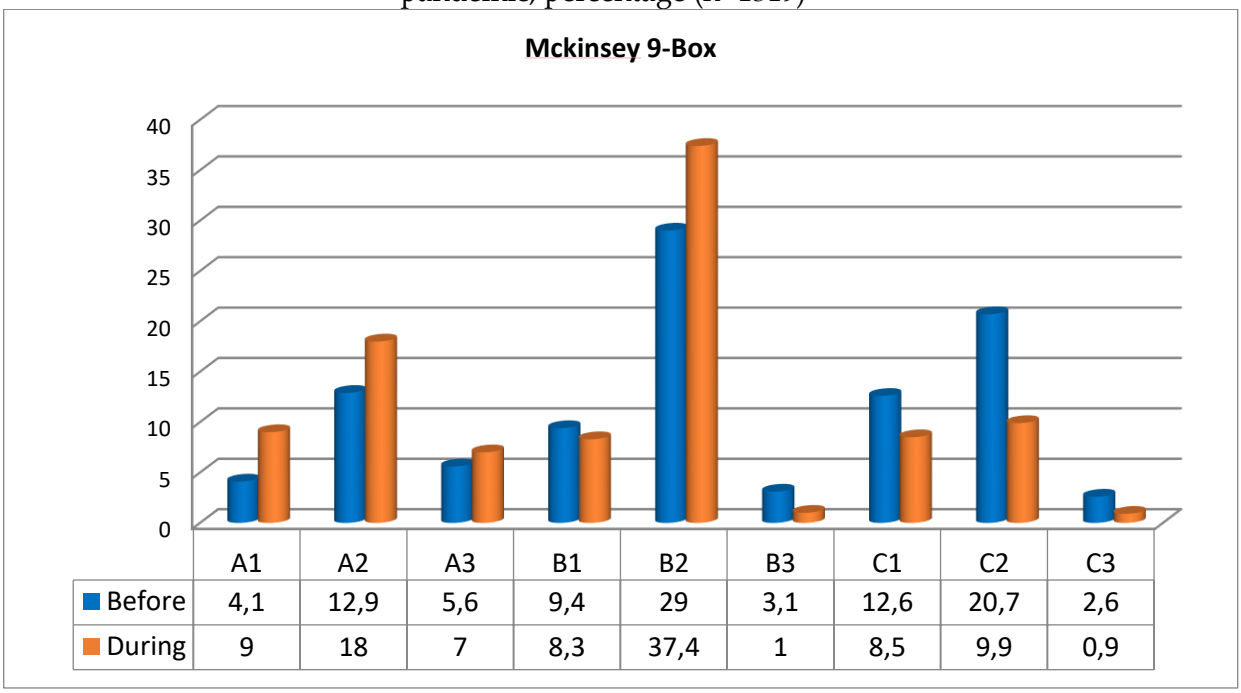
B1: 118 nurses, B2: 432 nurses, B3: 29 nurses

C1: 142 nurses, C2: 209 nurses, C3: 24 nurses

This Figure provides a clear visual overview of how nurses are distributed across different performance and potential categories according to the McKinsey 9-Box Matrix. It shows the relative proportions of nurses in each category, which can be useful for analyzing talent management and development strategies within the organization.

There are differences in nurse categorization and between before and during COVID assessments.

Fig 9. Distribution of nurses' McKinsey 9-Box Matrix evaluations before and during the COVID-19 pandemic, percentage (n=1319)



	A1	A2	A3	B1	B2	B3	C1	C2	C3
Before	4,1	12,9	5,6	9,4	29	3,1	12,6	20,7	2,6
During	9	18	7	8,3	37,4	1	8,5	9,9	0,9

Source: own research

Figure 9 show distributions of nurses among different categories of the McKinsey 9-Box Matrix before and during the COVID-19 pandemic. The McKinsey 9-Box Matrix categorizes nurses into nine distinct groups based on their performance and potential. Before COVID-19: In the 'A1' category, there were 30 nurses 4.1%, indicating those considered as 'Future Leaders.' 'A2' had 94 nurses 12.9% ('Evolving Employees'), while 'A3' had 41 nurses 5.6% ('Transition Period'). 'B1' had 69 nurses 9.4% ('Effective and High Performance'), 'B2' had 212 nurses 29% ('Core Employee Group'), and 'B3' had 23 nurses 3.1% ('Unstable'). 'C1' included 92 nurses 12.6% ('Trusted Professionals'), 'C2' had 151 nurses 12.6% ('Efficient Employees'), and 'C3' had 19 nurses 2.6% ('Failed').

