Assiut Scientific Nursing Journal
http://asnj.journals.ekb.eg http://www.arabimpactfactor.com
DOI: 10.21608/asnj.2024.260432.1745 http://olddrji.lbp.world/indexedJournals.aspx
https://vlibrary.emro.who.int/journals/assiut-scientific-nursing-journal

Effect of Technology on Quality of Work life for Nursing Staff and Patients Satisfaction at El-Rajhy Hospital

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Abstract:
Background: The nursing profession is crucial to providing patients with high-standard medical care. Achieving the best possible patient outcomes depends heavily on nursing practitioners who possess the necessary competences and the roles. **Aim:** Determine the effect of technology on quality of work life for nursing staff and patient satisfaction. **Methods:** Descriptive research design was used in this study. **Setting:** It was conducted in the El-Rajhy Hospital at Assiut University. **Subjects:** A total number of 173 nurses and 112 patients was involved in the study. **Data collection:** it includes two parts **part I**: include two tools were used self-administered questionnaire for nurses, personal data and quality of wok life scale. **Part II:** include two tools were used structured interview questionnaire for patients**,** socio demographic data and patient satisfaction questionnaire. **Results:** majority of studied nurses had good and 8.1% had poor quality of work life, 83.9% of studied patients, had satisfied. **Conclusion:** the majority of the studied nurses and had good quality of work life and the majority of patients were satisfied by technology. **Recommendations:** Carryout In-service training programs in other healthcare setting regarding using technology in other hospitals for enhancing quality of work life, and pay attention adding new features to the system to meet new needs in all future health care setting.

Keywords: Effect, Nursing Staff, Patients satisfaction, Quality of work life & Technology

Introduction
Since nurses make up the majority of employees in healthcare environments, they are essential to both preserving patient safety and the quality of healthcare delivery. Because they provide round-the-clock patient care, nurses are the most frequent users of Electronic Medical Record (EMR) systems. As such, they are both stakeholders and end users of these systems, with special insights and opportunities. Regrettably, alterations to nurses' work environments or workflows may result in inadvertent effects to patient safety **(Jedwab et al., 2023).**

With the advent of health information technology, the delivery of healthcare has undergone rapid transformation. The usage of Electronic Health Records (EHR) and various electronic health devices has improved the daily practices of healthcare providers and their approach. Most people believe that health information technology lowers morbidity and death while also improving safety and quality of care **(Setyowati et al., 2022).** The application of organized knowledge and skills in the form of devices, drugs, immunization procedures, and systems developed to solve a health problem and improve quality of life" is how the world health organization defines health technology **(Kohn et al, 2020).**

Since technology encourages Egyptian nurses to work on those machines instead of hiring foreign nurses with hands-on rehabilitation experience, it can help with the unemployment issues faced by national nurses (avoiding the need to seek global nurses experienced in hands-on rehabilitation). The request for national nurses to receive training and use such medical technology in practice will reduce unemployment while also improving the quality of medical care through efficient delivery **(Joseph & Locsin, 2019).**

Health-related data both the quality and the affordability of healthcare are enhanced by technology that actively involves patients in their treatment. Technology helps patients feel more satisfied because it involves them in the decision-making process related to the medical care; when patients are considered as partners in their own recovery rather than as outside forces outside of the hospital setting, this positively impacts the prognosis **(Haleem et al., 2022).**

Quality of Working Life (QWL) refers to the process by which organizations allow their employees, regardless of rank, to actively shape the work environment, processes, and results. The two objectives of this value-based approach are to increase employee quality of life at work and organizational effectiveness. QWL is a way of

thinking about health workers, work, and organizations .the main components are the idea of involvement in organizational decision-making and problem-solving, as well as a concern for the influence of work on health workers and organizational effectiveness **(Ismaiel et al., 2022).**

