▪ *Basic Research*

Entrepreneurial Leadership and Work Engagement among Nurse Managers

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Abstract

Background: Entrepreneurial leadership entrepreneurial leadership is a leadership style known as entrepreneurial leadership is able to delegate, foster employee responsibility, make and implement choices, and operate independently and contribute to enhancing work engagement that has positive characteristics on nurses' performance. **Aim**: **The present study aimed** to determine level of nurse managers' entrepreneurial leadership, assess level of work engagement among nurse managers, and explore the relationship between nurse managers' entrepreneurial leadership and their work engagement. **Research design**: A descriptive correlational study design was used. **Setting**: The study was conducted at Nasser Institute Hospital. **Subjects**: The study included all nurse managers (98), working at the above-mentioned setting. **Tools of data collection**: Data were collected by using entrepreneurial leadership measurement and Utrecht Work Engagement Scale. **Results**: less than half (49%) of studied nurse managers had high total level of entrepreneurial leadership, while less than one third (31.6%) had total moderate level and less than one fifth (19.4%) had total low level with mean±SD (22.90±4.77). Moreover, more than half (56.1%) of studied nurse managers had high level of total work engagement, and more than one fifth (22.4% & 21.5%) of them had moderate and low levels respectively with mean±SD (24.22±5.00). **Conclusion**: There was strong positive correlation among nurse managers' entrepreneurial leadership and their work engagement. **Recommendations**: The study recommended establishing entrepreneurial leadership training to provide nurse managers with the skills they need to build a collaborative and participatory management organization, thus enhancing their work engagement.

*Keywords***:** Entrepreneurial leadership, work engagement, nurse managers.

Introduction

In today's healthcare environment, nurses are expanding their clinical roles and offering a range of quality and effective services and creating a positive public image as patient advocates, caregivers, counsellors and educators, this independent-minded group of nurses are entrepreneurs *(Agung, Landra & Sudja, 2020)* [2]. An entrepreneur is someone who takes on the responsibility and risk of finding or creating exceptional possibilities to use their own abilities, skills, and energy, and who then uses a strategic planning approach to convert those opportunities into a marketable healthcare service *(Decuypere & Schaufeli, 2020)* [5]. However, the term is not limited to employment status, a nurse intrapreneur could be a salaried nurse who develops, promotes and delivers an innovative nursing program or project within a given health care setting, or they could be nurses who start their own business and are self-employed. The capacity for leaders to build, implement, and sustain flexibility, think strategically, and collaborate with others to make changes to improve the future of healthcare organizations is known as entrepreneurial leadership *(Iqbal, Nazir & Ahmad, 2022)* [10].

To improve healthcare service quality, nurse managers are required to effectively lead and engage in nursing practice *(George & Massey, 2020)* [6]. Nurse managers' work engagement is a working condition in which their perceptions, feelings and behaviors are aimed to achieve organizational goals. The ability of nurse managers to be engaged at work is essential because it enhances their wellbeing, enjoyment, and passion, as well as their physical and mental health, job performance, and capacity to inspire others *(Gómez-Salgado et al., 2021)* [7]. The role of entrepreneurial leadership in the day-to-day operations of the practice workplace is highly important.

The capacity of nurse managers to envision and foresee even while maintaining flexibility, think strategically, and be prepared to collaborate with others to make decisions that would be worthy of the healthcare organization may be characterized as entrepreneurial leadership *(Herron & Herron, (2018)* [9].

Entrepreneurial leadership could generate entrepreneurial behavior for nursing leaders who work to achieve organizational goals. Such behavior strengthen, enhances and support change, creativity among nursing personnel, improves work engagement, reinforces being initiative, conductive, and effective decision-makers. Framing challenges, absorbing uncertainty, underwriting, building commitment and defining gravity are subscales of nurse managers' entrepreneurial leadership that can lead to effective work engagement *Jakobsen, (2021)* [11].

Leadership is one of the factors that significantly contributes to raising nurses' levels of job engagement. Although, entrepreneurial leadership may be the best paradigm for analyzing work engagement *(Kimbu et al., (2021)* [13]. Additionally, entrepreneurial leaders could empower nurses to have work commitment, motivate employees to participate in their job and show a desire for

coming up with original ideas and creative work practices. They also promote pleasant feelings, conciliation, trust, and communication. *(Bagheri and Harrison, 2020)* [4].

As a result of the relationship between needs and resources, work engagement is a motivating process. Three factors—vigor, devotion, and absorption—were essential for a productive workplace. A person's perception of their physical stamina, emotional vivacity, and mental alertness at work is referred to as vigour *Aboramadan & Dahleez, (2020)* [1]. Workplace vigour may be seen as a personal resource that results from encounters at work that are connected to an individual's sense of energy. So, labour vigour may be a precursor to involvement. An individual's emotionally stable and upbeat attitude towards their job with the goal of attaining professional advancement is referred to as commitment. Working with dedication entails being intensely engaged, experiencing obstacles, and feeling that your job is essential and valuable. The term "absorption" describes a person's more enduring and pervasive mental state. It describes being completely focused, content, and involved in one's job to the point that time appears to fly by and it is hard to break away from it *(Kwon & Kim, 2020)* [14].

In order to collect and mobilize a "supporting personnel" of nurse leaders who are devoted to the discovery and exploitation of strategic value creation, entrepreneurial leadership develops creative scenarios. Increased job resources and reduced job expectations are two ways that leadership styles may help people be more engaged at work *(Leal, Salomón & Rivera, (2021)* [15]. Entrepreneurial leaders are known for their strong work ethic, willingness to take calculated risks, enthusiasm, creativity, proactivity, agility, vision, and tenacity. They also prefer working with external clients and think strategically about the future *(Li, Makhdoom & Asim, (2020)* [16]. Entrepreneurial leaders have also predictors for their work engagement; concerning with their job characteristics, rewards and recognition, perceived organizational support, person organization fit, and core-self-evaluation *Liu, Zhou & Wang, (2022)* [15]. Therefore, this study was carried out to observe the relationship between entrepreneurial leadership work engagement among nurse managers.

Significance of the Study

Risk-taking, influencing, and directing staff nurses' performance, an entrepreneurial nurse leader also inspires people to think creatively and ingeniously in order to grasp the demands of the organization. Inspiring pleasant feelings, harmony, trust, and communication, as well as fostering work engagement, this kind of leader encourages people to be dedicated to their job *(Mehmood et al., 2021)* [18].

In the current context, highly engaged nursing leaders cannot be imitated by competitive healthcare organizations and they bring equaling competitive advantage to the organization. Also, nurse managers who have high level of work engagement supports quality healthcare services and improve organizational productivity *Li, Makhdoom & Asim, (2020)* [16].

Based on the study hypothesis, nurse managers need this kind of leadership in order to handle the problems of organizational growth since they are in charge of the effectiveness and quality of the organization. Thus, the entrepreneurial leadership of nurse managers is becoming increasingly crucial in enhancing organizational development, effectiveness, and work engagement *(Nguyen et al., 2021)* [20].

Aim of the Study:

This study aimed at assessing nurse managers' entrepreneurial leadership level and its influence on their work engagement through:
1- Assessing level of nurse managers' entrepreneurial leadership.
2- Assessing level of work engagement among nurse managers.
3- Finding out the relationship between nurse managers' entrepreneurial leadership and their work engagement.