During COVID-19: In the 'A1' category, the number increased to 53 nurses 9%, showing a rise in 'Future Leaders.' 'A2' had 106 nurses 18% ('Evolving Employees'), and 'A3' remained unchanged with 41 nurses 7% ('Transition Period'). 'B1' decreased to 49 nurses 8.3% ('Effective and High Performance'), while 'B2' slightly increased to 220 nurses37.4% ('Core Employee Group'). 'B3' had a significant decrease to 6 nurses 1% ('Unstable'). 'C1' had 50 nurses 8.5% ('Trusted Professionals'), 'C2' had 58 nurses 9.9% ('Efficient Employees'), and 'C3' had 5 nurses 0.9% ('Failed').

These findings highlight shifts in the distribution of nurses across different categories of the McKinsey 9-Box Matrix between the two periods, changes in their performance and potential evaluations, particularly in response to the challenges posed by the COVID-19 pandemic.

According to McKinsey's 9-Box Matrix evaluation, 32.8% of nurses fall into the B2: Core Employee Group category, which includes individuals who exhibit average or moderate performance with moderate potential. They are crucial because they constitute the backbone of the workforce. While they may not be high achievers, they bring stability and consistency to their roles. Organizations should prioritize offering training and development opportunities to enhance their skills, with the potential for advancement into higher-performance categories such as B1 or A2.

The second McKinsey's 9-Box Matrix evaluation reveals that 24% of nurses fall into the C3 category. C3: Failed - Low-performing employees with limited potential. They may have limited value to the organization the third McKinsey's 9-Box Matrix evaluation revealed that 16.8% of nurses fall into the C2: Efficient Employees category. These employees excel in their current roles but may have limited potential for advancement. They are valuable for maintaining operational efficiency and productivity within the organization even though they may not be future leaders. Retaining them is essential for smooth operation.

There was a statistically significant difference in McKinsey 9-Box Matrix evaluation categories when comparing assessments conducted before and during the COVID-19 pandemic ($\chi^2 = 67.863$, df = 8, p = 0.001). This indicates that the categorization of nurses within the 9-Box Matrix has undergone notable changes in response to the pandemic.

H6: Differences in Nurses' Potential Levels Before and During COVID:

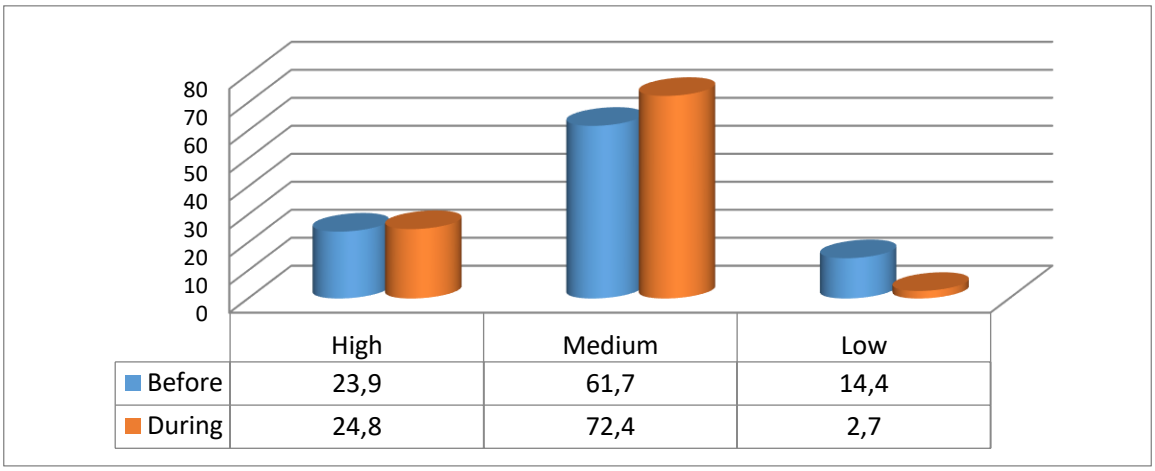
Our analysis of nurses' leadership potential evaluations revealed substantial changes in the assessment of leadership potential over the years, with a statistically significant difference observed ($\chi^2 = 73.676$, df = 10, $p < 0.001$). The data presented in Figure 10 illustrates variations in nurses' leadership potential levels before and during the COVID-19 pandemic, categorized as "High," "Medium," and "Low."

