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The Relationship between Nurse Well-being and Artificial Intelligence

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Abstract

Background: Nowadays integrating artificial intelligence is the main importance of increase satisfaction and decrease work distress and burnout as well as physical and psychological wellbeing in healthcare while considering the ethical implications and impact on nurses' work. **Aim:** This study aimed to assess the relationship between nurse well-being and artificial intelligence**. Design:** A descriptive correlational research design was utilized in this study. **Setting:** The study was conducted in Dar El Shefa hospital. **Subject:** Consisted of a convenience sample (N=100) of nurses. **Data collection:** Two tools were used to collect data; **(1)** Wellbeing Index questionnaire**, (2)** Artificial Intelligence Assessment by using Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire. **Results:** Showed that about half of the studied nurse have a moderate level of total wellbeing, Additionally, about three-quarters of the studied nurse perceived a low level of artificial intelligence with a highly statistically significant positive strong correlation between total score of wellbeing and total score of artificial intelligence among the studied nurses. **Conclusion:** There was there was a highly statistically significant positive strong correlation between dimensions of wellbeing and dimensions of artificial intelligence among the studied nurses. **Recommendations:** This study recommended attend workshop for enhancing physical and psychological wellbeing and perform awareness sessions for using AI in nursing practice.

Keywords: Artificial intelligence, Nurse and Wellbeing.

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Introduction

The global world is focusing on the well-being of healthcare workers in the face of spending all their time outdoors and increasing occupational stress, and there is a growing interest in developing effective and easy-to-implement strategies that improve the well-being of healthcare workers. A range of interventions will be needed to support the well-being of healthcare workers, and in light of these pressures, responding to these challenges and improving the well-being of healthcare workers will require a multi-pronged approach, focused on the system, organizational levels and Individual actions ***(Townsley et al., 2023).***

Wellbeing is a multidimensional concept that encompasses an individual's physical, mental and emotional state of being. Wellbeing is not only defined by the absence of illness or disease, but rather by the presence of positive factors such as good physical health, positive relationships, a sense of fulfillment and meaning and the ability to cope with life's challenges ***(Schramme, 2023).*** It is essential to prioritize their wellbeing to ensure that they can continue to provide high-quality care to their patients.as maintain a healthy and productive workforce in the healthcare, improved patient outcomes ***(Halcomb et al., 2020).***

Nurses' wellbeing also improved nurse satisfaction and retention, increase productivity. When nurses are physically and mentally healthy, they can work efficiently, effectively managing their tasks and responsibilities ***(Pérez-Francisco et al., 2020).*** Additionally, enhance teamwork and collaboration by focusing on nurses' wellbeing fosters a positive work environment that promotes teamwork and collaboration ***(Kleib et al., 2021).*** when nurses feel supported and valued, they are more likely to collaborate effectively with their colleagues and provide better care to their patients and nurse can better cope with the demands of their work and adapt to changes in the healthcare industry ***(Søvold et al., 2021).***

The dimensions of nurses' wellbeing encompass various aspects of their physical, mental and emotional health, as well as their overall work environment. These dimensions are important for understanding and promoting the holistic wellbeing of nurses such as physical wellbeing which includes factors such as nurses' physical health, fitness and occupational safety. It encompasses aspects such as ergonomic work practices, access to proper equipment, the risk of work-related injuries and strategies for managing physical demands such as lifting patients and standing for extended periods ***(Xiao et al., 2022).***

AI refers to the development of computer systems that are capable of performing tasks that would typically require human intelligence. AI have essential benefits in healthcare as enhanced patient monitoring which including vital signs, to detect patterns and changes in health status, enabling early intervention and personalized care. Also**,** predictive analytics: predicting patient outcomes, identify at-risk individuals and assist in making informed decisions about treatment plans and interventions ***(Alowais et al., 2023).***

There are several types of AI that can be utilized in nursing care to enhance patient outcomes and streamline healthcare processes example machine learning is an application of AI that provides systems the ability to learn and improve from experience without being explicitly programmed. In nursing, machine learning can be utilized for predicting patient readmissions, assessing the risk of infections, and determining potential

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health complications based on patient data. Machine learning algorithms can analyze vast amounts of patient information, including medical history, laboratory results, and vital signs, to provide nurses with predictive analytics for personalized care and health management ***(Clancy, 2020).***

Significance of the study:

It was observed in the study setting the nurses in needed to identify using types of AI and haw it effect on their wellbeing. Today many of hospital using driven innovations in health care, such as artificial intelligence which transforming health care by risk prediction and intervention, population health management, medical advice and triage, remote patient monitoring, chart review and documentation, diagnostics, clinical decision making and practice management as automate repetitive clerical tasks ***(Kueper, 2022).***

In the study of artificial intelligence as an innovative approach for investment in the future of health care in Egypt in three hospitals to assess perception of managers and patients about AI application in the healthcare domain in Egypt find that all managers either nurses or medical had lack of knowledge regarding the application of AI in medicine while patients agree to apply AI in health care. According to report on healthcare system leaders, about 46% say AI is currently in use for clinical decision support and 42% have or are planning to add AI for disease management ***(Taie, 2020).***

Based on the results of previous studies carried out to assess the relationship between nurse wellbeing and artificial intelligence. The Global Wellbeing Index analyzing perception of prosperity in different countries. The research shows 67% of people worldwide believe the rising cost of living is affecting their well-being; however, 63% expect to improve their well-being in the next three years ***(Santander, 2023).*** Therefore, this study aimed to assess relationship between nurse wellbeing and artificial intelligence among nursing personnel**.**

Aim of study:

This study aimed to assess relationship between nurse well-being and artificial intelligence among nursing personnel.

Research question:

- Is there relation between nurse well-being and artificial intelligence.

Subject and Methods

Research design:

A descriptive correlational research design was utilized in this study.

Study Setting:

The study was conducted in Dar El Shefa hospital which is affiliated to specialized medical centers secretariat. The hospital capacity is 151 beds and data were collected from (ICU, ER, obstetrics departments, medical department, Orthopedic departments and General surgery department).