The standard of working life for nurses is regarded as a foundational element for the advancement of health care. Work life quality has an impact on job satisfaction, which in turn has an impact on nurses' performance. Positive results, like higher-quality care delivered, increased productivity and performance, higher retention rates, and lower turnover, are linked to nurses' satisfaction with quality of work life. Thus, enhancing the quality of nursing life at work is essential to providing better nursing services. Many factors have been shown to affect nurses' quality of work life, including work overload, a lack of work-life balance, and the workplace environment **(Al Mutair et al., 2022).**

Quality of Working Life (QWL): is a measure of the level of care received and despite the fact that defining and measuring patient satisfaction is challenging, due to greater interaction and technical nursing activities in the surgical wards which were relatively fewer in the medical wards it was found that overall patient satisfaction was lower in the medical wards than in the surgical wards. Because hospitalized patients typically spend longer in the hospital, the basic needs of the patients were better served in out-patient departments than in in-patient departments. Therefore, increasing patient satisfaction among hospitalized patients is thought to be a key sign of high-quality treatment **(Kannan et al., 2020).**

Significance of the study:

Through searching 0n the web, the researcher found numerous international studies about the impact of technology on patient satisfaction and nursing staff quality of work life. These studies have the following titles. The first title "The impact of information technology on work satisfaction, performance, productivity, and work-life balance" is the title of the first study conducted done **by Ratna (2018).** The following one, **by Akyol & Guler, (2020)** is title "Effects of information technology use on quality of working life in hospitals. The researcher observed , that no studies on the effects of technology had been conducted in Upper Egypt about effect of technology on quality of work life for nursing staff and patient satisfaction. So, the researcher enthusiastic to conduct this study at El-Rajhy Hospital in Assiut University.

Aim of the study: This study aimed to:

Determine the effect of technology on quality of work life for nursing staff and patient satisfaction in El-Rajhy Hospital at Assiut University.

Research Questions:

To fulfill the aims of the present study, the following research questions are formulated:

Q1: What is the effect of technology on quality of work life for nursing staff?

Q2: What is the effect of technology on patient's satisfaction?

Subjects & Methods:

The current study's subjects and techniques were discussed under four designs (technical, operational, administrative, and statistical design).

Technical design:

Research design*:*

Descriptive research design was used.

Setting

The current study was conducted in the El-Rajhy Hospital at Assiut University (for liver and gastrointestinal diseases), it includes 4 floors, 48 rooms, and 112 beds.

Subjects:

As regard nursing staff:

This study was conducted in Al-Rajhi University Hospital in Assiut A convenient nursing staff working at Gastrointestinal and Surgical Units at the time of study conduction with a total number (No =173) divided into 154 staff nurses and 19 nursing managers.

Units	**No. of staff nurs**
Internal unit	16
Surgical unit	11
Male tropical unit	22
Female tropical unit	8
Intensive care unit	18
critical care unit	24
Radiology unit	11
Endoscopy unit	13
Lab	9
Operation unit	22
Total	**154**

Nurse managers	No.
Nurse director	1
Supervisors	3
Head nurses	15
Total	19

Tools of data collection:

Two parts of the data collection tools were used in the current study.

Part I: Self administrated questionnaire includes two tools for nursing staff:

Tool (1): Personal data sheet for the studied nursing staff which include: age, gender, material status educational level, and years of experience.

Tool (2) Quality of work life scale: The scale developed by **(Lateef et al., 2022)** to measure the quality of work life for nursing staff. It contains 42 items divided into four dimensions: work-life (7 items), work design (10 items), work context (20 items) that consists of four sub-dimensions: [1st management and supervision (7 items), 2nd co-workers (5 items), 3rd development opportunities (3 items), and 4th work environment (5 items)] and finally work world (5 items).