Research Questions:
1. What is the level of nurse managers' entrepreneurial leadership?
2. What is the level of work engagement among nurse managers?
3. Is there a relationship between nurse managers' entrepreneurial leadership and their work engagement?

Subjects and Methods:

Research design
This study was carried out using a descriptive-correlational design. Descriptive research is research that is used to provide a picture of the existing situation. The study of the relationships between variables and the identification of future event prediction from current information are both accomplished through correlational study and research.

Setting
The study was conducted in all departments at Nasser Institute Hospital for Research and Treatment that is one of general secretariat hospitals, affiliated to "Egyptian Ministry of Health" that serves all citizens across the country. The study was performed at all hospital units including; nursing administrative unit, quality unit, infection control unit, outpatient clinics, emergency unit, medical unit, surgical unit, operative rooms, intensive care units, cardiology unit, neurology unit, kidney dialysis units, obstetric unit, pediatric unit, ophthalmology unit, and GAMA NIFE unit.

Subjects of the study:
The study subjects consisted of all (98) nurse managers in the selected setting; including nurse managers of both genders with at least one year of experience in the current hospital

setting. And excluded those who had attended any previous training on entrepreneur leadership or work engagement. All nurse managers with the required inclusion criteria were accepted to participate in the study and there was no drop-out.

Data collection tools:

"Entrepreneurial Leadership Measurement" and "Utrecht Work Engagement Scale" were used to collect data for this study.

First tool: **Entrepreneurial Leadership Measurement:** It was aimed to assess entrepreneurial leadership level among nurse managers. The scale developed by *Bagheri & Harrison, (2020)* [4] and it consisted of two parts:

Part I: This part was prepared to collect information about the participants' personal and professional characteristics, including their age, gender, marital status, number of years in their present post, nursing degree, and participation in training programmers for entrepreneur leadership or work engagement.

Part II: It included (43) items divided into eight dimensions include: Framing challenges (5 items), absorbing uncertainty (4 items), underwriting (5 items), building commitment (6 items), defining gravity (5 items), opportunity identification and exploitation (10 items), orientation towards learning (5 items), and creative collective self-efficacy (3 items).

Scoring system: The subject's responses in this part were scored in five-point Likert scale from one to five; strongly agree (5), agree (4), uncertain (3), disagree (2), strongly disagree (1). These scores were summed and were converted into a percent score.

Entrepreneurial leadership level of study subjects was considered low if total score was less than 60%. While it considered moderate if score was ranged from 60-75% and it considered high if total score was more than 75% *(Verma &Verma, (2020)* [27].

Second tool: Utrecht Work Engagement Scale (UWES): It was developed by *Schaufeli, Bakker & Salanova, (2006)* [25]. It was consisted of (17 items) measured work engagement level among nurse managers. The items were clustered into three subscales namely: vigor (6 items), dedication (5 items) and absorption (6 items).

Scoring system: Responses were scored using a five-point Likert scale (1–5). The numbers on the scale read (1) for never, (2), sporadically, (3), rarely, (4), frequently, and (5) constantly. The item scores were added up, and the amount divided by the number of items produced the part's mean score. These ratings were transformed into a % rating. Study participants were judged low engaged if their overall score was less than 60%, moderately involved if their total score varied from (60-75%) to highly engaged if their total score was greater than (75%) *(Verma &Verma, 2020)* [27].

Tools validity: A juror group panel evaluated the validity of the tools for both face and substance. Seven academics from the Nursing Faculty at Ain Shams University, Tanta University, and Modern University for Technology and Information made up this committee. They were experts in nursing administration and psychiatric health nursing. The jury panel carefully considered the instruments to assess their clarity, thoroughness, and correctness. They were asked for feedback on the design, elements, and scoring methodology of the tool. According to jury comments, the researcher made modest changes to the tools, such as rephrasing and rearrange certain elements, to make them more precise and understandable.

Tools Reliability: By calculating the internal consistency of tools of the data collection using the Cronbach's Alpha Coefficient test, their dependability was evaluated. Entrepreneur Leadership Measurement received a score of (0.89), while the Utrecht Work Engagement Scale received a score of (0.90).

Pilot study: Ten nurse managers participated in a pilot trial. This figure represents 10 percent of the study's whole sample. The purpose of the pilot research was to determine whether the study instruments were applicable, the language was clear, and the tools were practical and appropriate. It also provided estimates for the length of time each subject would need to spend filling out the forms and a list of possible challenges. It took around (25–30) minutes to fill the tools. In November 2022, a pilot study was carried out. The study participants from the pilot were included in the full research sample with no alterations made.

Fieldwork: Data collection of the study started in December (2022) and ended at May (2023). The researcher introduced herself to nurse managers at work, explained the purpose of the study and the components of the questionnaires, and distributed the sheets to nurse managers in their work settings at various times. The researcher also observed as the nurse managers filled out the questionnaires to address any questions or ambiguities. Two days a week, throughout various shifts, data were gathered. Every week, researchers gathered between 12 and 16 sheets. Each completed page was verified by researchers to make sure it was complete.

Administrative design and ethical considerations:
The study was first conducted with formal approval from the appropriate authorities. In order to get their agreement and request their cooperation prior to the conduct of the study, the researchers presented the purpose of the study and its ramifications to hospitals' medical and nursing directors. The researcher then visited with the head nurses of each unit to discuss the study's purpose, anticipated outcomes, and permission. She also asked for their support. The participants were made aware of their rights to decline or withdraw from the study at any time and without providing a reason, and that the information gathered would be kept private and used exclusively for research.

Statistical Design:

In order to analyse the data for this study, the statistical software for social sciences (SPSS version 24.0) was utilised. Frequencies and percentages for non-numerical variables, means and standard deviations (±SD), and range for parametric numerical data were all employed. The Cronbach's Alpha coefficient test was calculated to determine the tools' dependability by assessing internal consistency. Additionally, when the predicted count is less than 5 in more than 20% of the cells, the chi square test is used in statistics to examine the association between two variables. To conduct the correlation matrix, the Pearson correlation coefficient test (r) was utilised. Statistical significance was determined by P-values of 0.05 and higher significance by P-values of 0.001.

Results:

Table (1): Personal data of studied nurse managers (n= 98).

Personal data items	No.	%
Age \ year		
25<30	12	12.2
30<40	65	66.3
40<50	21	21.5
Mean±SD	30.12 ± 2.03	
Gender		
Male	9	9.2
Female	89	90.8
Level of education in nursing		
Technical nursing institute	25	25.5
Bachelor degree	53	54.1
High qualified post graduate studies	20	20.4
Years of experience in nursing		
1<10	10	10.2
10 ≤20	70	71.4
>20	18	18.4
Mean±SD	37.15 ± 3.12	
Hospital work units		
Nursing Administrative unit	6	6.1
Quality Unit	12	12.2
Infection Control Unit	10	10.2
Outpatients' Clinics	4	4.1
Emergency Unit	4	4.1
Medical Unit	6	6.1
Surgical Unit	6	6.1
Operative Rooms	8	8.2
Intensive Care Units	4	4.1
Cardiology Unit	6	6.1
Neurology Unit	6	6.1
Kidney Dialysis Unit	6	6.1
Obstetric Unit	6	6.1
Pediatric Unit	6	6.1
Ophthalmology Unit	6	6.1
GAMA NIFE Unit	2	2.0

Table (1) illustrates that more than two thirds (66.3%) of studied nurse managers fall in age group thirty to less than forty years old with mean age 30.12 ± 2.03, it was shown that the majority (90.8%) were females, and more than half of them (54.1%) had a bachelor degree in nursing. Additionally, less than three quarters

(71.4%) have years of experience from ten to twenty years with mean (37.15 ± 3.12). Regarding their hospital work units, the highest percent (12.2%) of them work in quality unit, while low percent (2.0%) work in GAMA NIFE Unit.