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Study Subject

The total study sample was N=100 from total (N=327) nurses working in the detected hospital for more than one year.

Type of sample

Convenient sample was used to select the study subject.

Tools for data collection:

Two tools were used for data collection as the following:

Tool (1) Well-being index questionnaire: The Well-Being index includes physical wellbeing and psychological wellbeing. Physical wellbeing adapted from ***(Randall, 2021)*** and psychological wellbeing adapted from ***(Dyrbye et al., 2018)*** and ***(Demo et al., 2016)*** and it consisted of two parts as the following:

Part 1: Personal characteristics of the studied nurses:

This part included personal characteristics of nurses (age, gender, marital status, level of education, years of experience, income and years of using technology…etc).

Part 2: **Well-being Index Questionnaire:** This part used to assess the wellbeing of the nurse in workplace. It included 45 items on two dimensions as; first dimension is physical wellbeing (17 items) and second dimension is psychological wellbeing consists of (28) items. Used 3 Likert scale in answered each item, for positive items ranged from 1 disagree, 2 for neutral and 3 for agree and negative items (reversed items) ranged from 1 for agree, 2 for neutral and 3 for disagree.

Total scoring system classified into:

- Low level: if the total score was less than 50%, it means less than 68 points.
- Moderate level: if the total score was equal or more 50 to less than 70 %, it means less than ≥ 68 < 95.
- High level: if the total score was equal or more 70 %, it means equal or more than 95.

Tool (2): Artificial intelligence Assessment by using Unified Theory of Acceptance and Use of Technology (UTAUT) questionnaire: This questionnaire was adapted from ***(Venkatesh et al., 2003).*** To assess perception of nurse personnel about artificial intelligence, it consists of (24) of seven dimensions. Used 3 Likert scale in answered each item, for positive items ranged from 1 disagree, 2 for neutral and 3 for agree.

Scoring system:

Total scoring system classified into:

- Low level: if the total score was less than 60%, it means less than 44 points.
- Moderate level: if the total score was equal or more 60 to less than 75%, it means less than ≥ 44< 54.

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- High level: if the total score was equal to or more 75%, it means equal or more than 54.

Validity of the tools

Validity by jury (content validity): researcher presented questionnaire in its initial form to (5) experts of academic nursing administration professors and assistant professors in nursing administration department faculty of nursing from different universities (Ain shams university – Damanhur university – Cairo university _ Banha university (2 assistant professor)) through an opinionative sheet to measure validity of the tools and the necessary modifications were done accordingly.

Reliability:

Cronbachs alpha is commonly used as a measure of the internal consistency (reliability). The coefficients normally range between 0 and 1. The closer it is to 1.0, the greater internal consistency of the items in the scale. Indicated that wellbeing index questionnaire total **0,928** in which artificial intelligence questionnaire total **0.888.**

Ethical considerations:

The research approval was obtained from the scientific research ethical committee in faculty of nursing, Helwan University, in addition to an approval was obtained from the nursing director of Dr El Shifa hospital. Participation in the study is voluntary and subjects were given provide full information about the study to assess the relationship between nurse wellbeing and artificial intelligence. They were assured that anonymity and confidentiality of their information would be guaranteed and were informed about their role before signing the informed consent. The ethical considerations included explaining the purpose and the nature of the study, stating the possibility to withdraw at any time, confidentiality of the information where it won't be accessed by any other party without taking permission of the participants. Ethics, values, culture and beliefs were respected.

Pilot study

The pilot study was carried out on (10%) of the total sample size equal (10) nurses to test applicability and clarity of tools and time needed to complete it. Total time needed to complete the tools was ranged between (15-20) minutes. No modifications were done so participants in the pilot study were included in the study sample.

Field work:

Data collected within 2 months started at the beginning of September 2023 and completed by the end of October 2023. After obtaining all official permissions the researcher met nursing director to explain the aim of the study to gain the approval of data collection, the researcher determined the suitable time to collect the data and confirmed the days and times. Before data collection, the researcher introduced herself to the nurses, explained aim of the study and informed them their information will be treated confidentially, so, the researcher used codes in the questionnaire sheets because of their worry about their answers. Then, the investigator obtained a verbal consent to participate in the study.

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The researcher assessed the relationship between nurse wellbeing and artificial intelligence using the study tools (WBI) Questionnaire & (UTAUT**)** questionnaire), The researcher visited the setting 2 days per week for 3-4 hours /day in the morning and afternoon shifts to collect the data.

Statistical design:

Data entry and analysis were performed using SPSS statistical package version 26. Categorical variables were expressed as number and percentage while continuous variables were expressed as (mean ±SD). Chi-Square (x2) in one sample used to compare differences between levels of wellbeing and levels of artificial intelligence among the studied nurses. Crosstab Chi-Square (x2) was used to test the association between row and column variable of qualitative data

For all tests, a two-tailed p-value ≤ 0.05 was considered statistically significant, P-value ≤ 0.01 was considered highly statistically significant. While p-value> 0.05 was considered not significant.

Results.

Table (1): Frequency distribution of the studied nurses' personal characteristics (n= 100)

Items		No	%
Age (year)	▪ 20 < 25 Yrs.	26	26.0
	▪ 25 < 30 Yrs.	49	**49.0**
	▪ 30 < 35 Yrs.	13	13.0
	▪ ≥ 35 Yrs.	12	12.0
	▪ **Mean ± SD**	**27.83 ± 5.14**	
Gender	▪ Male	54	**54.0**
	▪ Female	46	46.0
	▪ Male to female ratio	**1.1:1**	
Marital status	▪ Single	39	39.0
	▪ Married	59	**59.0**
	▪ Widow	2	2.0
Level of education	▪ Diploma nursing degree	13	13.0
	▪ Technical institute of nursing	61	**61.0**
	▪ Bachelor nursing degree	24	24.0
	▪ Master	2	2.0
	▪ Doctorate	0	0.0
Years of experience	▪ 1 < 5 Yrs.	37	37.0
	▪ 5 < 10 Yrs.	41	**41.0**
	▪ ≥ 10 Yrs.	22	22.0
	▪ **Mean ± SD**	**7.31 ± 3.90**	
Wages	▪ 3000 < 4000 pound.	22	22.0
	▪ 4000 < 5000 pound.	39	**39.0**
	▪ 5000 < 6000 pound.	27	27.0
	▪ ≥ 6000 pound.	12	12.0
	▪ **Mean ± SD**	**4900 ± 1180**	