Scoring system

The response for each item is based on a five-point Likert scale ranging from: "Strongly agree=5" "Agree=4" "Uncertain=3" "Disagree=2" and "Strongly disagree=1". The minimum total score is 42, and the maximum is 210 (with higher total scores indicating better work-life quality). The scores of each dimension summed up and then converted into a percent score: a score of 60% or higher considered as "good" and less than 60% regarded as poor quality of work.

Part II: Structured interview for the patient it includes two tools

Tool (1): Socio demographic data include age, sex, level of education, and marital status.

Tool (2) Patient satisfaction questionnaire: It developed by **(Ahmed, 2018)** to measured patient's satisfaction about nursing care competency it consists of 46 items classified into three categories as: needs and expectations (19 items) nurse's communications (12 items) & nurse's skills and competences (15).

Scoring system:

Participants response based on 5 points likert scale from (5) very satisfied, satisfied (4), moderate (3), mild (2), low (1) less than 60% considered un-satisfaction and more than 60% considered satisfaction

Operational design:

The study was conduct throughout:

- Reviewing the available literature on the subject of the study.
- The face validity of the study tools is cited by lateef (2020).
- Also, content validity was checked and analyzed using confirmatory factor analysis test to assure (importance, clearness, and accountability of each items of the study tool) and its result was ≥ 1.8 for all items of the study tool.
- This face took about three months December 2022 to February 2023 to end the proposal

Pilot study:

- A pilot study on ten nurses ,representing (10%) of the total participants in the study, to ensure the clarity, accessibility, and understandability of the study tools and for time estimation before actual data collection.
- The data obtained from the pilot study were analyzed, and necessary modifications were made.
- The study tools were tested for its reliability by using cronbach alpha co-efficient test**,** it was (= 0.799) for the quality work life tool and was (= 0.812) for patient satisfaction tool. thus indicated height degree of reliability for the study

Field work:

The study's data collecting spanned roughly four months, commencing in early November 2022 and ending at the end of February 2023. It entailed the following steps:

Preparatory phase:

The researcher studied the associated literature of the current study, both nationally and international, utilizing text books, papers, and significant publications. The instruments were developed based on this literature, and they were validated by administration nursing staff experts.

Procedures:

- The researcher granted official approval to conduct the study.
- Reviewing the available literature related to the researcher topic.
- After explaining the nature and goal of the study to the nurses and patients, oral permission for voluntary participation was acquired.
- The researcher met with each nurse and patient personally and collected data.
- The questionnaire's completion by the researcher took roughly 25 to 30 minutes.

Administrative design:

The official approval to conduct this study and collect the necessary data was obtained from the following: Dean of Faculty of Nursing at Assiut University, Director of El-Rajhi Hospital, Nursing Director at El-Rajhi Hospital, and the Nurses in Medical and Surgical Units at El-Rajhi Hospital.

- Before include each nurse or patients in the study sample and after clearly and simply explaining the purpose of the study, an informed oral consent was obtained from each participant.
- The nature of the investigation and its anticipated results were communicated in a straightforward and clear manner.
- They ensured the secrecy and anonymity of all data collected.
- All of the participants who were studied had the option to discontinue the research at any point.

Ethical considerations:

The research proposal was approved by the Ethical Committee of the Faculty of Nursing, Assiut University. There are no risk to study participants while applying the research; this study follow common ethical principles in clinical research, and a written agreement taken from the participants in the present study (the study participants have the right to refuse to participate and/or withdraw from the study at any time). Confidentiality and anonymity of participants assured and achieved during data collection and the study followed common ethical principles in clinical area.

Statistical analysis:

Collected data were verified before computerized data entry and analysis by using statistical software package for social sciences (SPSS) v.g 26 program. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables, means and standard deviations for quantitative variables. Quantitative variables were compared using the chi-square test, paired t-test, Pearson correlation matrix and (ANOVA test) were used, and statistical significance wasconsidered at P-value ≤ 0.05.