Table (2): Percentage distribution of nurse managers' level of framing challenges dimension of entrepreneurial leadership (n= 98).

I. Framing challenges dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I seek continuous performance improvement.	52	53.1	25	25.5	21	21.4	23.98	3.17
2. I set high performance expectation for organizational development.	45	45.9	33	33.7	20	20.4	23.71	3.67
3. I develop task goals according to nursing staff abilities.	66	67.3	30	30.6	2	2.1	22.27	4.26
4. I develop a creative plan for nursing care.	25	25.5	29	29.6	44	44.9	21.95	2.94
5. I spend time on new strategies for organizational development.	10	10.2	15	15.3	73	74.5	23.98	3.17
Total	**39**	**39.8**	**26**	**26.5**	**33**	**33.7**	**23.16**	**3.44**

Table (2) identifies that less than two fifths of studied nurse managers (39.8%) had high level of framing challenges dimension of entrepreneurial leadership. While, more than

one third of them (33.7%) had low level. Moreover, slightly more than quarter (26.5%) of them had moderate level with mean± SD (23.16± 3.44).

Table (3): Percentage distribution of nurse managers' level of absorbing uncertainty dimension of entrepreneurial leadership (n= 98).

II. Absorbing uncertainty dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I anticipate possible future events.	14	14.3	53	54.1	31	31.6	22.36	4.59
2. I think ahead about new developments that will occur in the healthcare sector.	14	14.3	74	75.5	10	10.2	22.27	4.72
3. I undertake risk to reduce the uncertainty in staff nurses' work.	9	9.2	75	76.5	14	14.3	21.25	5.02
4. I promote an environment where risk taking is encouraged.	5	5.1	56	57.1	37	37.8	21.17	3.77
Total	**10**	**10.2**	**65**	**66.3**	**23**	**23.5**	**21.77**	**4.52**

Table (3) describes that more than two thirds of studied nurse managers (66.3%) had moderate level regarding absorbing uncertainty dimension of entrepreneurial leadership. While,
less than one quarter of them (23.5%) had low level. Moreover, law percent (10.2%) of them had high level with mean± SD (21.77± 4.52).

Table (4): Percentage distribution of nurse managers' level of underwriting dimension of entrepreneurial leadership (n= 98).

III. Underwriting dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I negotiate effectively to eliminate the obstacles in staff nurses' work.	5	5.1	56	57.1	37	37.8	24.70	4.90
2. I show empathy toward staff nurses.	3	3.1	69	70.4	26	26.5	21.17	4.07
3. I make staff enthusiastic for my ideas.	6	6.1	60	61.2	32	32.7	22.71	3.11
4. I inspire emotions, beliefs, values and behaviors of staff nurses.	6	6.1	61	62.2	31	31.6	25.22	3.71
5. I inspire passion for new idea generation and exploitation of staff nurses.	13	13.3	54	55.1	31	31.6	24.70	4.91
Total	**7**	**7.6**	**60**	**61.2**	**31**	**31.6**	**23.07**	**4.14**

Table (4) demonstrates that less than two thirds of studied nurse managers (61.2%) had moderate level regarding underwriting dimension of entrepreneurial leadership. While, less than one third of them (31.6%) had low level. Additionally, law percent (7.6%) of them had high level with mean ± SD (23.07± 4.14).

Table (5): Percentage distribution of nurse managers' level of building commitment dimension of entrepreneurial leadership (n= 98).

IV. Building commitment dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I recruit team-oriented staff.	89	90.8	7	7.1	2	2.1	21.31	7.11
2. I acquire staff nurses' identification with organizational change.	70	71.4	22	22.4	6	6.2	27.09	3.55
3. I motivate staff nurses' commitment to the goals of organizational development.	53	54.1	14	14.2	31	31.6	32.61	3.71
4. I prioritize tasks required for organization's success.	69	70.4	15	15.3	14	14.2	23.73	7.84
5. I communicate effectively with staff nurses.	60	61.2	17	17.3	21	21.5	21.31	7.11
6. I listen and act upon organization stakeholders' complaints.	61	62.3	26	26.5	11	11.2	27.09	3.55
Total	**67**	**68.5**	**17**	**17.3**	**14**	**14.2**	**25.52**	**5.47**

Table (5) reveals that more than two thirds (68.5%) of studied nurse managers had high level regarding building commitment dimension of entrepreneurial leadership, while

less than one fifth (17.3%) had moderate level and only (14.2%) had low level with mean± SD (25.52±5.47).

Table (6): Percentage distribution of nurse managers' level of defining gravity dimension of entrepreneurial leadership (n= 98).

V. Defining gravity dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I integrate people or things into a cohesive, working whole.	52	53.1	25	25.5	21	21.4	23.98	3.17
2. I make decisions firmly and quickly.	69	70.4	15	15.3	14	14.2	23.73	7.84
3. I specify the health care services presented by the organization to suggest what can or cannot be done.	66	67.3	30	30.6	2	2.1	22.27	4.26
4. I understand limitations of organizational ability to avoid unnecessary resource utilization.	70	71.4	22	22.4	6	6.2	27.09	3.55
5. I demonstrate the ability to manage time effectively.	45	45.9	33	33.7	20	20.4	23.71	3.67
Total	**60**	**61.2**	**22**	**22.4**	**16**	**16.4**	**24.15**	**4.49**

Table (6) describes that less than two thirds (61.2%) of studied nurse managers had high level regarding defining gravity dimension of entrepreneurial leadership, while less than quarter (22.4%) had moderate level and only (16.4%) of them had low level with mean± SD (24.15±4.49).

Table (7): Percentage distribution of nurse managers' level of opportunity identification and exploitation dimension of entrepreneurial leadership (n= 98).

V. Opportunity identification and exploitation dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I recognize existing market opportunities.	66	67.3	30	30.6	2	2.1	22.27	4.26
2. I adjust current planning approach when new opportunities arise.	14	14.3	53	54.1	31	31.6	22.36	4.59
3. I actively identify, develop and go after new business opportunities.	14	14.3	74	75.5	10	10.2	22.27	4.72
4. I have insight into the market and business competition.	9	9.2	75	76.5	14	14.3	21.25	5.02
5. I point out the competition's weaknesses and how we could exploit them.	5	5.1	56	57.1	37	37.8	24.70	4.90
6. I often come up with radical improvement ideas for the provided healthcare services.	3	3.1	69	70.4	26	26.5	21.17	4.07
7. I push staff to be innovative in nursing care.	69	70.4	15	15.3	14	14.2	23.73	7.84
8. I create a climate and allots time to help staff nurses find ways to improve nursing care innovation and opportunity recognition.	60	61.2	17	17.3	21	21.5	21.31	7.11
9. I create an environment where organization nursing staff feel free to try new things.	89	90.8	7	7.1	2	2.1	21.31	7.11
10. I recognize existing market opportunities.	45	45.9	33	33.7	20	20.4	23.71	3.67
Total	**37**	**37.8**	**43**	**43.9**	**18**	**18.3**	**22.40**	**5.32**

Table (7) shows that less than half (43.9%) of studied nurse managers had moderate level regarding opportunity identification and exploitation dimension of entrepreneurial leadership, while less than two fifths (37.8%) had high level and less than one fifth (18.3%) of them had low level with mean± SD (22.40±5.32).