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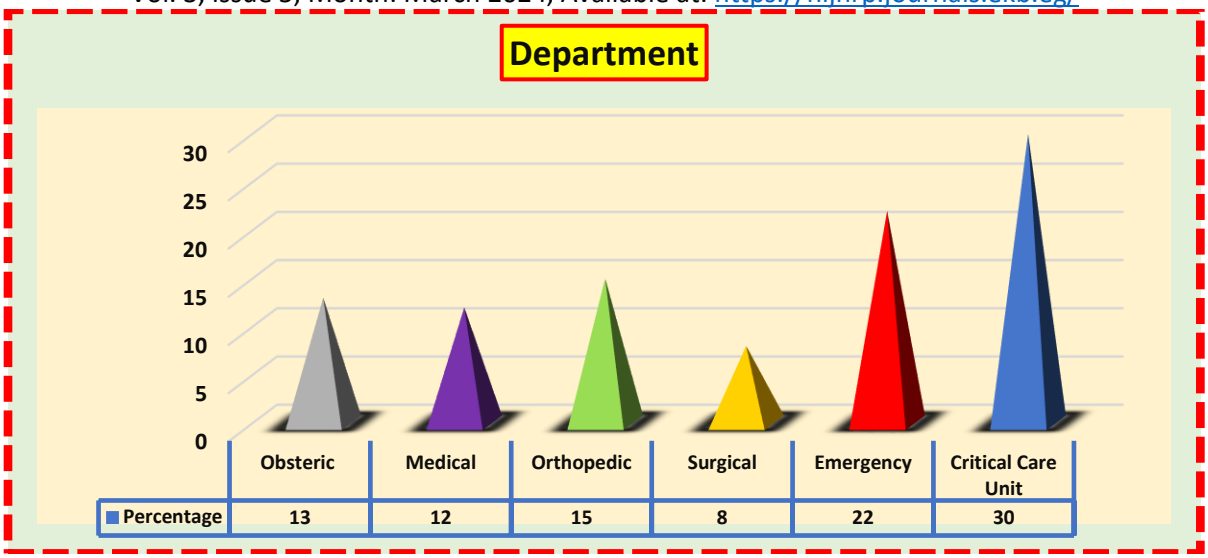
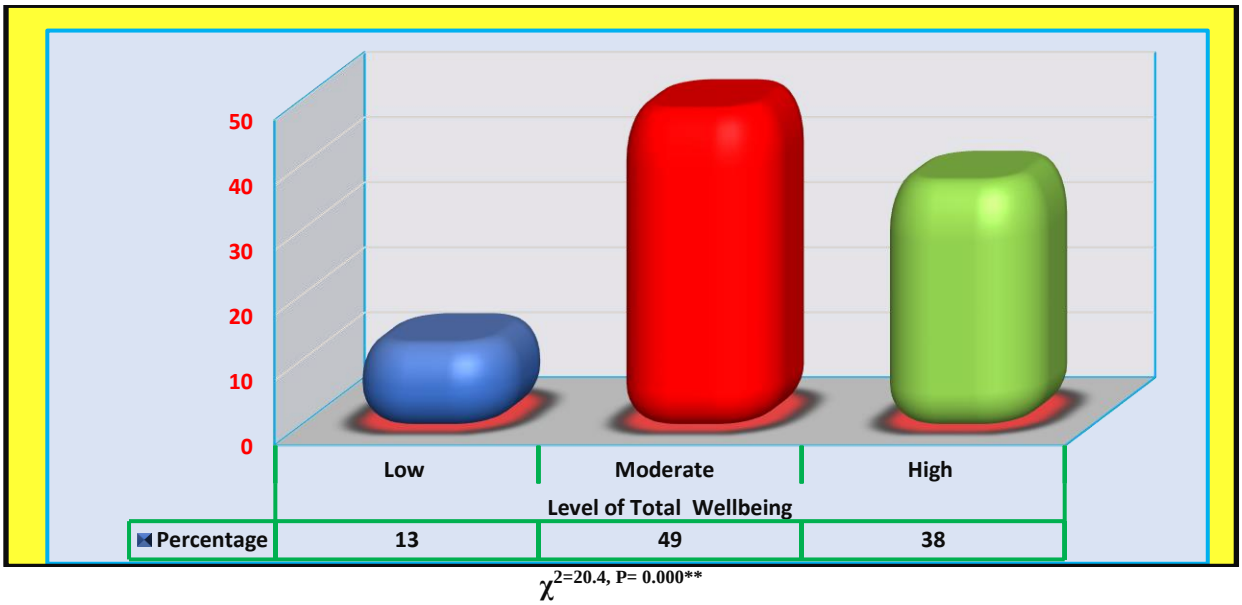


Figure (1): Frequency distribution of working department of the studied nurses (n= 100).