Before the COVID-19 pandemic, 175 nurses were assessed as having high leadership potential, while 451 nurses were deemed to have "Medium" potential. During this period, 105 nurses were evaluated for low leadership potential. During the COVID-19 pandemic, the number of nurses with high leadership potential decreased to 146, and those with "Medium" potential reduced to 426. Notably, there was a significant decrease in the number of nurses assessed with "Low" leadership potential during the pandemic, dropping to just 16 nurses. This suggests a shift in how nurses' leadership potential was evaluated between the "Before" and "During" COVID-19 periods. The decrease in nurses with "Low" leadership potential during the pandemic may be attributed to the challenging health care environment, emphasizing the need for effective leadership and teamwork. Further statistical analysis confirmed a significant difference in nurses' leadership potential evaluation points before and during the COVID-19 pandemic ($\chi^2 = 53.926$, df = 2, $p < 0.001$). This underscores a notable change in nurses' perceived leadership potential, emphasizing the impact of the pandemic on their roles and responsibilities. The specific nature of this change, whether indicating an increase or decrease in leadership potential, warrants in-depth exploration. Furthermore, our correlation analysis revealed a significant negative correlation between years and age ($r = -0.471$, $p < 0.01$), indicating that as the number of years increased, the age of the nurses decreased. Additionally, a significant positive correlation between age and working years ($r = 0.560$, $p < 0.01$) suggests that as participants' age increased, so did the number of years they had worked. This correlation analysis was conducted on a sample of N = 1319 participants.

Conclusion - H6: Differences in Nurse Potential Levels Before and During COVID:

Our findings support H6, indicating significant differences in nurses' potential levels between assessments conducted before and during the COVID-19 pandemic. This highlights the dynamic nature of nurses' perceived leadership potential, which is influenced by the unique challenges and experiences faced during times of crisis. Further research into the factors contributing to these changes can provide valuable insights for health care organizations seeking to adapt and optimize leadership development strategies in response to evolving circumstances.

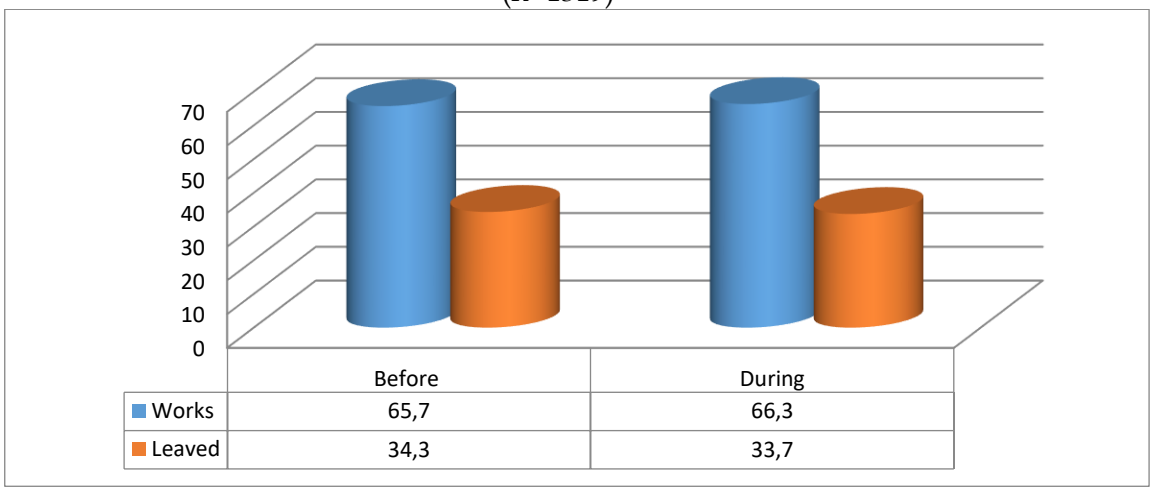
Fig 10. Distribution of Nurses' Leadership Potential Evaluation Before and During the COVID-19 pandemic (n=1319)



Source: own research

H7: Employment Status Differences in Nurse Categorization

Fig 11. Distribution of employment status of nurses before and during the COVID-19 pandemic (n=1319)



Source: own research

Table 3. Nurses' McKinsey 9-Box Matrix Evaluations and Employment Status Comparisons before and During the COVID-19 pandemic (n=1319)

	Continued working		Left their positions		Total	
Category*	**n**	%	**n**	%	**n**	%
A1	53	4.0	30	2.3	83	6.3
A2	131	9.9	69	5.2	200	15.2
A3	53	4.0	29	2.2	82	6.2
B1	76	5.8	42	3.2	118	8.9
B2	284	21.5	148	11.2	432	32.8
B3	21	1.6	8	0.6	29	2.2
C1	89	6.7	53	4.0	142	10.8
C2	149	11.3	60	4.5	209	15.8
C3	14	1.1	10	0.8	24	1.8
Total	**870**	**66.0**	**449**	**34.0**	**1319**	**100**

Source: own research

Our investigation into employment status differences in nurse categorization, both before and during the COVID-19 pandemic, offers valuable insights into the distribution of nurses across various McKinsey 9-Box Matrix categories. Table 3 illustrates this breakdown based on nurses' employment status, distinguishing between those who continued to work and those who left their positions.

In category A1, 53 nurses continued to work, whereas 30 nurses left.

For category A2, 131 nurses continued working, and 69 nurses left.

In category A3, 53 nurses continued to work and 29 nurses left.