Results:

Table (1): Distribution of the studied subject according to their personal data N=173

Personal data	No	%
Age		
From 20-30 year	125	**72.3**
From 30-40 year	48	27.7
Gender		
Male	33	19.1
Female	**140**	**80.9**
Marital Status		
Married	126	**72.8**
Single	39	22.6
Divorced	4	2.3
Widow	4	2.3
Education Level		
Diploma	36	20.8
technical / institute and health	113	**65.3**
Bachelor of nursing	24	13.9
Experience year		
From 1- less than5 year	64	37.0
From 5- lees than15 year	87	**50.3**
From 15-30 year	22	12.7

Table (2): Mean scores of quality of work life for nursing staff N=173

Quality of work life	Max Score	Mean ± SD	Range	Mean%	Good
Work-life and technology	35	26.02±3.54	18-35	74.3	Good
Work design and technology	50	39.68±4.16	30-50	79.4	Good
Management and supervision	35	26.69±4.8	13-35	76.3	Good
Co worker	25	20.63±1.77	16-25	82.5	Good
Development opportunities	15	12.36±1.84	5-15	82.4	Good
Work Environment	25	18.46±2.68	12-25	73.8	Good
Work World	25	18.2±3.05	12-25	72.8	Good
Total quality of work life for nursing staff	**210**	**160.88±17.6**	**116-210**	**76.6**	**Good**

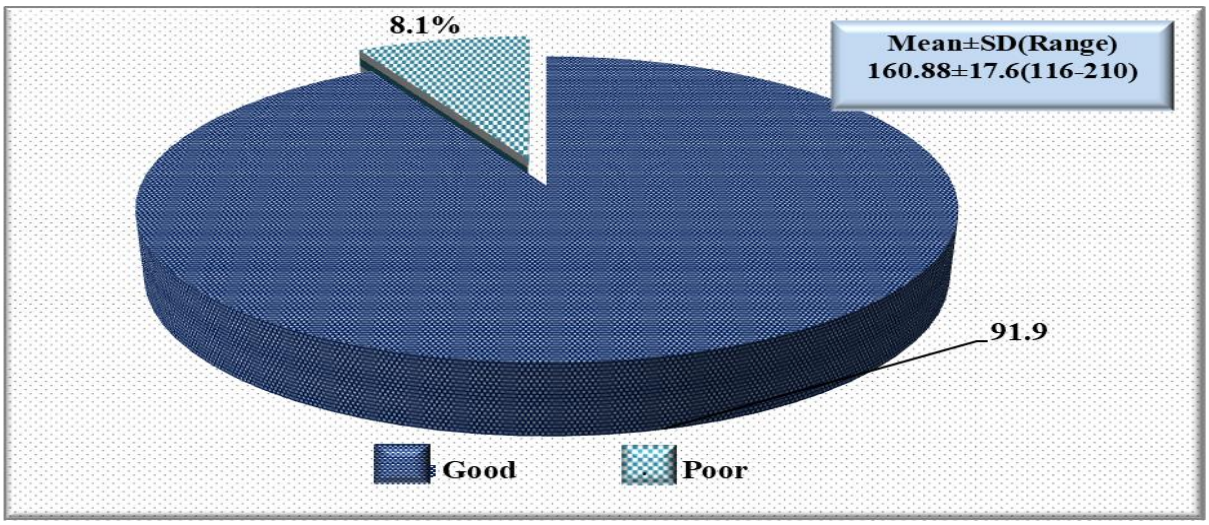

Figure (1): Distribution of the studied subject according to quality of work life

Table (3): Correlation between quality of work life for nursing staff N=173

Quality of work life	work-life and technology	work design and technology	management and supervision	Co worker	Work Environment	Work World
Work-life and technology	1					
Work design and technology	.355**	1				
Management and supervision	.420**	.329**	1			
Co worker	.207**	.337**	.294**	1		
Work Environment	.419**	.563**	.423**	.468**	1	
Work World	.348**	.526**	.515**	.379**	.508**	1
Quality of work life for nursing staff	**.647****	**.762****	**.744****	**.501****	**.711****	**.724****