Table (2): Frequency distribution of the studied nurses' who attaining knowledge and training course regarding AI (n= 100)

Items		No	%
Period of using artificial intelligence and technology in nursing	▪ 1 < 3 Yrs.	52	**52.0**
	▪ 3 < 5 Yrs.	25	25.0
	▪ 5 < 10 Yrs.	15	15.0
	▪ ≥ 10 Yrs.	8	8.0
	▪ **Mean ± SD**	**4.27 ± 3.72**	
knowledge about artificial intelligence	▪ Yes	59	**59.0**
	▪ No	41	41.0
Training course in artificial intelligence	▪ Yes	3	3.0
	▪ No	97	**97.0**



χ^{2}=20.4, P= 0.000**

Figure (2): Frequency distribution of total wellbeing level of the studied nurses (n= 100)

Table (3): Total mean score of dimensions of wellbeing level of the studied nurses (n= 100)

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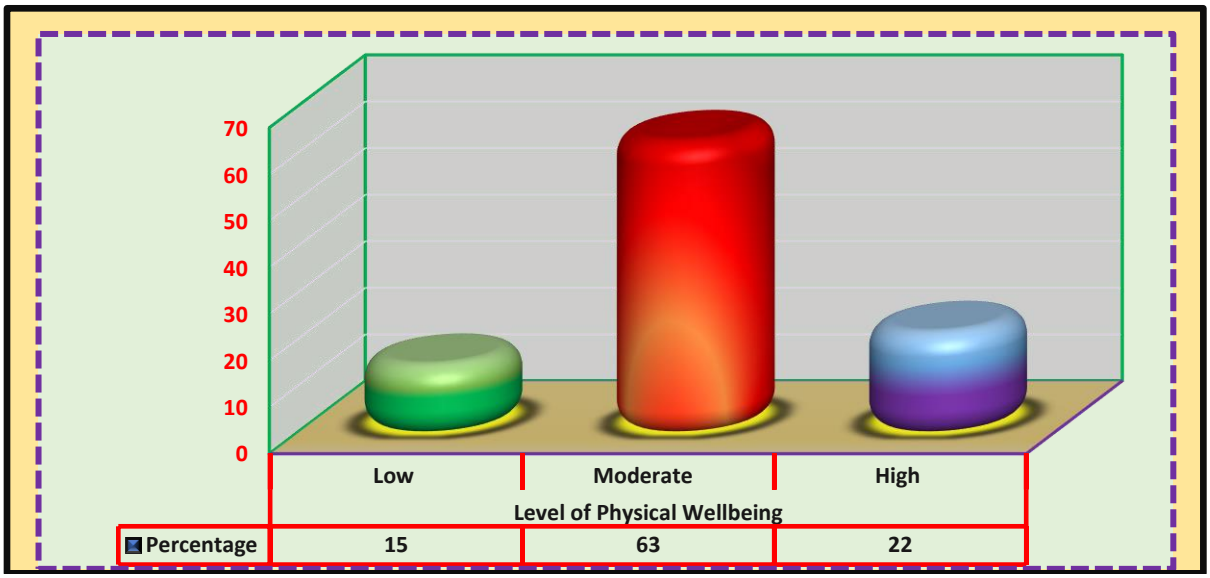
Variable		No	%	Min	Max	x^2	SD	Weight x^2	Rank	F Test	P-value
Physical wellbeing	Low	15	15.0	17	25	18.0	2.6	1.83 ± 0.39			
	Moderate	63	63.0	26	35	31.5	2.5				
	High	22	22.0	36	45	38.6	2.4				
	Total	**100**	**100.0**	**17**	**45**	**31.0**	**6.7**		**2**	**284**	**0.000****
Psychological wellbeing	Low	13	13.0	28	28	28.0	0.00	1.97 ± 0.42			
	Moderate	39	39.0	46	58	54.0	3.0				
	High	48	48.0	59	70	63.4	3.3				
	Total	**100**	**100.0**	**28**	**70**	**55.1**	**11.8**		**1**	**713**	**0.000****
Total	Low	13	13.0	45.0	45	45.0	0.00	**1.92 ± 0.38**			
	Moderate	49	49.0	70.0	93	85.3	5.8				
	High	38	38.0	95.0	115	101	5.5				
	Total	**100**	**100.0**	**45.0**	**115**	**86**	**18.4**		**-**	**540**	**0.000****

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01 F: ANOVA Test



$\chi^{2=40.34, P= 0.000**}$

Figure (3): Frequency distribution of physical wellbeing of the studied nurses (n= 100)

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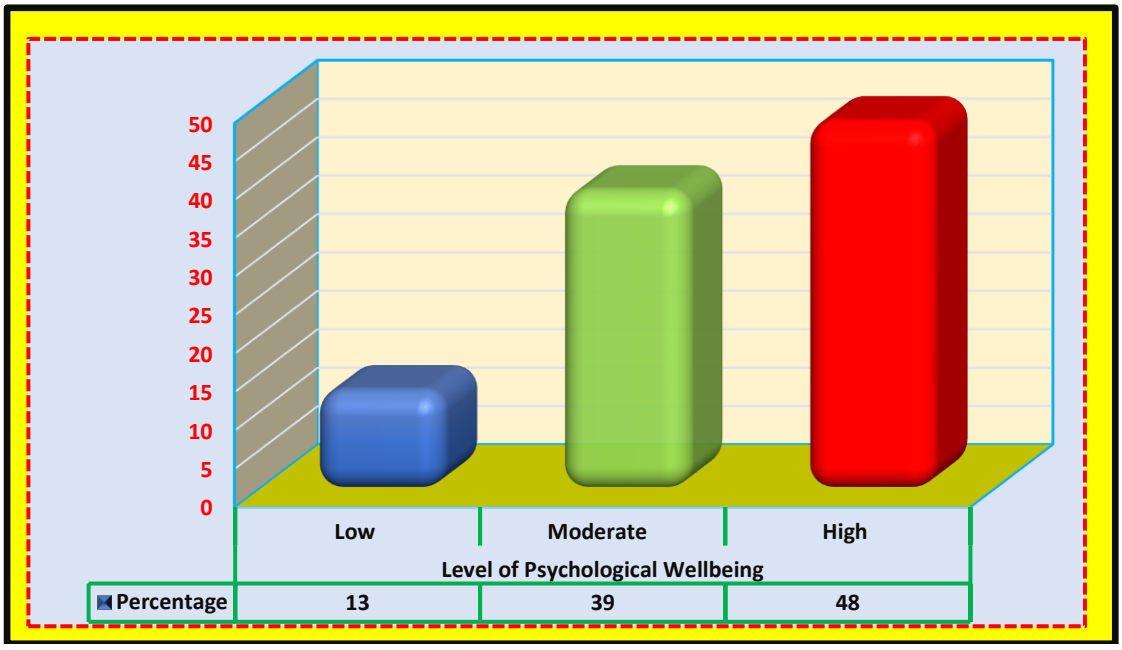
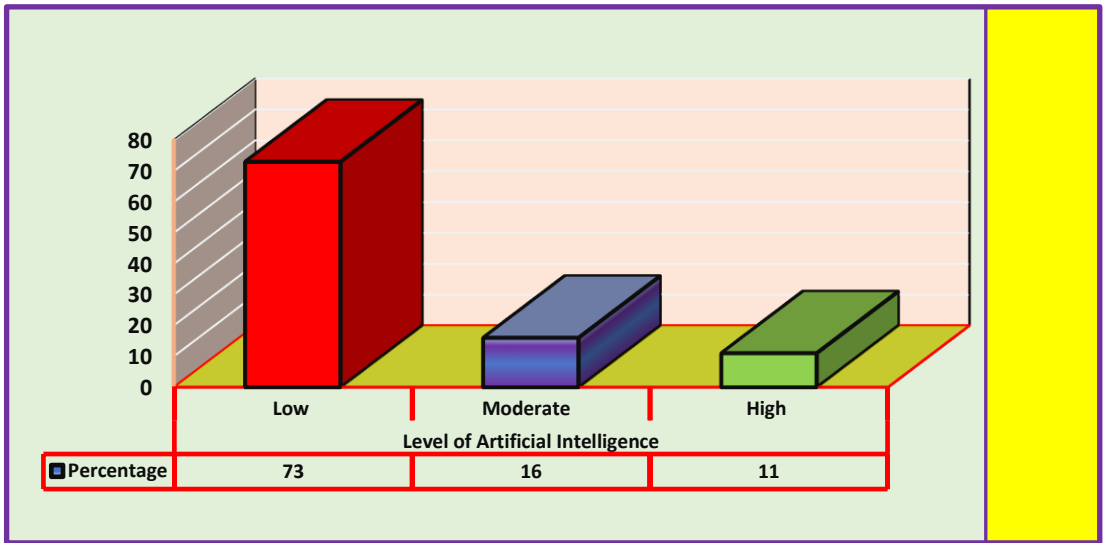