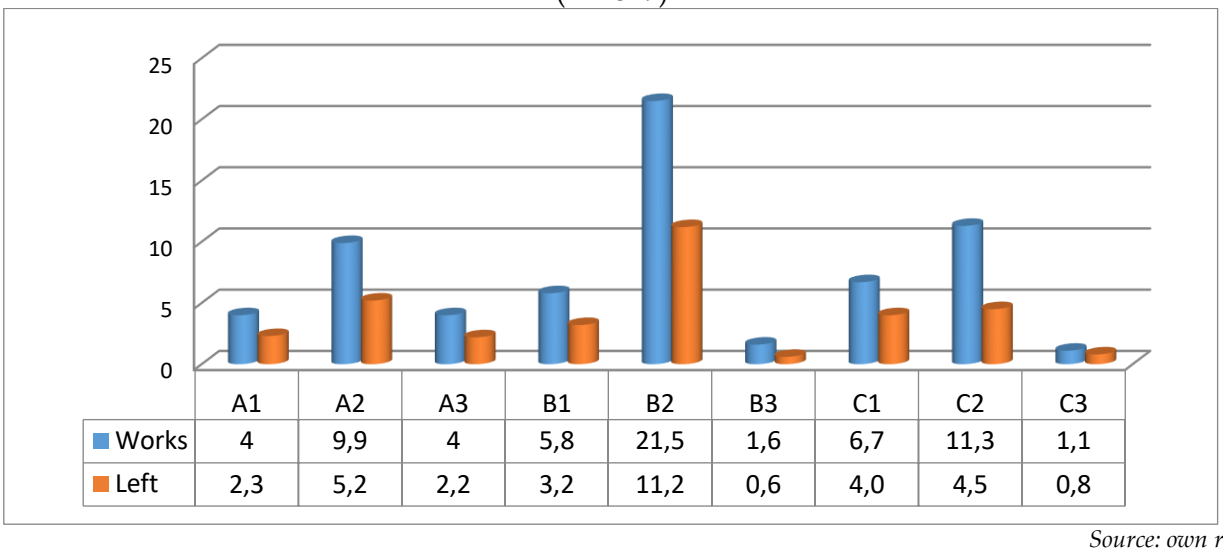
Category B1 had 76 nurses continuing to work and 42 leaving.
In category B2, 284 nurses continued to work, whereas 148 nurses left.
Category B3 had 21 nurses continuing to work and 8 leaving.
For category C1, 89 nurses continued to work and 53 nurses left.
In category C2, 149 nurses continued to work, and 60 nurses left.
Finally, in category C3, 14 nurses continued working, and 10 nurses left their positions.

This breakdown sheds light on the distribution of nurses across different McKinsey 9-Box Matrix categories, allowing organizations to understand the composition of their talent pool before the COVID-19 pandemic in relation to these categories and employment status. However, our statistical analysis indicates that there was no significant difference in nurses' McKinsey 9-Box Matrix evaluation categories based on their employment status before and during the COVID-19 pandemic ($\chi^2 = 4.871$, df = 8, p = 0.771). In terms of the McKinsey 9-Box Matrix categories, there was no substantial change related to nurses' working status (continuing or leaving) when comparing the periods before and during the COVID-19 pandemic. The distribution of nurses across these categories remained relatively stable, regardless of their employment status (Figure 12).

Conclusion - H7: Employment status impact on nurse categorisation

Our results do not support H7, indicating that there were no significant differences in nurse categorization based on employment status over the 6-year study period and between the periods before and during the COVID-19 pandemic. The stability in the distribution of nurses across McKinsey 9-Box Matrix categories suggests that employment status did not play a decisive role in shaping nurse categorization during this period. Further exploration into the factors influencing nurse categorization may provide additional insights into the dynamics of talent management within health care organizations.

Fig 12. Distribution of employment status of nurses before and during the COVID-19 pandemic (n=1319)



	A1	A2	A3	B1	B2	B3	C1	C2	C3
Works	4	9,9	4	5,8	21,5	1,6	6,7	11,3	1,1
Left	2,3	5,2	2,2	3,2	11,2	0,6	4,0	4,5	0,8

Source: own research

H8: Temporal Differences in Nurse Categorization (for A1, A2, and B1 employees)