Table (8): Percentage distribution of nurse managers' level of orientation towards learning dimension of entrepreneurial leadership (n= 98).

V. Orientation towards learning dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I show awareness of staff nurses' strengths and weaknesses.	90	91.8	5	5.1	3	3.1	22.71	3.11
2. I seek continuous self-improvement.	91	92.8	4	4.1	3	3.1	25.22	3.71
3. I lead staff nurses by serving as role models.	89	90.8	5	5.1	4	4.1	24.70	4.91
4. I focus on staff training.	93	94.8	3	3.1	2	2.1	24.70	4.90
5. I keep the organization informed and updated on new educational trends and methods to improve staff nurses' learning and achievement.	94	95.9	3	3.1	1	1.0	21.17	4.07
Total	**91**	**92.8**	**4**	**4.1**	**3**	**3.1**	**23.07**	**4.14**

Table (8) explains that the majority (92.8%) of studied nurse managers had high level regarding orientation towards learning dimension of entrepreneurial leadership, while only

(4.1%&3.1%) of them had moderate and low levels respectively with mean± SD (23.07±4.14).

Table (9): Percentage distribution of nurse managers' level of Creative collective self-efficacy dimension of entrepreneurial leadership (n= 98).

V. Creative collective self-efficacy dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. I have confidence in the ability of nursing team to solve problems creatively.	69	70.4	15	15.3	14	14.2	23.73	7.84
2. I have confidence in the nursing team's ability to produce new ideas.	60	61.2	17	17.3	21	21.5	21.31	7.11
3. I have confidence in the team's ability to further developing new ideas of others.	89	90.8	7	7.1	2	2.1	21.31	5.11
Total	**73**	**74.5**	**13**	13.3	**12**	**12.2**	**22.11**	**6.68**

Table (8) demonstrates that less than three quarters (74.5%) of studied nurse managers had high level regarding Creative collective self-efficacy dimension of entrepreneurial leadership, while low percent (13.3%&12.2%) of them had moderate and low levels respectively with mean± SD (22.11±6.68).

Table (10): Percentage distribution of nurse managers' level of total entrepreneurial leadership (n= 98).

Entrepreneurial leadership Dimensions items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. Framing challenges.	39	39.8	26	26.5	33	33.7	23.16	3.44
2. Absorbing uncertainty	10	10.2	65	66.3	23	23.5	21.77	4.52
3. Underwriting.	7	7.6	60	61.2	31	31.6	23.07	4.14
4. Building commitment.	67	68.5	17	17.3	14	14.2	25.52	5.47
5. Defining gravity.	60	61.2	22	22.4	16	16.4	24.15	4.49
6.Opportunity identification and exploitation	37	37.8	43	43.9	18	18.3	22.40	5.32
7. Orientation towards learning.	91	92.8	4	4.1	3	3.1	23.07	4.14
8.Creative collective self-efficacy	73	74.5	13	13.3	12	12.2	22.11	6.68
Total	**48**	**49**	**31**	**31.6**	**19**	**19.4**	**22.90**	**4.77**

Table (10) and figure (1) identifies that less than half (49%) of studied nurse managers had high total level of entrepreneurial leadership, while less than one third (31.6%) had total

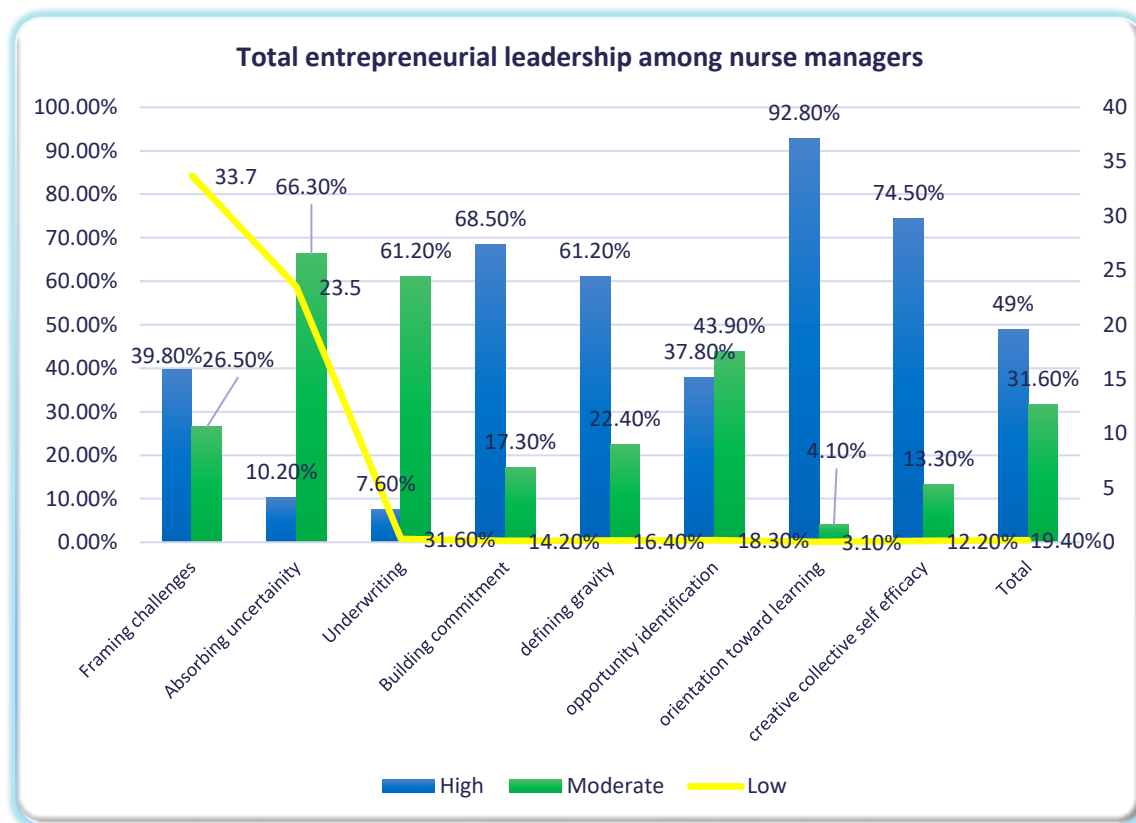moderate level and less than one fifth (19.4%) had total low level with mean± SD (22.90±4.77).

Figure (1): Level of entrepreneurial leadership among nurse managers (n= 98).

Table (11): Level of vigor dimension of work engagement among studied nurse managers (n=98).