χ^{2}=19.8, P= 0.000**

Figure (4): Frequency distribution of psychological wellbeing of the studied nurses (n= 100)



χ^{2}=71.7, P= 0.000**

Figure (5): Frequency distribution of total artificial intelligence as perceived by the studied nurses (n= 100)

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Table (4): Total mean score of dimensions level of artificial intelligence assessment among the studied nurses (n= 100)

Variable		No	%	Min	Max	X^2	SD	Weight X^2	Rank	F Test	P value
Performance expectancy	Low	76	76.0	4	7	4.36	0.76	1.37 ± 0.55			
	Moderate	12	12.0	8	8	8.00	0.00				
	High	12	12.0	9	12	10.1	1.19				
	Total	**100**	**100.0**	**4**	**12**	**5.49**	**2.23**		**7**	**357**	**0.000****
Effort expectancy	Low	72	72.0	4	7	5.0	1.08	1.52 ± 0.51			
	Moderate	14	14.0	8	8	8.0	0.00				
	High	14	14.0	9	12	9.71	099				
	Total	**100**	**100.0**	**4**	**12**	**6.08**	**2.05**		**4**	**160**	**0.000****
Social Influence	Low	63	63.0	3	5	3.78	0.77	1.63 ± 0.57			
	Moderate	20	20.0	6	6	6.00	0.00				
	High	17	17.0	7	9	7.82	0.72				
	Total	100	100.0	**3**	**9**	**4.91**	**1.72**		**2**	**266**	**0.000****
Facilitating factor	Low	75	75.0	4	7	5.97	0.95	1.66 ± 0.37			
	Moderate	14	14.0	8	8	8.0	0.00				
	High	11	11.0	9	11	9.45	0.68				
	Total	100	100.0	**4**	**11**	**6.64**	**1.48**		**1**	**97.6**	**0.000****
Behavioral intention	Low	76	76.0	3	5	3.46	0.72	1.40 ± 0.50			
	Moderate	16	16.0	6	6	6.00	0.00				
	High	8	8.0	7	9	7.63	0.74				
	Total	100	100.0	**3**	**9**	**4.20**	**1.52**		**6**	**212**	**0.000****
Behavioral expectations	Low	73	73.0	3	5	3.62	0.86	1.46 ± 0.51			
	Moderate	18	18.0	6	6	6.0	0.00				
	High	9	9.0	7	9	7.56	0.72				
	Total	100	100.0	**3**	**9**	**4.40**	**1.55**		**5**	**152**	**0.000****
Voluntary use	Low	65	65.0	3	5	3.91	0.82	**1.62 ± 0.51**			
	Moderate	17	17.0	6	6	6.0	0.00				
	High	18	18.0	7	8	7.28	0.46				
	Total	**100**	**100.0**	**3**	**8**	**4.87**	**1.53**		**3**	**191**	**0.000****