***** Statistically Significant correlation at P. value <0.01***

Table (4): Distribution of nursing staff quality of work life and their personal data N=173

Personal data	QWL				Total		X2	P. value
	Poor		Good					
	No	%	No	%	No	%		
Age								
From 20-30 year	11	78.6	114	71.7	125	72.3	0.30	0.582
From 30-40 year	3	21.4	45	28.3	48	27.7		
Gender								
Male	4	28.6	29	18.2	33	19.1	0.89	0.346
Female	10	71.4	130	81.8	140	80.9		
Marital Status								
Married	10	71.4	116	73.0	126	72.8	49.22	**0.0001****
Single	0	0.0	39	24.5	39	22.6		
Divorced	4	28.6	0	0.0	4	2.3		
Widow	0	0.0	4	2.5	4	2.3		
Education Level								
Nursing Diploma	0	0.0	36	22.6	36	20.8	8.09	**0.018***
Nursing technical /health institute	14	100.0	99	62.3	113	65.3		
Bachelor of nursing	0	0.0	24	15.1	24	13.9		
Year of experience								
From 1- less than5 year	8	57.1	56	35.3	64	37.0	3.78	0.151
From 5- less than15 year	6	42.9	81	50.9	87	50.3		
From 15-30 year	0	0.0	22	13.8	22	12.7		

Chi square test for qualitative data between the two groups
***statistically significant difference (p<0.01)* **statistically significant difference (p<0.05)*

Table (5): Distribution of the studied patient according to their Socio demographic data (N=112)

Socio demographic data	No	%
Age group		
Less than 40 year	30	26.8
From 40- less than 50 year	8	7.1
From 50-60 year	**41**	**36.6**
More than 60 year	33	29.5
Gender		
Male	**67**	**59.8**
Female	45	40.2
marital status		
Single	23	20.5
Married	**73**	**65.2**
Widowed	16	14.3
Education		
Illiterate	24	21.4
read & writer	17	15.2
below average	8	7.1
Average	22	19.7
Collector	**41**	**36.6**

Table (6): Maximum score and mean & Standard deviation of Patient satisfaction Subdomain (N=112)

Patient satisfaction	Max Score	Mean ± SD	Range	Mean%	Level
Needs and expectations	95	65.58±11.96	35-87	69.0	Satisfaction
Communicate with the nurse	60	44.35±8.82	21-56	73.9	Satisfaction
Skills and competencies of the nurse	75	53.24±8.09	31-71	71.0	Satisfaction
Patient satisfaction	230	163.17±27.1	87-213	70.9	Satisfaction