	Vigor dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
		No.	%	No.	%	No.	%		
1.	Feel bursting with energy.	56	57.2	20	20.4	22	22.4	21.31	7.11
2.	Work full of meaning.	49	50	19	19.4	30	30.6	27.09	3.55
3.	Feel strong at job.	49	50	19	19.4	30	30.6	32.61	3.71
4.	Enthusiastic about job.	32	32.6	39	39.8	36	27.6	23.73	7.84
5.	Inspires with job.	36	36.7	19	19.4	43	43.9	21.31	7.11
6.	Like going to work in the morning.	22	22.4	18	18.4	58	59.2	27.09	3.55
	Total	**41**	**41.8**	**22**	**22.4**	**35**	**35.8**	**25.52**	**5.47**

Table (11) describes that more than two fifths (41.8%) of studied nurse managers had high level of vigor dimension of work engagement, and more than one fifth (22.4%) of them had moderate level, while more than one third (35.8%) of them had low level with mean± SD (25.52± 5.47).

Table (12): Level of dedication dimension of work engagement among studied nurse managers (n=98).

Dedication dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. Immersing in work.	67	68.5	17	17.3	14	14.2	25.52	5.47
2. Proud of the work.	60	61.2	22	22.4	16	16.4	24.15	4.49
3. Job is challenging.	37	37.8	43	43.9	18	18.3	22.40	5.32
4. Resilient at job.	70	71.4	22	22.4	6	6.2	27.09	3.55
5. Persevere at work.	45	45.9	33	33.7	20	20.4	23.71	3.67
Total	**56**	**57.1**	**27**	**27.6**	**15**	**15.3**	**24.57**	**4.5**

Table (12) identifies that more than half (57.1%) had high level regarding dedication dimension of work engagement, and more than quarter (27.6%) of them had moderate level, while less than one fifth (15.3%) of them had low level with mean ± SD (24.57± 4.5).

Table (13): Level of absorption dimension of work engagement among studied nurse managers (n=98).

Absorption dimension items	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. Time flies when working.	69	70.4	15	15.3	14	14.2	23.73	7.84
2. Forgetting around when working.	60	61.2	17	17.3	21	21.5	21.31	7.11
3. Feel happy when working intensely.	61	62.3	26	26.5	11	11.2	27.09	3.55
4. Can work for long periods.	89	90.8	7	7.1	2	2.1	21.31	7.11
5. Carried away when working.	70	71.4	22	22.4	6	6.2	27.09	3.55
6. Difficult to detach from job.	53	54.1	14	14.2	31	31.6	32.61	3.71
Total	**67**	**68.5**	**17**	**17.3**	**14**	**14.2**	**25.52**	**5.47**

Table (10) illustrates that more than two thirds (68.5%) of studied nurse managers had high total level absorption dimension of work engagement, while less than one fifth (17.3%&14.2) of them had moderate and low levels respectively with mean± SD (25.52± 5.47).

Table (11): Total level of work engagement among nurse managers (n=98).

Work engagement dimensions	High >75		Moderate 60-75%		Low <60 %		Mean	SD
	No.	%	No.	%	No.	%		
1. Vigor.	41	41.8	22	22.4	35	35.8	25.52	5.47
2. Dedication.	56	57.1	27	27.6	15	15.3	24.57	4.52
3. Absorption.	67	68.5	17	17.3	14	14.2	22.52	5.01
Total	**55**	**56.1**	**22**	**22.4**	**21**	**21.5**	**24.22**	**5.00**
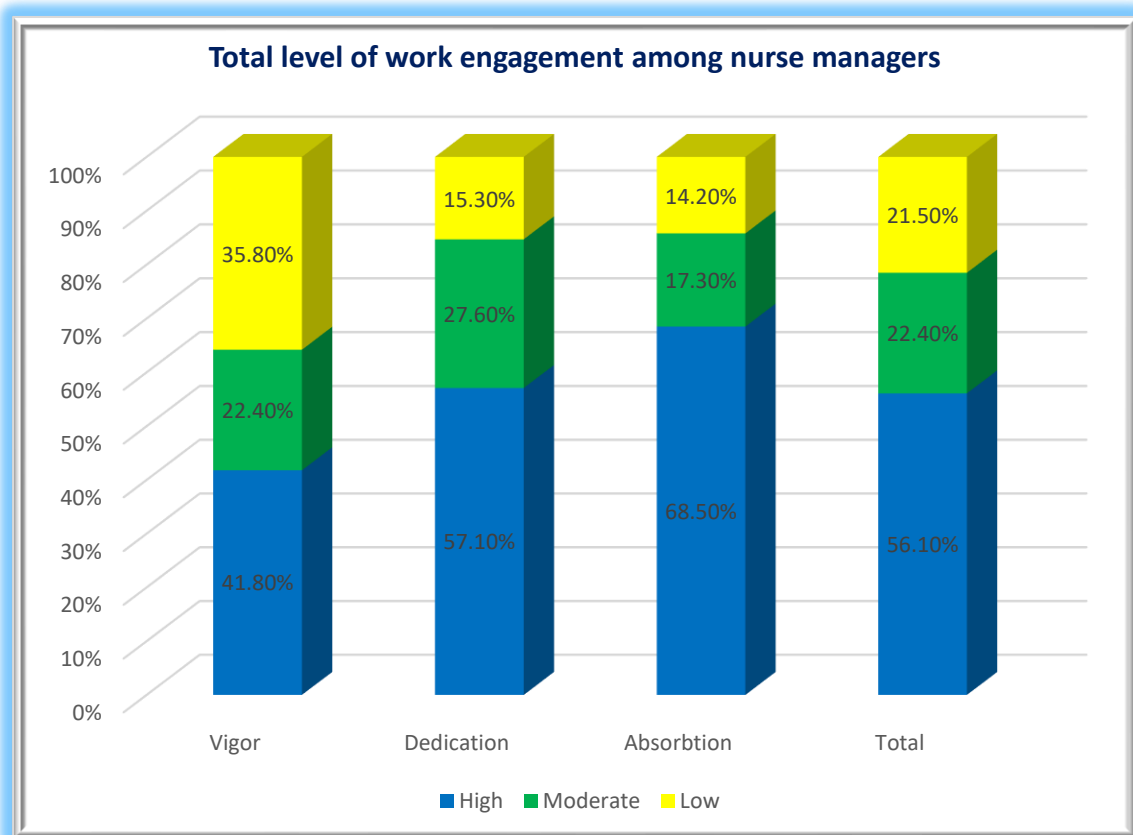
Figure (2): Total level of work engagement among nurse managers (n=98).

Table (11) and figure (2) demonstrates that more than half (56.1%) of studied nurse managers had high level of total work engagement, and more than one fifth (22.4% & 21.5%) of them had moderate and low levels respectively with mean± SD (24.22± 5.00).

Table (12):   Correlation matrix between nurse managers' level of entrepreneurial leadership and their work engagement (n=98).