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01 F: ANOVA Test

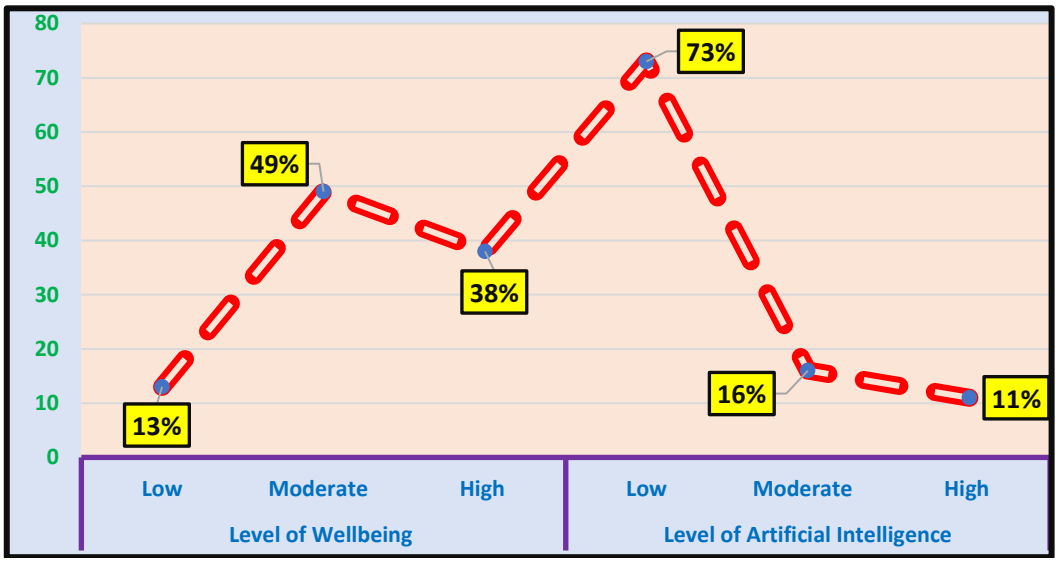

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Figure (6): Frequency distribution of total wellbeing level and AI level as perceived by the studied nurses (n= 100)

Table (5): Correlation between total dimensions of AI level and wellbeing level of the studied nurses (n= 100)

Items		Physical wellbeing	Psychological wellbeing
▪ Performance expectancy	R	0.711	0.607
	P	0.000**	0.000**
▪ Effort expectancy	R	0.836	0.748
	P	0.000**	0.000**
▪ Social Influence	R	0.859	0.773
	P	0.000**	0.000**
▪ Facilitating conditions factor	R	0.918	0.852
	P	0.000**	0.000**
▪ Behavioral intention	R	0.761	0.661
	P	0.000**	0.000**
▪ Behavioral expectations	R	0.796	0.706
	P	0.000**	0.000**
▪ voluntary use	R	0.881	0.805
	P	0.000**	0.000**

*Significant p ≤ 0.05 **Highly significant p ≤ 0.01

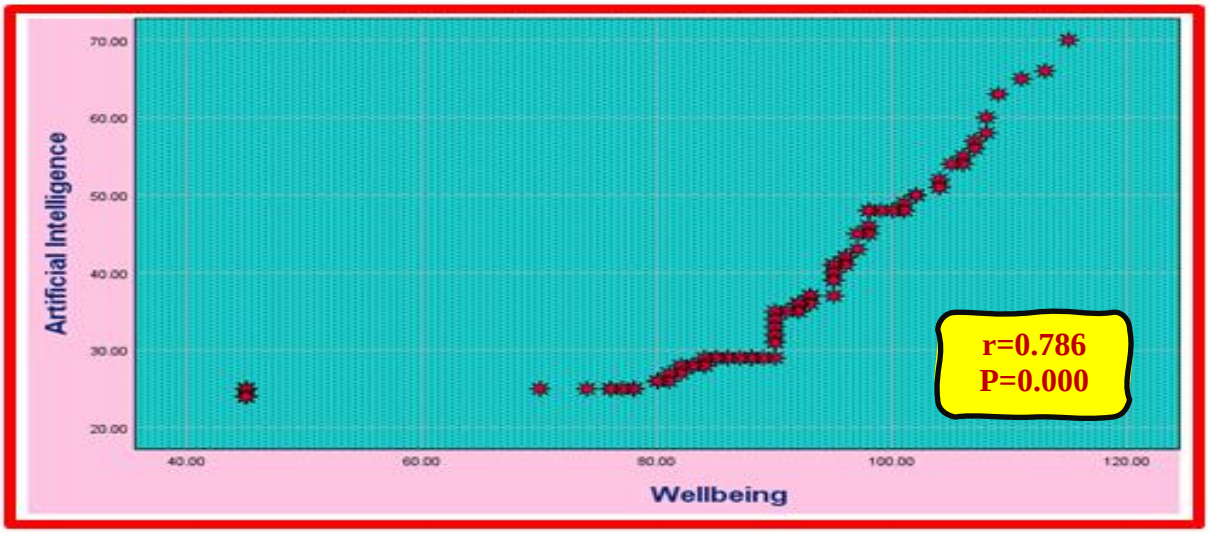

Figure (7): Linear regression between total score of wellbeing and AI as perceived by the studied nurses (n= 100).

Table (1) shows that about half **(49%)** of the age of the studied nurses was ranged from 25 < 30 years old, with a mean age of **27.83 ± 5.14**. Additionally, more than half **(54% &59%)** of them were a male with a male to female ratio is 1.1:1 and were married respectively. Considering, level of education, about two thirds **(61%)** of studied nurse were holding a certificate of technical institute of nursing.

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Figure (1) illustrates that the largest percentage 30% of the studied nurses working on critical care unit and the lowest percentage 8% of the studied nurses working on surgical department respectively.

Table (2) shows that more than half **(52% & 59%)** of the studied nurses were using artificial intelligence and technology in nursing from a period ranged from 1 < 3 years, with a total mean of **4.27 ± 3.72** and were had knowledge about artificial intelligence respectively**.** Additionally, the majority **(97%)** of them weren't attending training course in artificial intelligence.

Figure (2) illustrates that about half **(49%)** of the studied nurse have a moderate level of total wellbeing, followed by about two fifth **(38%)** have a high level. While the minority **(13%)** of them have a low level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000**.

Table (3): represents that the total main score of wellbeing dimensions about half of studied nurses 49% had moderate wellbeing while about two fifth of studied nurses 38% had high level of wellbeing. Additionally, 13% had low level of wellbeing. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000**.

Figure (3) illustrates that about two-thirds **(63%)** of the studied nurse have a moderate level of physical wellbeing, followed by about fifth **(22%)** have a high level. While the minority **(15%)** of them have a low. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000**.

Figure (4) illustrates that about half **(48%)** of the studied nurse have a high level of psychological wellbeing, followed by **(39%)** have a moderate level. While the minority **(13%)** of them have a low level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000**.