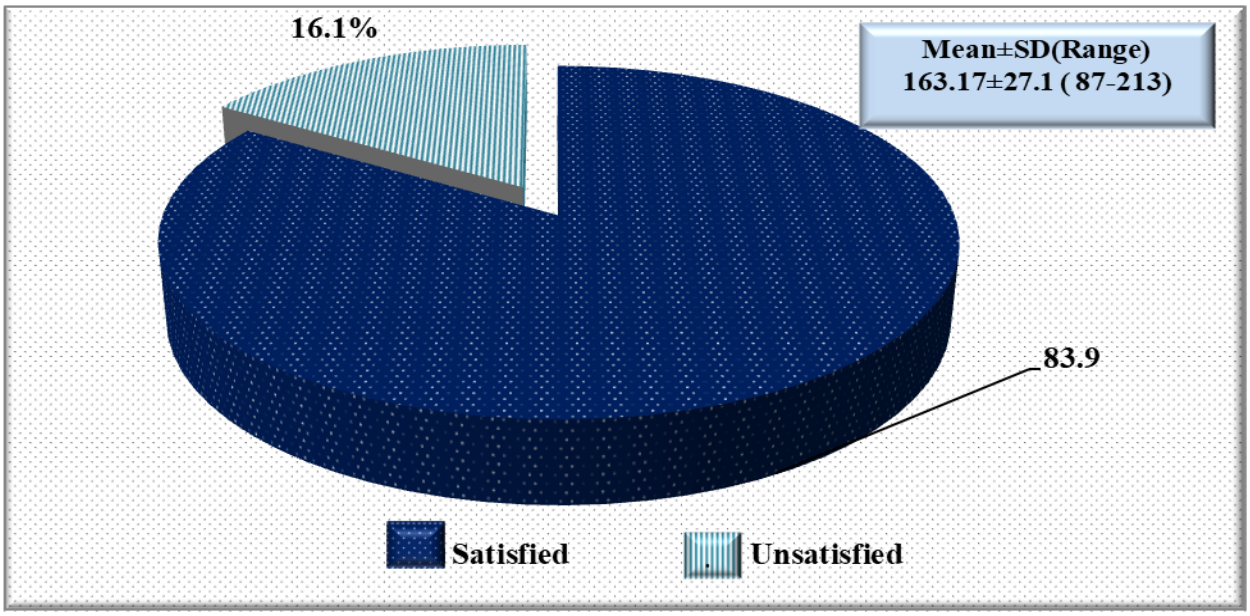

Figure (2): Distribution of the studied patients according to their satisfaction level (N=112):

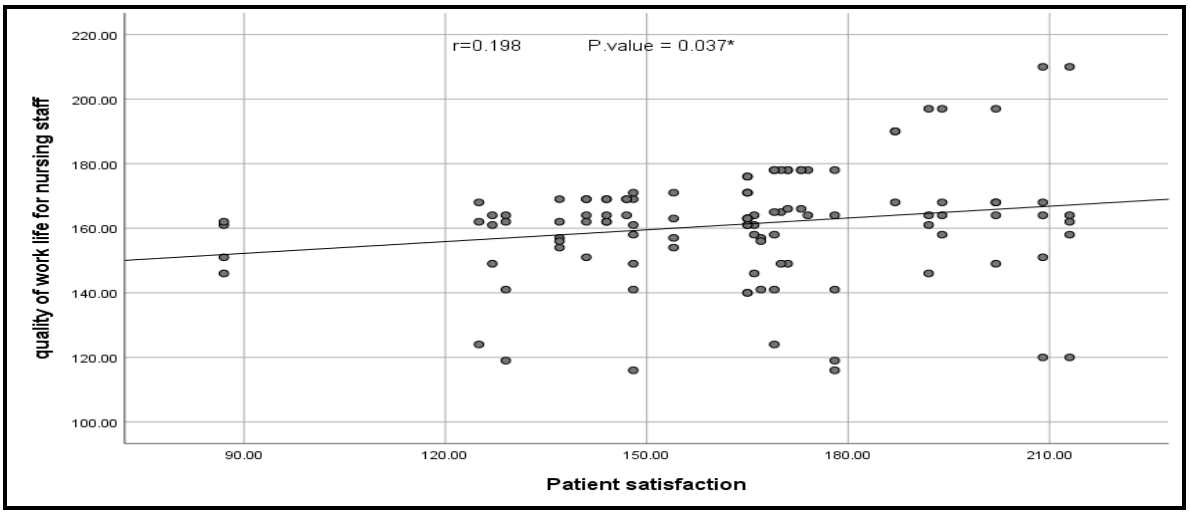

Figure (3): Correlation between quality of work life of the studied nurses and patients' satisfaction (N=112)

This table (1): Shows that, the distribution of personal data of the studied subject. As regard the age groups (72.3%) of the studied nurses from (20-30) year regarding the gender (80.9%) of them are female and (72.8%) of them married. About (65.3%) of them nursing technical / health institute. Also, (50.3%) of them are years of experience from less than 5-15 years.