Variables	Pearson Correlation	Vigor	Dedication	Absorption	Total work engagement
1. Framing challenges.	R	0.895	0.858	0.697	0.687
	P	0.000**	0.000**	0.000**	0.000**
2. Absorbing uncertainty.	R	0.588	0.715	0.723	0.759
	P	0.011*	0.000**	0.000**	0.000**
3. Underwriting.	R	0.676	0.750	0.838	0.764
	P	0.000**	0.000**	0.000**	0.000**
4. Building commitment.	R	0.942	0.656	0.759	0.684
	P	0.000**	0.000**	0.000**	0.000**
5. Defining gravity.	R	0.663	0.730	0.764	0.792
	P	0.025*	0.005**	0.000**	0.000**
6. Opportunity identification and exploitation.	R	0.616	0.825	0.730	0.697
	P	0.000**	0.000**	0.005**	0.000**
7. Orientation towards learning.	R	0.883	0.584	0.588	0.838
	P	0.000**	0.000**	0.011*	0.000**
8.Creative collective self-efficacy.	R	0.673	0.931	0.732	0.873
	P	0.000**	0.000**	0.000**	0.000**
Total entrepreneurial leadership	R	0.918	0.942	0.792	0.838
	P	0.000**	0.000**	0.000**	0.000**

r Pearson Correlation
* Statistically significant at P≤0.05
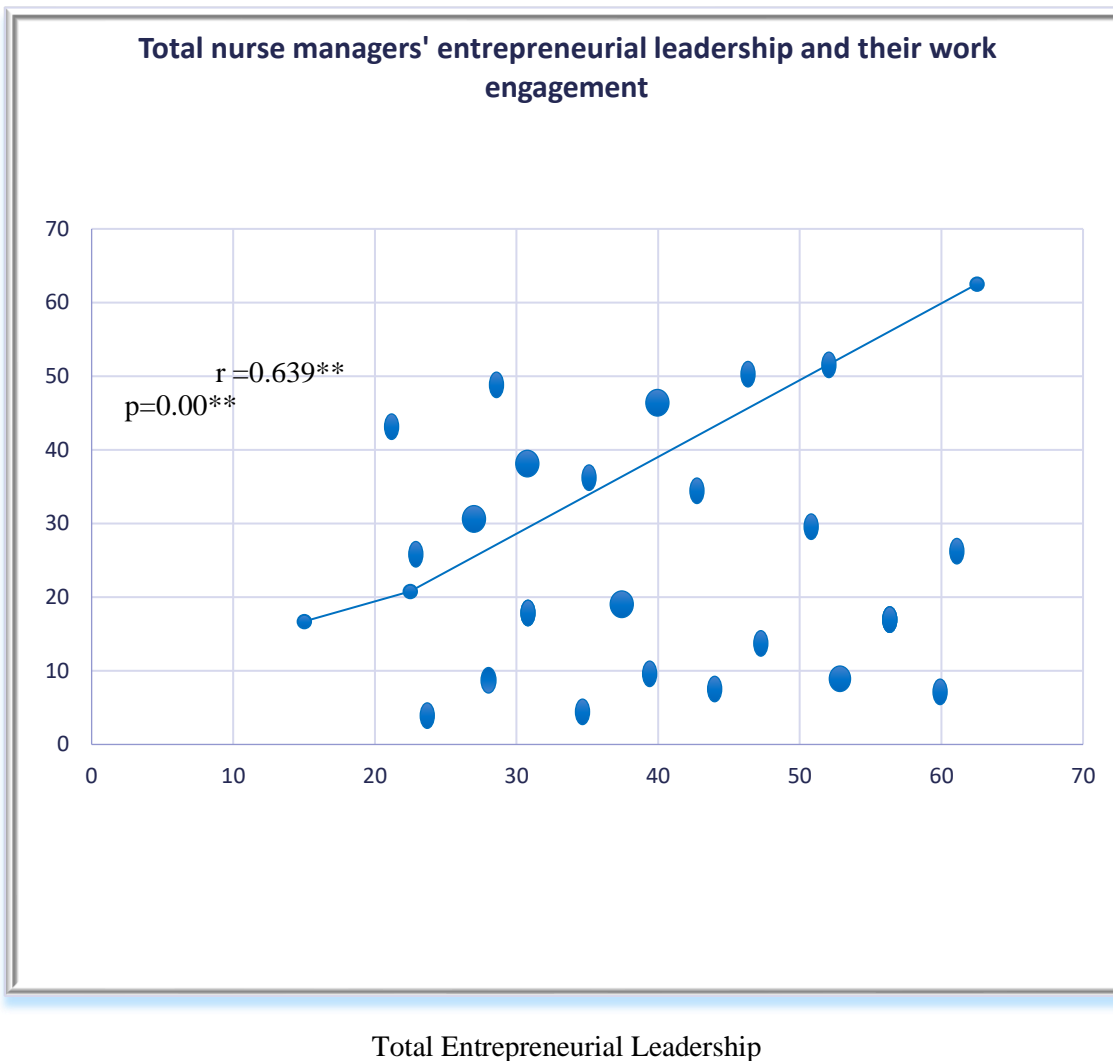** Highly statistically significant at P≤0.

Table (12) validates that there were highly statistically significant positive correlations between nurse managers' entrepreneurial leadership dimensions' levels and their work engagement dimensions' levels.

Table (13): Correlation between total nurse managers' level of entrepreneurial leadership and their total level of work engagement (n=98).

Items	Pearson Correlation coefficient	P-value
Total entrepreneurial leadership Total work engagement	r= 0.639**	**0.000****

Table (13) and figure (3): Illustrates that there was highly statistically significant positive correlation between total level of nurse managers' entrepreneurial leadership and their work engagement level.

Total Entrepreneurial Leadership

r Pearson Correlation
* Statistically significant at P≤0.05
** Highly statistically significant at P≤0.01

Figure (3):   Scatter plot correlation between total nurse managers' entrepreneurial leadership and their work engagement (n=98).

Table (14): Correlation between nurse managers' level of entrepreneurial leadership and their personal data (n=98).

Personal data items		Nurse managers' level of entrepreneurial leadership (N=98)						X²	P-Value
		High (n=48)		Moderate (n= 31)		Low (n= 19)			
		N	%	N	%	N	%		
Age	25<30	2	4.2	8	25.8	2	10.5	20.68	0.000**
	30<40	40	83.3	20	64.5	5	26.3		
	40<50	6	12.5	3	9.7	12	63.2		
Gender	Male	4	8.3	4	12.9	1	5.3	1.568	0.457
	Female	44	91.7	27	87.1	18	94.7		
Level of education in nursing	Technical nursing institute	10	20.8	10	32.3	5	26.3	18.99	0.001**
	Bachelor degree	35	73	21	67.7	14	73.7		
	High qualified post graduate studies	3	6.2	0	0	0	0		
Years of experience in nursing	1<10	10	20.8	1	3.2	5	26.3	14.49	0.001**
	10 ≤20	30	62.5	25	80.7	5	26.3		
	>20	8	16.6	5	16.1	9	47.4		
Hospital work unit	Nursing Administrative unit	2	4.2	1	3.2	-	-		
	Quality Unit	2	4.2	1	3.2	1	5.3		
	Infection Control Unit	2	4.2	1	3.2	1	5.3		
	Outpatients' Clinics	2	4.2	1	3.2	3	15.7		
	Emergency unit	2	4.2	-	-	1	5.3	0.214	0.898
	Medical Unit	2	4.2	5	16.1	1	5.3		
	Surgical Unit	8	16.6	1	3.2	1	5.3		
	operative Rooms	2	4.2	5	16.1	2	10.5		
	Intensive care Units	6	12.5	1	3.2	1	5.3		
	Cardiology Unit	2	4.2	5	16.1	1	5.3		
	Neurology Unit	6	12.5	1	3.2	1	5.3		
	Kidney Dialysis Unit	2	4.2	5	16.1	1	5.3		
	Obstetric Unit	4	8.3	1	3.2	1	5.3		
	Pediatric Unit	2	4.2	1	3.2	1	5.3		
	Ophthalmology Unit	2	4.2	1	3.2	1	5.3		
	GAMA NIFE Unit	2	4.2	1	3.2	2	10.5		

*Significant at p ‹ 0.05 **highly significant at p ‹ 0.01.