Figure (5) illustrates that about three-quarters **(73%)** of the studied nurse perceived a low level of artificial intelligence, followed by **(16%)** have a moderate level. While the minority **(11%)** of them have a high level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000**.

Table (4): represents the same results of more than three quarters **(76%)** of studied nurses had low level of perception about dimensions of **behavioral intention and performance expectancy** while performance expectancy has the lowest weight mean=1.37± 0.55. The dimension of **facilitating condition factor** was ranked as the first and gained higher weight mean=1.66 ± 0.37 and presence of a highly statistically significant differences between all dimensions, at P = 0.000**.

Figure (6) illustrates that about half **(49%)** of the studied nurse have a moderate level of total wellbeing while the minority **(13%)** of them have a low level. Additionally, it describes that about three-quarters **(73%)** of the studied nurse perceived a low level of artificial intelligence while **(11%)** perceived a high level of artificial intelligence.

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Table (5): represents that there was a highly statistically significant positive strong correlation between dimensions of AI level and wellbeing level of the studied nurses, at r ranged from 0. 607 to 0.918 & P = 0.000**.

Figure (7): illustrates that there was a highly statistically significant positive strong correlation between total score of AI level as perceived by the studied nurses and total score of wellbeing level, at r = 0.786 & P = 0.000**.

Discussion

The relationship between nurse wellbeing and AI is a complex and evolving one. On one hand, AI has the potential to positively impact nursing practice and improve patient care, which could contribute to nurse satisfaction. On the other hand, there are concerns and challenges associated with the integration of AI in healthcare that may affect nurse wellbeing ***(Vasquez et al., 2023).***

As regarding to studied nurses' personal characteristics data, the current study results were showed that, about half of the age of the studied nurses was ranged from 25 < 30 years old, with a mean age of 27.83 ± 5.14. Additionally, more than half of them were a male with a male to female ratio is 1.1:1. Level of education, about two thirds of studied nurse were holding a certificate of technical institute of nursing**.**

Regarding the working department among the studied nurses**,** the current study results stated that, near to one third of them of them working on critical care unit, while, the minority of them working on surgical department. This might be related to working on critical care unit allow the opportunity to take a sufficient income than another department. The present study findings were in the same line with the study by ***(Taylor, 2021)*** who conducted the study in USA, entitled of "the relationship between nurse wellbeing and artificial intelligence: a quantitative correlational study". Further, who reported that, less than half of the participants were working on critical care unit.

Regarding the attaining knowledge and training course regarding artificial intelligence of the studied nurses, the present study findings were stated that, more than half of them had knowledge about artificial intelligence, while, the majority of them weren't attending training course in artificial intelligence. From the researcher point of view, the current study findings could be related to employee has knowledge from social media and unavailable AI using in the hospital just only a simple type of electronic health record. Additionally, nurses may not perceive AI as directly relevant to their current roles or may not understand how it can enhance their practice. This perception might discourage them from seeking out training opportunities in AI. In addition, Nurses often have demanding work schedules, and taking time away for training may not be feasible. If AI

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training courses require significant time commitments, nurses may be reluctant to participate due to their busy work schedules.

The current study findings were matched with the study by ***(Hussein et al., 2023)*** who conducted the study in Egypt and studied "The Effect of Educational Program on Nurses' Knowledge and Attitude Regarding Artificial Intelligence". Also, who reported that, more than two third of the nurses had a satisfied knowledge level about artificial intelligence and positive attitude post educational Program, while, near to three quarter of them had a satisfied knowledge level about artificial intelligence from internet and more than three quarter of them not attend any training about artificial intelligence pre-educational Program.

Regarding wellbeing of the studied nurses, the present study findings were reported that, about half of them had a moderate level of total wellbeing with total mean score 86 ± 18.4, followed by about two fifth had a high level. While the minority of them had a low level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000. From the researcher point of view, the present study results might be due to more than half of the studied nurses working in critical unites and emergency unite which indicated that nurses often experience high levels of stress due to heavy workloads, long hours, and demanding job responsibilities. The distribution of wellbeing scores could be influenced by these factors.

The current study results were consistent with the study by ***(Sampaio et al., 2022)*** who conducted the study in Switzerland, entitled of "Workplace Wellbeing and Quality of Life Perceived by Portuguese Nurses during the COVID-19 Pandemic: The Role of Protective Factors and Stressors", further, who indicated that, more than half of the study sample of Portuguese nurses during the COVID-19 pandemic had a moderate perceived level of total wellbeing.

The current study results were displayed that, about two third of the studied nurses had moderate physical wellbeing. While psychological wellbeing about half of studied nurses and had high psychological wellbeing. This could be related to nurses often face demanding work schedules, long hours, and high levels of responsibility as more than half of studied nurses working in critical and emergency unites. These factors can contribute to physical and psychological stress, affecting overall wellbeing. In addition, nurses differences in coping strategies and resilience can also contribute to variations in wellbeing among nurses.

As regarding physical wellbeing of the studied nurses, the present study results indicated that, about two-thirds of the studied nurse had a moderate level of physical wellbeing, followed by about fifth had a high level. While the minority of them had a low level. This could be due to more than half of the studied nurses were male and about two third of them aged below thirty years which impact on their regular physical activity and wellbeing. The present study results were in consistent with the study by **(*Hung et al., 2023)*** who conducted the study in Taiwan who studied "Examining Physical Wellness as the Fundamental Element for Achieving Holistic Well-Being in Older Persons: Review of Literature and Practical Application in Daily Life". Also, who stated

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that, the majority of the studied sample had a moderate level of physical wellbeing and physical wellness in daily life.

Regarding level of psychological wellbeing of the studied nurses, the current study results were reported that, about half of the studied nurse had a high level of psychological wellbeing, followed by near to two fifth of them had a moderate level. While the minority of them had a low level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000. From the researcher point of view, the present study findings might be related to studied nurses hadn't sense of endurance to cope with many stressors in their life. Feeling of overwhelming with responsibilities during working shifts and inability to solve problems effectively and take appropriate decisions due to decrease knowledge and experience as about three quarter of them were diploma and technical institute in nursing education that lead to increase pressure and strain of them. So, inability of them to feel of wellbeing.