This table (2): Illustrates that maximum score and mean & Standard deviation of quality of work life for nursing staff Subdomains, firstly work-life and technology from total score 35 (74.3%) and mean & SD (26.02±3.54) of the studied nurses. Regarding work design and technology from total score 50 (79.4%) and mean & SD (39.68±4.16) of the studied nurses. Regarding management and supervision total score 35 about (76.3%) with mean & SD (26.69±4.8). However, Coworker from maximum score (82.5%) and mean & SD (20.63±1.77). Concerning development opportunities total score (82.4%) with mean & SD (12.36±1.84). While Work Environment from total score (73.8%) with mean & SD (18.46±2.68). Also Work World total score (72.8%) with mean & SD (18.2±3.05). **Finally** max score of total quality of work life for nursing staff (210) have 76.6% with mean & SD (144.42±29.91).

This figure (1): Illustrates quality of work life for nursing staff, and reported that about 91.9% from study sample are good while 8.1% are Poor. With Mean ± SD (160.88±17.6) from total max score 210.

This table (3): Shows that, there are a positive correlation between quality of work life for nursing staff and work life and technology, work design and technology, management and supervision, Coworker, work environment and work world p-value < 0.001 for all.

This table (4): Reveals that, there is highly statistical significant relationship between quality of work life of the studied nurses and marital status at p- value < 0.01, and there is statistical significant relationship quality between of work life of the studied nurses and their educational level. Also, there is no statistically significant relation between quality of work life for nursing staff and their age gender, and year of experience.

This table (5): Shows distribution of demographic data of the studied patients regarding the age groups (36.6%) of the studied patients are from (50-60) year. About (59.8%) of them are male. Also (65.2%) of them are married. And (36.6%) of them have collector education.

This table (6): Illustrates that maximum score and mean & Standard deviation of Patient satisfaction Subdomain, firstly needs and expectations from total score 95 had (69.0%) and mean & SD (65.58±11.96) of studied patients regarding communicate with the nurse from total score 60 had (73.9%) and mean & SD (44.35±8.82) of studied patients. As regarding Skills and competencies of the nurse total score 75 about (71.0%) with mean & SD (53.24±8.09). **Finally** max score of patient satisfaction (230) have 70.9% with mean & SD (163.17±27.1).

This Figure (2): Reveals that 83.9% of study sample has satisfied level of total patient satisfaction. While 16.1% of them have unsatisfied level of patient satisfaction with Mean ±SD (163.17±27.1).

This figure (3): Illustrates a positive correlation between quality of work life of the studied nurses and patients' satisfaction at p-value <0.037*.

Discussion:

Patient happiness and the quality of nurses' working lives are seen as building blocks for the advancement of health services. work life quality has an impact on job satisfaction, which in turn has an impact on nurses' performance. The way that nurses carry out their everyday tasks is significantly impacted by the progress of technology in nursing practice. More links between nursing and technology actually enable nurses to spend more time with patients and less time on administrative duties, both of which have a substantial positive effect on patient satisfaction. The purpose of the current study was to determine how technology affected patient satisfaction and the quality of life for nursing staff. **(Altmiller & Pepe, 2022).**

The current study began by attempting to understand the participants' ages, genders, levels of education, and years of experience.

According to the findings of the current study, more than two-thirds of them were female, three-quarters were married, and they ranged in age from 20 to 30 years. More than half of them were graduates of a nursing technical/health institute. Furthermore, roughly half of them had less than 5 to 15 years of experience.

Present study illustrates that, work design and technology subdomain has highest score and mean & Standard deviation of quality of work life for nursing staff. Which is in congruent with **Moradi, et al, (2019)**, who examine the impact of new technology on job design and work organization and mentioned that, nursing staff quality of work life significantly influenced by work design of health care settings.

In the researcher point of view good work design helps health care providers develop strategies for improving nurses working conditions and their quality of work life. Thus, nurses will be able to perform better care for their patients.