Table (14): shows that there was highly statistically significant correlation between nurse managers' level of entrepreneurial leadership and their personal data including age, education, and years of experience. While there was non-significant correlation with gender and hospital work unit.

Table (15): Correlation between nurse managers' level of work engagement and their personal data (n=98).

Personal data items		Nurse managers' level of work engagement (N=98)						X^2	P-Value
		High (n=55)		Moderate (n= 22)		Low (n= 21)			
		N	%	N	%	N	%		
Age	25<30	10	18.2	1	4.5	1	4.8		
	30<40	32	58.2	17	77.3	16	76.2	22.49	0.000**
	40<50	13	23.6	4	18.2	4	19.0		
Gender	Male	3	5.5	4	18.2	2	9.5	1.824	0.402
	Female	52	94.5	18	81.8	19	90.5		
Level of education in nursing	Technical nursing institute	1	1.8	3	13.6	21	100		
	Bachelor degree	34	61.8	19	86.4	0	0	8.532	0.014*
	High qualified post graduate studies.	20	36.4	0	0	0	0		
Years of experience in nursing	1<10	1	1.8	4	18.2	5	23.8		
	10 ≤20	50	90.9	10	45.5	10	47.6	13.250	0.010*
	>20	4	7.3	8	36.3	6	28.6		
Hospital Work unit	Nursing Administrative unit	5	9.1	2	9.1	1	4.7		
	Quality Unit	20	36.4	6	27.2	2	9.5		
	Infection Control Unit	11	20	1	4.5	2	9.5		
	Outpatients' Clinics	7	12.7	1	4.5	4	19.0		
	Emergency Unit	1	1.8	1	1.8	1	4.7		
	Medical Unit	1	1.8	1	1.8	1	4.7		
	Surgical Unit	1	1.8	1	1.8	1	4.7		
	Operative Rooms	1	1.8	1	1.8	1	4.7	4.618	0.099
	Intensive Care Units	1	1.8	1	1.8	1	4.7		
	Cardiology Unit	1	1.8	1	1.8	1	4.7		
	Neurology Unit	1	1.8	1	1.8	1	4.7		
	Kidney Dialysis Unit	1	1.8	1	1.8	1	4.7		
	Obstetric Unit	1	1.8	1	1.8	1	4.7		
	Pediatric Unit	1	1.8	1	1.8	1	4.7		
	Ophthalmology Unit	1	1.8	1	1.8	1	4.7		
	GAMA NIFE Unit	1	1.8	1	1.8	1	4.7		

*Significant at p ‹ 0.05 **highly significant at p ‹ 0.01.

Table (15): validates that there was highly statistically significant correlation between nurse managers' level of work engagement and their personal data including age, education, and years of experience. While there was non-significant correlation with gender and hospital work unit.

Discussion

The leadership of nurse managers and their work engagement is a fundamental indicator to evaluate the quality of health care ***Ree & Wiig, (2020)*** [24]. Entrepreneurial nursing leaders have to manage the strongest strengths of the organization that is staff nurses, so that they work more or more effectively, in the daily service to perform according to standards ***Wardan, Ghandour & Elghabbour,(2020)*** [29].

The finding of the present study identified that less than half (49%) of studied nurse managers had high total level of entrepreneurial leadership, with mean±SD (22.90±4.77). This means that, nurse managers believed that entrepreneurial leadership significantly contributes to their success in professional performance compared to other leadership styles. Also, they believed in the strengths of entrepreneurial leadership as the ability to recognize opportunities to improve quality of care. This was supported by ***Jakobsen, (2021)*** [26] in his study titled "Entrepreneurship and nurse entrepreneurs lead the way to the development of nurses' role and professional identity in clinical practice". He found that the majority (86%) of nurse managers could be characterized as entrepreneurs.

Entrepreneurial leadership has been divided into eight dimensions include: framing challenges, absorbing uncertainty, underwriting, building commitment, defining gravity, opportunity identification and exploitation, orientation towards learning, and creative collective self-efficacy ***Bagheri & Harrison, (2020)*** [4]. Regarding the first dimension, present study results identified that less than two fifths of studied nurse managers (39.8%) had high level of framing challenges dimension of entrepreneurial leadership. These results were consistent with the results of ***Cai Li, Makhdoom & Asim (2020)*** who studied Impact of entrepreneurial leadership on innovative work behavior in China and found that around two fifths (41%) of entrepreneurial leaders had high level of framing challenges dimension. From the researchers' opinion, this could be related to their ability to create a promising environment and encouraging culture in which all of staff nurses consider innovation as one of their priority tasks and show their persistence in the face of challenges inherited in nursing care process.

Undoubtedly, absorbing uncertainty using knowledge and talent is a key resource, and entrepreneurial leadership cannot function without it. Present study results described that more than two thirds of studied nurse managers (66.3%) had moderate level regarding absorbing uncertainty dimension of entrepreneurial leadership. These results were inconsistent with the results of ***Bagheri & Akbari, (2018)*** in their study titled "The impact of entrepreneurial leadership on nurses' innovation behavior", They found that less than three quarters (72.3%) of studied nurse managers had high level of absorbing uncertainty dimension of entrepreneurial leadership. Referring to underwriting dimension of entrepreneurial leadership, present study results demonstrated that less than two thirds of studied nurse managers (61.2%) had moderate level. These results were in the same line

with the results of ***Bagheri & Akbari, (2018)*** who found that more than half (95%) of studied nurse managers had moderate level of underwriting dimension of entrepreneurial leadership.

Additionally, present study results revealed that around two thirds (68.5% & 61.2%) of studied nurse managers had high level regarding building commitment and defining gravity dimensions of entrepreneurial leadership respectively. These results were supported by the results of ***Herron & Herron, (2018)*** who studied "Entrepreneurial nursing as a conceptual basis for in-hospital nursing practice models" and found that (69% & 70.2%) of studied nurse managers had high level regarding building commitment and defining gravity dimensions respectively. Furthermore, present study results explains that high percent (92.8% &74.5%) of studied nurse managers had high level regarding orientation towards learning creative collective self-efficacy dimensions of entrepreneurial leadership. These results were congruent with the results of ***Cai Li, Makhdoom & Asim (2020)*** who declared that (87.9% & 72.3%) of studied nurse managers had high level regarding orientation towards learning creative collective self-efficacy dimensions.