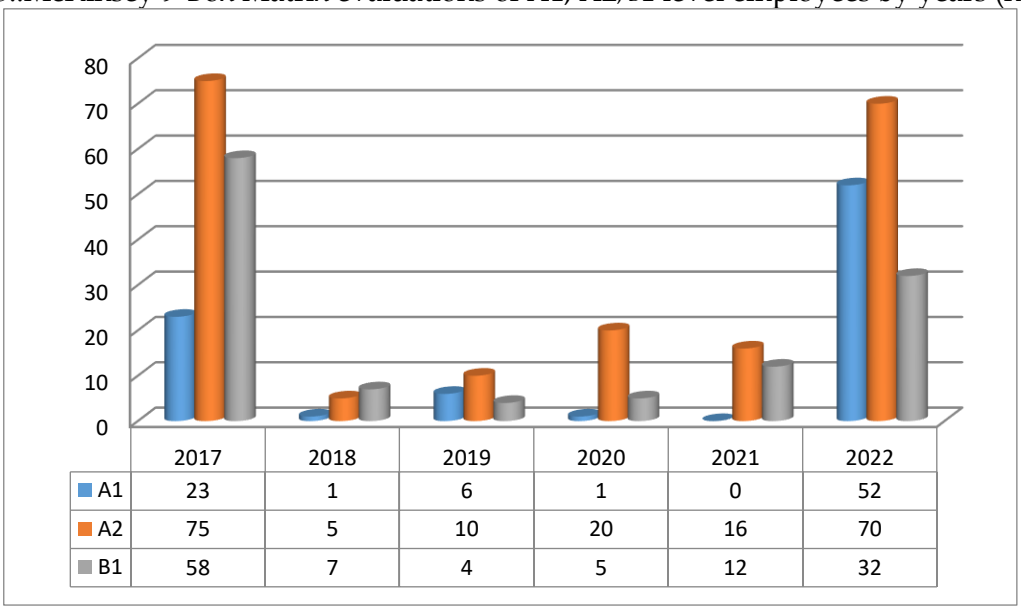
Our exploration of year differences in nurse categorization, focusing on A1, A2, and B1 employees, provides valuable insights into the dynamic interplay between current performance and future potential within the organization. A1 employees represent potential future leaders, A2 employees signify growth potential, and B1 employees contribute significantly to the organization's current performance. Effectively managing and developing employees in these categories is crucial for long-term organizational success and talent management. The statistical analysis uncovered a significant difference in nurses' McKinsey 9-Box Matrix evaluations, specifically in categories A1, A2, and B1, before and during the COVID-19 pandemic ($\chi^2 = 43.363$, df = 10, p = 0.000). This compelling result supports H8, signifying a noteworthy difference in how nurses were categorized in these matrix categories before and during the COVID-19 pandemic (Figure 13).

In practical terms, this indicates that the impact of the pandemic has had a discernible effect on the distribution of nurses across these specific talent management categories. Further analysis and interpretation are warranted to understand the nature and implications of this difference. It could signal changes in nurses' performances, potential, or roles within the organization during the pandemic. In addition, it may have implications for talent management and organizational strategies in response to these shifts.

Conclusion - H8: Temporal Differences in Nurse Categorization (for A1, A2, and B1 employees)

Our findings support H8, revealing significant temporal differences in nurse categorization across the 6-year study period and between assessments before and during the COVID-19 pandemic, particularly for A1, A2, and B1 employees. This underscores the need for organizations to adapt their talent management strategies in response to evolving circumstances, such as those imposed by the COVID-19 pandemic. Further investigation into the specific factors contributing to these temporal differences will enhance our understanding of the nuanced dynamics shaping nurse categorization within health care organizations.

Fig 13:.McKinsey 9-Box Matrix evaluations of A1, A2, B1 level employees by years (n=401)



	2017	2018	2019	2020	2021	2022
A1	23	1	6	1	0	52
A2	75	5	10	20	16	70
B1	58	7	4	5	12	32

Source: own research

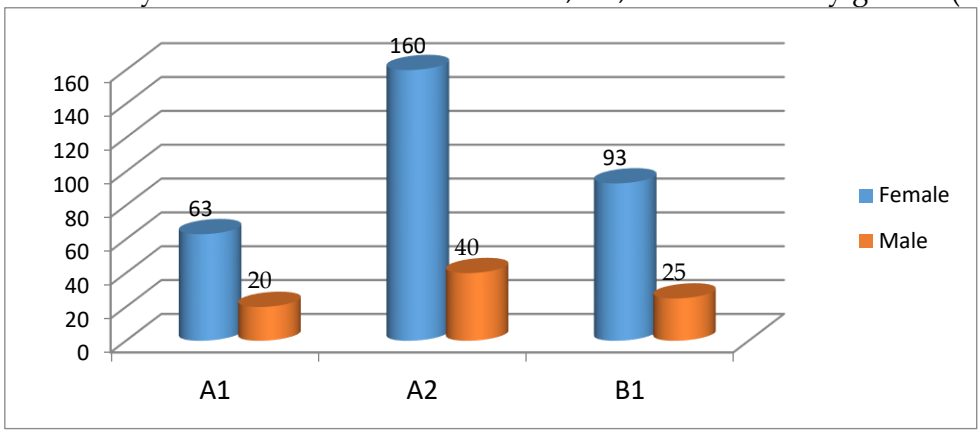
H9: Gender-specific differences in nurse categorisation (for A1, A2, and B1 employees)