This result shows that the majority of nursing staff believe technology has a positive impact on their quality of life at work. These findings are consistent with the findings of **Mohammad, et al. (2023)**, who conducted a study to assess how these technologies may affect their workload, particularly in rural contexts where workforce and supports may be limited, and stated that the use of technology can be important for improving the health, quality of life, and wellbeing of healthcare providers.

Also in the same line with **Al - Sadrah,(2020)**, who conducted a study to Identifying and addressing these barriers is essential for the optimal application of electronic medical record systems in all health care facilities, the study revealed that, The implementation of EMRs leads to several benefits for patients (elevated quality of health care systems/reduced errors, improved diagnosis, and treatments, faster healthcare decisions) and healthcare workers (increased information exchange among health care workers, decreases in expense and time, and enhancement of the safety culture among primary care providers.

According to the researcher, the increased use and reliance on technology for nurses resulted in the largest professional nursing care and helped nurses to be more knowledgeable and fully prepared, so the researcher completely agrees that technology has a positive effect on the quality of work life for nursing staff.

According to current findings, there is no statistically significant difference between age, marital status, education level, and years of experience. According to the quality of work life with technology for nursing staff, this is not the case with **Rababa et al, (2022),** who conducted a study to examine the differences in nurses' levels of perceived control over nursing practice based on demographic characteristics and found that male nurses have higher levels of quality of work life with technology than female nurses. Older nurses are perceived to be less interested in and less comfortable with technology than male nurses. From the researcher point of view, older nurses are perceived to be less interested in and less comfortable with technology than male nurses

Also not in the same line with **Kheiri, et al, (2021)**, who carry out a study to identify factors that affect the quality of work-life of nurses, and found that, quality of work life with technology for nursing staff are influenced by multiple individual and environmental factors, such as gender, education, time and access to resources, due to their educational background, nurses are assumed to have a high level of health information-seeking behaviors. **Rababa et al. (2022)** are strongly supported by the researcher. Older nurses are perceived to be less interested in and less adoptive of technology than male nurses, and highly educated nurses have a higher quality of life with technology than less educated nurses.

The majority of the patients in the current study expressed high levels of satisfaction with the use of technology at El-rajhy Hospital. According to **Roberts et al. (2017)**, who used their study to identify the salient characteristics of bedside technology interventions to involve hospital patients in their care and evaluate these in terms of context, mechanisms, and results, it is becoming more evident that advances in health information technology (HIT) are enabling patients to participate actively in their care in a number of ways. This is anticipated to enhance the quality and economy of healthcare and enable patients to experience high levels of satisfaction with the use of technology.

In the same line current result supported by **Pogorzelska, & Chlabicz, (2022)** who conduct study to assess Patient Satisfaction with Telemedicine, and study revealed that, use of technology offers comfort and convenience to patients, reduce the costs of healthcare system, increase the patient access to primary and specialty care and reduce patients' exposure to acute infectious diseases so patients reported a high level of patient satisfaction with use of technology in health care settings.

Positive impact: From the perspective of the researcher, using digital technology has a positive effect and benefits nurses by strengthening their theoretical foundations and improving nurse-patient interactions. Additionally, it is improving patient satisfaction, as evidenced by the favorable attitudes that patients have toward the healthcare facility.

Conclusions:

The majority of the studied nurses and had good quality of work life and the majority of patients had were satisfied by technology. And there is a positive correlation between quality of work life of the studied nurses and patients' satisfaction

Recommendations:

Based on the study the recommendations are as follows

- Carry out In-service training programs in other healthcare setting regarding using technology in other hospitals for enhancing quality of work life,
- System designers should consider how to add new features to the system in order to accommodate future needs.
- Adequate awareness is required prior to the implementation of new technology in other Assiut university hospitals
- Pay attention adding new features to the system to meet new needs in all future health care setting.

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