Work engagement as a positive, satisfying, work-related state of mind composed of three elements: vigor, dedication, and absorption ***Leal, Salomón & Rivera, (2021).*** Present study results demonstrates that more than half (56.1%) of studied nurse managers had high level of total work engagement, with mean± SD (24.22± 5.00). These results were supported by ***Neuber, et al., (2022)*** in their study titled " How work engagement relates to performance and absenteeism". They found that less than two thirds (64.8%) of studied cases had high level of total work engagement, with mean± SD (7.3± 1.2). But the study conducted by ***Ree & Wiig, (2020)*** about linking transformational leadership, patient safety culture and work engagement in home care services contrasted present results and found that less than fifth (16.3%) of studied nursing personnel had high work engagement level with mean± SD (3.8± 2.4). Also, present results were inconsistent with the findings of the study by ***Wang & Yang (2019)*** entitled "work engagement and innovative behavior among Chinese nurse managers". They declared that the majority (85%) of studied nurse managers self-reported a moderate level of total work engagement.

Work engagement is a widespread and enduring emotional state that includes such as high levels of energy and mental fortitude when working, the motivation to put effort into one's job, and tenacity even in the face of challenges ***Wang & Yang (2019)***. Present study results described that more than two fifths (41.8%) of studied nurse managers had high level of vigor dimension of work engagement, with mean± SD (25.52± 5.47). This result was consistent with the research conducted by ***Specchia et al., (2021)*** who studied leadership styles and nurses' job satisfaction. They found that around half of nurse managers had high level of vigor dimension of work engagement with mean± SD (11.2± 1.8).

Dedication dimension of work engagement is the commitment piece of nurses' engagement. Where nurses want to do more because you are enthused about the organization, its mission, and their ability to make a contribution to the team and larger goal.

Present study results identified that more than half (57.1%) had high level regarding dedication dimension of work engagement, with mean ± SD (24.57± 4.5). this was supported by *Schaufeli, (2021)* in a study titled "Engaging Leadership: How to Promote Work Engagement". He found that around half of studied nurse managers had high level of dedication dimension of work engagement, with mean ± SD (12.7± 3.2).

When nurses are fully engaged in their work, they are said to be engaged in it. Engagement, which is driven by intrinsic desire and innate interest in the activity, gives the job a higher gear of attention. Instead, than doing the task as quickly as feasible, the objective is to complete it as efficiently as possible. The current study's findings showed that over two thirds (68.5%) of nurse managers reported high levels of involvement in all aspects of their profession, with mean± SD (25.52± 5.47). *Schaufeli (2021)* contrasted present results and found that the majority (83.7%) of studied cases had high total level absorption dimension of work engagement, with mean± SD (12.7± 1.7).

Present study results validated that there were highly statistically significant positive correlations between nurse managers' entrepreneurial leadership dimensions' levels and their work engagement dimensions' levels. *Pinela , Guevara & Armijos ,(2022)* in their study titeled "Entrepreneurial Leadership, Work Engagement, and Innovative Work Behavior: The Moderating Role of Gender" supported present study results and found a significant positive relationship between entrepreneurial leadership and work engagement. This was also supported by the previous research carried out by *Cai et al. (2019)* in a study titled "Does Entrepreneurial Leadership Foster Creativity among Employees and Teams?". *Leal et al. (2021)*, in their study about impact of authentic leadership on work engagement and organizational citizenship behavior.

Our study revealed that, there was highly statistically significant relation between nurse managers' level of entrepreneurial leadership and their age, education, and years of experience. While there was non-significant relation between nurse managers' level of entrepreneurial leadership and their gender and hospital work unit.

This result was on the same line with *Mahdi & Faraj, (2022)* [32] who reported that there was no statistically significant relation between the studied nurse managers' entrepreneurial leadership level and their gender and working unit. Contrariwise, this study was in disagreement with *Elewa & El Banan, (2022)* [33] who mentioned that there was no statistically significant relation between the studied nurses' entrepreneurial leadership level and their age, educational level and years of experiences.

Conclusion

Less than half (49%) of nurse managers at Nasser Institute Hospital for Research and Treatment, affiliated to " Egyptian Ministry of Health" had high total level of entrepreneurial leadership, while less than one third (31.6%) had total moderate level and less than one fifth (19.4%) had total low level. Moreover, more than half (56.1%) of studied nurse managers had high level of total work engagement, and more than one fifth (22.4% & 21.5%) of them had moderate and low levels respectively. Additionally, there was highly statistically significant positive correlation between nurse managers' entrepreneurial leadership levels and dimensions and their work engagement levels and dimensions.

Recommendations

Based on the results of the present study, the following recommendation are suggested for:

Top management:

1- In order to increase the standard of nursing care, nurse managers must be pushed to show entrepreneurial leadership and foster a positive workplace culture.
2- In order to increase their capacity for work engagement, especially prior to promotion to a nursing post, nurse managers must further their understanding of entrepreneurial leadership through regular scientific meetings and conferences.
3- It is important to encourage nurse managers to take risks and be self-assured by creating an environment that fosters the flow of ideas and the explosion of energy that promotes organisational growth.
4- Consider and eliminate any organisational elements that prevent employees from becoming engaged in their job, which will foster a positive workplace climate.
5- It is necessary to provide nurse managers greater platforms to freely communicate their thoughts and opinions.

For education:

Teach entrepreneurial leadership work engagement in undergraduate courses.

For further researches on:

Relationship between practices of nurse managers' entrepreneurial leadership and their work engagement.

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الملخص العربى

القيادة الريادية هي أسلوب قيادة استراتيجي يمكن أن يساهم في تعزيز المشاركة في العمل و التي تؤثر إيجابيا على الأداء الوظيفي.

الهدف: هدفت الدراسة الحالية إلى تحديد مستوى القيادة الريادية بين مديري التمريض ، وتقييم مستوى المشاركة في العمل لديهم ، واستكشاف العلاقة بين القيادة الريادية لمديري الممرضات ومشاركتهم في العمل.

تصميم البحث: تم استخدام تصميم دراسة ارتباطية وصفية. المكان: أجريت الدراسة في مستشفى معهد ناصر للبحوث والعلاج التابعة لأمانة المراكز الطبية المتخصصة بوزارة الصحة. المواضيع: اشتملت الدراسة على جميع مديري التمريض (98) العاملين في المكان المذكور أعلاه.

أدوات جمع البيانات: تم جمع البيانات باستخدام مقياس القيادة الريادية ومقياس أوترخت للمشاركة في العمل.

النتائج: أقل من نصف مديري التمريض المشاركين في الدراسة (49٪) لديهم مستوى إجمالي عالٍ من القيادة الريادية ، بينما أقل من الثلث لديهم مستوى متوسط كليًا وأقل من الخمس لديهم مستوى إجمالي منخفض علاوة على ذلك ، كان أكثر من نصف مديري التمريض(56.1) ٪ لديهم مستوى عالٍ من المشاركة في العمل الكلي ، وأكثر من خمسهم(22.4)٪ لديهم مستويات متوسطة ومنخفضة على التوالي .

الخلاصة: كان هناك ارتباط إيجابي قوي بين القيادة الريادية لمديري التمريض والمشاركة في العمل في مستشفى معهد ناصر.

التوصيات: أوصت الدراسة بإنشاء تدريب على القيادة الريادية لتزويد مديري التمريض بالمهارات التي يحتاجونها لبناء منظمة إدارة تعاونية وتشاركية ، وبالتالي تعزيز مشاركتهم في العمل.