Our investigation into gender differences in nurse categorization, focusing on A1, A2, and B1 employees, aimed to discern the impact of gender on talent management dynamics within the organization, particularly before and during the COVID-19 pandemic. Contrary to our initial hypothesis (H9), the statistical analysis revealed no statistically significant difference in nurses' McKinsey 9-Box Matrix evaluations for categories A1, A2, and B1 based on gender before and during the COVID-19 pandemic. The chi-square test (χ^2) yielded a value of 0.589 with 2 degrees of freedom, and the p-value was calculated to be 0.745, surpassing the conventional significance threshold of 0.05. This robust evidence leads us to reject H9, indicating that gender did not exert a significant influence on how nurses were categorized in these matrix categories before and during the COVID-19 pandemic. In essence, gender did not emerge as a determining factor in the distribution of nurses across these specific talent management categories during this period. While gender may not have shown a significant difference in these categories, it is essential to acknowledge that other factors or variables may have played a role in nurses' categorizations. Further exploration and analysis may be necessary to better understand the overall impact of gender on talent management during the pandemic (Figure 14).

Conclusion - H9: Gender-specific differences in nurse categorisation (for A1, A2, and B1 employees)

Our findings do not support H9, suggesting that gender-specific differences in nurse categorization for A1, A2, and B1 employees were not significant across the 6-year study period and between assessments before and during the COVID-19 pandemic. This nuanced understanding contributes to the broader discourse on gender dynamics within talent management frameworks, emphasizing the need for multifaceted analyses to unveil the intricate factors shaping nurse categorization in health care organizations.

Fig 14. McKinsey 9-Box Matrix evaluations of A1, A2, and B1 levels by gender (n=401)



Source: own research

H10: Employment status impact on nurse categorisation (for A1, A2, and B1 employees)

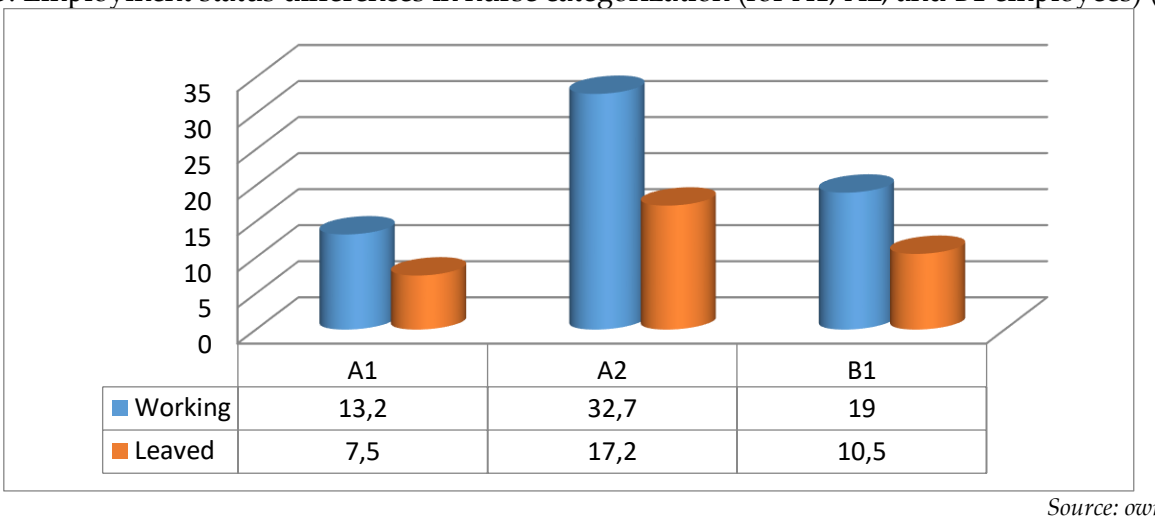
Our examination of employment status differences in nurse categorization, specifically focusing on A1, A2, and B1 employees, aimed to elucidate the potential impact of nurses' working status (continuing or taking leave) on their placement within the McKinsey 9-Box Matrix. We specifically investigated whether such differences were notable before and during the COVID-19 pandemic.

Contrary to our initial hypothesis (H10), the statistical analysis yielded a non-significant result (χ^2 = 0.083, df = 2, p = 0.959), suggesting that there is no substantial evidence to support the notion that employment status significantly influenced how nurses were categorized in the McKinsey 9-Box Matrix, particularly in categories A1, A2, and B1, before and during the COVID-19 pandemic. In essence, the decision to continue to work or take leave did not appear to have a significant impact on nurses' placement in these specific talent management categories. While working status and the choice to take leave did not show significant differences in these categories, it is crucial to recognize that other variables or factors might have contributed to nurses' categorizations. Further exploration and analysis may be necessary to gain a comprehensive understanding of the broader implications of working status and turnover on talent management practices during the pandemic (Figure 15).