The current study findings were consisted with the study by ***(Yeşi- Ltepe et al., 2022)*** who conducted the study in Turkey, entitled of 'Investigation of the effect of the life satisfaction and psychological well-being of nursing students on their happiness levels'. Also, who investigated that, nursing students have high levels of psychological well- being. On the other hand, the present results were in disagreement with the study by **(*Elbarbary et al., 2023)*** who conducted the study in Egypt, entitled of "Academic Burnout, Resilience and Their Relations with Psychological Wellbeing of Baccalaureate Nursing Students", and who revealed that, more than half of the nursing students had low level of psychological well-being, followed by more than one fifth of them had a high level. While the minority of them had a moderate level. In addition to the presence of a highly statistically significant difference between low, a moderate and high level, at P = 0.000.

Regarding artificial intelligence of the studied nurses, the present study results were reported that, about three-quarters of the studied nurse perceived a low level of total artificial intelligence. From the researcher point of view, The present study findings might be related to the majority of the studied nurses had no training course in artificial intelligence. The current study findings were consistent with the study by **(*Castagno & Khalifa, 2020)*** who conducted the study in UK, who studied "Perceptions of Artificial Intelligence Among Healthcare Staff: A Qualitative Survey Study", also, who reported that, the majority of respondents had never encountered AI applications in the workplace and were unaware of the differences between machine learning and deep learning. They confirmed that AI to be successfully incorporated into clinical practice, the support of healthcare professionals is essential.

On the other hand, the present study results were in the opposites line with the study by **(*Mohamed et al., 2023)*** who conducted the study in Egypt, entitled of "Artificial Intelligence Technology and its Relation to Staff Nurses' Professional Identity and Problem-Solving Abilities", also, who showed that, about two-thirds of staff nurses had high perception level toward artificial intelligence technology.

As regarding expectancy about artificial intelligence of the studied nurses, the current study results were confirmed that, more than three quarters of studied nurses had low level of perception about performance

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expectancy and behavioral intention followed by three quarters of them had low level of perception about facilitating condition factor. In addition to, presence of a highly statistically significant difference between low and high levels, at P = 0.000. From the researcher point of view, the current study results were due to healthcare professionals, including nurses, may resist adopting new technologies due to concerns about job security, changes in workflow, or fear of the unknown.

The present study findings were in the same line with **(*Su & Chao, 2022)*** who conducted the study in Taiwan, entitled "Investigating Factors Influencing Nurses' Behavioral Intention to Use Mobile Learning: Using a Modified Unified Theory of Acceptance and Use of Technology Model", and who demonstrated that, the majority of nurses had a negative perception about performance expectancy and behavioral intention with a highly statistically significant difference. On the other hand, the present study results were in correspondent with **(*Lambert et al., 2023)*** who conducted the study in Germany, entitled "An integrative review on the acceptance of artificial intelligence among healthcare professionals in hospitals", and who demonstrated that, more than two third of healthcare professionals in hospitals had a high acceptance level of artificial intelligence.

The current study results were revealed that, there was a highly statistically significant positive strong correlation between dimensions of wellbeing and dimensions of artificial intelligence among the studied nurses, at P = 0.000. From the researcher point of view, the present study results might be due to sufficient knowledge level among the studied nurses about artificial intelligence that reflect on their job satisfaction and well-being.

The present study results matched with the study by ***(Mohammed, 2023)*** who conducted the study in Saudi Arabia, entitled of "Acceptance of Artificial Intelligence Application in the Post-COVID Era and Its Impact on Faculty Members' Occupational Well-being and Teaching Self Efficacy", also, who showed that, there was a positive statistically significant correlation between Physical wellbeing, psychological wellbeing, and occupational well-being and acceptance of artificial intelligence application among the Faculty Members.

The current study results were showed that, there was a highly statistically significant positive strong correlation between total score of wellbeing and total score of artificial intelligence among the studied nurses, at P = 0.000. From the researcher point of view, the present study results might be due to more than half of the studied nurses had a knowledge about artificial intelligence which impact positive on job satisfaction and efficiency, contributing to higher levels of nurses wellbeing. Also, The organizational culture and leadership support for the integration of artificial intelligence into nursing practices can significantly influence nurses' perceptions and, subsequently, their wellbeing.

The present study findings were in harmony with the study by **(*Nevill et al., 2022)*** who conducted the study in Australia, entitled of "The impact of an educational video about the role of an emergency nurse, viewed by emergency nurses' support systems, on emergency nurses' wellbeing", also, who reported that, there was a statistically significant correlation between educational video, emergency nurses' support systems, and emergency nurses' wellbeing. The results of the current study answered the research question about the relation between nurse wellbeing and artificial intelligence. Also, the present study results accomplish the study aim to

assess relationship between nurse wellbeing and artificial intelligence and find out the relationship between nurse wellbeing and artificial intelligence research question.

Limitations of the study:

- Approval time is too long.
- There were little nurses with bachelor degree and the rest of them graduated from technical institute.
- The nursing personnel were very busy during the entire shift at the time of data collection.
- All most nurses in surgical department refused to participate in data collection.

Conclusion

On the light of the findings of the current study, it can be concluded that: About half of the studied nurse have a moderate level of total wellbeing, Additionally, about three-quarters of the studied nurse perceived a low level of artificial intelligence. Additionally, there was a highly statistically significant positive strong correlation between total score of wellbeing and total score of artificial intelligence of the studied nurses.

Recommendations

Based on the previous findings the following recommendations suggested that:

- Provide resources for improvement of physical wellbeing.
- Maintain healthy work environment for improving employee psychological wellbeing.
- Attend workshop for enhancing physical and psychological wellbeing.
- Perform awareness sessions for using AI in nursing practice.
- Integrate AI in nursing practices.
- Support staff for using technology in their practices.
- Replicate the study on large sample size to generalize the resalts.

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