Conclusion - H10: Employment status impact on nurse categorisation (for A1, A2, and B1 employees)

Our findings do not support H10, indicating that employment status differences in nurse categorization for A1, A2, and B1 employees were not significant across the 6-year study period and between assessments before and during the COVID-19 pandemic. This insight contributes to nuanced understanding of the intricate factors shaping nurse categorization in health care organizations, emphasizing the need for comprehensive analyses to reveal the multifaceted nature of talent management dynamics.

Fig 15. Employment status differences in nurse categorization (for A1, A2, and B1 employees) (n=401)



	A1	A2	B1
Working	13,2	32,7	19
Leaved	7,5	17,2	10,5

Source: own research

5 DISCUSSION

Talent management is the cornerstone of organisational success, orchestrating a Symphony of strategies to identify, nurture and retain invaluable assets. Committed to this ethos since 2012, our institution has embarked on a journey to adapt leadership programmes to meet the evolving demands of leadership attributes. In particular, the integration of the McKinsey 9-Box Matrix in 2017 marked a paradigm shift in assessing nurse performance and potential, providing an opportunity to condense six years of experiential wisdom to strengthen nurses in their professional journey. While not explicitly reflected in the assessment of leadership potential, our ongoing attention to gender equality underscores our commitment to inclusivity and equity in fostering a supportive work environment.

The diverse outcomes revealed by the McKinsey 9-Box Matrix assessments prompted a deep dive into their determinants. These insights have profoundly influenced the criteria governing performance evaluations and the creation of tailored support structures for our invaluable staff. The statistically significant shifts in the McKinsey 9-box matrix scoring categories before and during the COVID-19 pandemic indicate adaptive responses to the challenges posed by the dynamic health care landscape during the pandemic.

The notable fluctuations in leadership potential ratings over time testify to the evolving nature of leadership. In response, the institution has carefully developed leadership programmes calibrated to nurture these emerging attributes, with the aim of cultivating the leaders of tomorrow.

These processes, designed to uncover, inspire, and motivate latent employee potential in line with institutional aspirations, go beyond mere performance assessment. The McKinsey 9-box matrix serves as a strategic compass to guide the future trajectory of XX Health Care Group.

While this study provides a snapshot of the factors influencing nurse talent management, particularly for frontline nurses, it is not exhaustive. Health care systems may find that creating a nurturing environment that aligns with nurses' core values can not only attract new talent but also recapture those who have temporarily moved away from direct patient care in the past two years. In the long term, investing in the nursing workforce can promote stability and enhance the delivery of excellent patient care, reflecting our commitment to continuous improvement and resilience idespitehealth care challenges.

6 THEORETICAL AND PRACTICAL IMPLICATIONS

By elucidating the multiple dimensions of nurses' characteristics and evaluations both before and during the unprecedented challenges of the COVID-19 outbreak, this study unfolds numerous theoretical and practical implications:

Gender dynamics: The consistent gender distribution of nurses throughout the COVID-19 pandemic, as indicated by the lack of statistically significant differences, has theoretical significance. This study highlights the resilience and stability of gender representation within the nursing profession. Theoretical frameworks exploring gender dynamics in health care can draw on these findings to emphasise the robust and equitable nature of the nursing workforce.

In practice, health care institutions can use these findings to strengthen their commitment to gender inclusivity. By acknowledging the consistent representation of both male and female nurses, organisations can further cultivate an environment that encourages diversity and equal opportunities for professional growth.

Educational transitions: The notable shift in educational attainment during the COVID-19 pandemic, with a significant increase in the number of nurses with bachelor's degrees and a corresponding decrease in the number of graduate nurses, has theoretical implications for workforce planning and educational strategies. The observed changes highlight the adaptability of nursing education to meet the changing demands of health crises.

In practice, nursing education programmes may need to incorporate flexible structures that can accommodate fluctuations in the demand for specific levels of education. Institutions can proactively align their educational offerings with the emerging needs of the health care sector to ensure a dynamic and responsive nursing workforce.

Positional dynamics: The discernible differences in nurses' positions before and during the pandemic have theoretical implications for understanding the malleability of nursing roles in response to external challenges. These shifts highlight the adaptability and fluidity of job responsibilities within health care organisations.

Practically, health care organisations can use these findings to inform strategic workforce planning. Flexible job roles and responsibilities, which can be dynamically adjusted in times of crisis, can increase the resilience and effectiveness of nursing teams in dealing with unforeseen challenges.

Departmental adaptation: The statistically significant differences in the distribution of nurses across departments before and during the COVID-19 pandemic have theoretical implications for understanding the dynamic nature of health care delivery. The findings highlight the importance of departmental flexibility in responding effectively to emerging challenges.

In practice, health care organisations can use these theoretical insights to refine their departmental structures and staffing plans. Adaptable departmental frameworks that can quickly reallocate nursing staff based on evolving patient care needs can improve the overall resilience of the health care system.

Temporal and category variations: The observed differences in the distribution of nurses across McKinsey's 9-box matrix categories based on years of experience and specific assessment categories (A1, A2 and B1) provide theoretical insights into the evolving landscape of nursing talent. These findings underscore the need for dynamic talent management frameworks that account for both temporal variation and nuanced subgroup distinctions.

In practical terms, health care organisations can refine their talent management strategies to reflect the evolving needs of nurses at different stages of their careers and within specific performance and potential categories. This adaptability ensures a tailored approach to talent development and retention.

Leadership development: The statistically significant differences in nurses' leadership potential ratings before and during the COVID-19 pandemic suggest theoretical implications for the evolution of leadership roles within nursing. The findings suggest a possible redefinition of leadership attributes and responsibilities in response to the challenges posed by the pandemic.

Practically, health care organisations can use this theoretical understanding to tailor leadership development programmes to meet the evolving expectations of nursing leadership. Recognising and nurturing emerging leadership potential in nurses is critical to organisational resilience.

Stability of work status: The lack of significant differences in nurses' McKinsey 9-box matrix assessment categories based on work status before and during the COVID-19 pandemic indicates theoretical stability of work status across performance and potential categories. This suggests that the overall composition of the workforce remained relatively stable despite external challenges.

In practice, health care organisations can draw on this theoretical stability to implement strategies that support workforce retention and stability during crises. Understanding the resilience of workforce composition across different categories can inform organisational policies to ensure workforce continuity.

In-depth subgroup analysis: The significant differences found before and during the COVID-19 pandemic within specific McKinsey 9-box matrix categories (A1, A2, and B1) highlight the need for nuanced theoretical frameworks that account for subgroup differences. These findings highlight the distinct dynamics within critical subgroups and contribute to a more comprehensive understanding of talent management in nursing.

In practice, health care organisations can use these theoretical insights to tailor interventions and support structures specifically for subgroups within the nursing workforce. Recognising and addressing the unique needs of critical subgroups can improve the overall effectiveness of talent management.

Overall insights for future nursing dynamics: Taken together, these findings provide theoretical insights into the evolving nursing landscape during the pandemic. The observed changes in nurses' educational levels, positions, specialties, years of experience, leadership potential, and specific evaluation categories contribute to a nuanced understanding of nursing dynamics.

In practical terms, health care institutions can use these theoretical insights to inform future strategies and policies. By recognizing the dynamic nature of nursing, organisations can proactively adapt talent management practices, educational programmes workforce planning to meet the evolving needs of health care delivery.

7 LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Despite the valuable findings, this study has limitations. The small sample size and focus on a private health care group require caution in generalising findings to broader populations or different health care settings. Uncontrolled variables and contextual specificity also highlight the need for cautious interpretation. This study highlights the importance of further research to explore the specific factors influencing nurse attrition and the lasting effects of observed post-pandemic changes. Recognition of these limitations opens avenues for future research to refine and expand our understanding of nurse characteristics, assessments, and retention strategies.

Health care organisations can use the study findings to adapt their talent management practices. Understanding shifts in educational attainment, job roles, and leadership potential enables organisations to tailor their recruitment, training, and leadership development strategies. McKinsey's 9-box matrix scores serve as a valuable tool for organisations to categorise and strategies the development of their nursing workforce.

To address the limitations of the study, future research should explore different health care settings, consider uncontrolled variables, and examine the post-pandemic trajectory of nurse characteristics. In-depth qualitative studies can elucidate the specific factors influencing nurse attrition and contribute to targeted retention strategies.

8 CONCLUSION

This study presents a comprehensive analysis of nurses' characteristics and evaluations before and during the COVID-19 outbreak. The findings of this research provide valuable contributions to the understanding of talent management in health care settings. This study revealed several key insights into the dynamics of nursing during the pandemic. Notably, gender distribution remained consistent, indicating a balanced representation of male and female nurses. There was a significant shift in educational attainment, highlighting the need to adapt talent management strategies to the changing composition of the nursing workforce. Changes in roles and responsibilities within health care organisations were evident, highlighting the need for adaptability in response to challenging times.

McKinsey's 9-box matrix assessments provided a nuanced understanding of nurses' positions, leadership potential, and performance categories. Statistically significant differences emerged in leadership potential ratings before and during the pandemic, signalling the evolving landscape of leadership roles among nurses. In conclusion, this study provides a snapshot of the evolving landscape of nursing during the pandemic and offers insights that can guide talent management practices.

CONFLICT OF INTEREST

The authors have stated that there are no potential conflicts of interest regarding the research, authorship, authorship, and publication of this article.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author, S.K.A., upon reasonable request.

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