

**Association between Indoor Environmental
Quality and Patient's Satisfaction to the
Quality of Nursing Care in Critical Care
Units**

العلاقة بين جودة البيئة الداخلية ورضا المرضى عن جودة
الرعاية التمريضية في وحدات العناية الحرجة

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المستخلص:

الخلفية: يشير جودة البيئة الداخلية في وحدات العناية الحرجة الى الظروف المحددة داخل هذه البيئات الصحية التي تؤثر على صحة المرضى واداء الطاقم الطبي. في وحدات العناية المركزة تعتبر البيئة الداخلية امرا بالغ الاهمية بسبب الطبيعة الحساسة للمرضى ومستوى الرعاية العالية التي يتطلبونها والتي تشمل جودة الهواء والاضاءة ومستويات الضوضاء والراحة الحرارية والراحة البصرية والنظافة واخيرا تخطيط المساحة وبيئة العمل. يعد رضا المرضى فيما يتعلق برعاية التمريضية على انه درجة القيمة والموقف التي يحملها المرضى تجاه الرعاية المقدمة من قبل طاقم التمريضي خلال فترة اقامتهم في المستشفى ويعتبر رضا المرضى عن رعاية التمريضية مقياسا حاسما لتقييم جودة خدمات الرعاية الصحية المقدمة في المستشفيات ويعد احد الاساليب المستخدمة لتقييم فعالية تقديم الرعاية الصحية.

الاهداف: اكتشاف جودة البيئة الداخلية في وحدات العناية الحرجة واكتشاف رضا المرضى عن جودة الرعاية التمريضية في وحدات العناية الحرجة وللتعرف على العلاقة بين جودة البيئة الداخلية ورضا المرضى عن جودة الرعاية التمريضية في وحدات العناية الحرجة.

المنهجية: تم استخدام تصميم دراسة وصفية ارتباطية في الدراسة مع استخدام طريقة العينة الغرضية. استهدفت الدراسة ٣٠٨ مرضى راقدين في وحدات العناية الحرجة في ثلاث مستشفيات في محافظة بابل في العراق. تم جمع البيانات خلال فترة من ٢٦

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نوفمبر ٢٠٢٤ الى ١٦ يناير ٢٠٢٥. تم استخدام استبيان رضا المرضى عن جودة الرعاية التمريضية وكذلك استبيان جودة البيئة الداخلية.

النتائج: أظهرت النتائج أن الغالبية العظمى من المشاركين في الدراسة ينتمون إلى الفئة العمرية "٥١-٦٠" سنة بنسبة (٢٨.٩٪). كما تبين أن الغالبية العظمى من المشاركين في الدراسة (٧٢.٧٪) يقيمون في المستشفى لفترة إقامة تتراوح بين (١-٧ أيام). وفقاً لنوع الغرفة، فإن معظم المرضى يقيمون في غرف متعددة الأنواع بنسبة (٧٦.٩٪). كما يرافق أفراد الأسرة المرضى عند دخولهم إلى المستشفى بنسبة (٩٢.٢٪). وأكثر من نصف المرضى (٥٨.١٪) تم تشخيصهم بحالات طبية مزمنة.

الاستنتاجات: أظهرت الدراسة أن المعدل الإجمالي بين المشاركين يكشف أن المرضى لديهم مستوى جيد من الرضا عن جودة الرعاية التمريضية، كما أن المعدل الإجمالي بين المشاركين يكشف عن مستوى جيد من جودة البيئة الداخلية. وهذا يعني أن هناك علاقة ذات دلالة إحصائية عالية بين جودة البيئة الداخلية ورضا المرضى، كما يعني أن المرضى يكونون أكثر رضا عندما تكون البيئة التي يتلقون فيها الرعاية مريحة وجيدة. **التوصيات:** يجب على المستشفيات التركيز على تحسين البيئة الداخلية في وحدات العناية الحرجة من خلال تحسين الإضاءة، والتهوية، ودرجة الحرارة، وتقليل الضوضاء، والنظافة العامة، حيث أن هذه العوامل تساهم في رضا المرضى عن جودة الرعاية التمريضية. **الكلمات المفتاحية:** جودة البيئة الداخلية , رضا المرضى عن جودة الرعاية التمريضية , وحدات العناية الحرجة

Abstract:

Background: Indoor Environmental Quality (IEQ) in Critical Care Units (CCUs) refers to the specific conditions within these healthcare environments that affect both patient health and the performance of medical staff. In critical care units such as intensive care units (ICUs) the indoor environment is crucial due to the sensitive nature of the patients and the high level of care they require which includes air quality, lighting, noise levels, thermal comfort, visual comfort, sanitation and cleanliness and finally space layout and ergonomics.

Patient satisfaction concerning nursing care is characterized as the degree of value and disposition patients hold regarding the care administered by nursing

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personnel throughout their hospital stay. Patient satisfaction regarding nursing care is regarded as a crucial metric for assessing the quality of healthcare services rendered in hospitals and serves as one of the methodologies for appraising the efficacy of healthcare delivery.

Objectives: Find out the Indoor Environmental Quality in critical care units, find out the Patient satisfaction to the Quality of Nursing Care in Critical Care Units and find out the Association between Indoor Environmental Quality and Patient satisfaction to the Quality of Nursing Care in Critical Care Units.

Methodology: A descriptive correlational study design used in the study and using purposive sampling method. The study targeted 308 patients admitted to critical care units in three hospitals in Babylon governorate in Iraq. Data were collected for the period from November 26\2024 to January 16\2025. Using Patient Satisfaction with Nursing Care Quality Questionnaire-Arabic (PSNCQQ-Ar) and Indoor environmental quality questionnaire.

Results: The results shown that the majority of the participants in the study with age group of "51-60" years as reported (28.9%). the majority of the participants in the study with (72.7%) stay in hospital for residency period ranged between (1-7days) in hospital. According to room type most of patient's resident in multiple room type (76.9%). The family member accompanies the patient when they enter the hospital (92.2%). More than half of patients (58.1%) diagnosed with chronic medical conditions.

Conclusions: The study show the total average among participants reveals that patients' have good level of satisfaction about quality of nursing care as well as the total average among participants reveals that good level as Indoor Environmental Quality. This means there is high significant relationship between Indoor Environmental Quality and patients' satisfaction as well as this means that patients are more satisfied when the environment in which they receive care is comfortable and good.

Recommendations: Hospitals should focus on enhancing indoor environment in critical care units by improving lighting, ventilation, temperature, noise reduction and overall cleanliness which contribute to patient's satisfaction to the quality of nursing care.

Key words: indoor environmental quality , patient's satisfaction about the quality of nursing care , critical care units.

Introduction

The Critical Care Unit (CCU) constitutes an exceptionally specialized and meticulously equipped segment within a healthcare institution, wherein patients afflicted with life-threatening conditions and injuries are admitted for rigorous surveillance

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concerning both their survival and the functionality of their vital organ.⁽¹⁾ The physical environment of the Intensive Care Unit incorporates several critical components; the subsequent examples illustrate some of these essential elements: the comprehensive design of the unit's functional architecture ought to be strategically devised with an emphasis on optimizing nursing efficiency, which includes facilitating straightforward access from all patient rooms to essential supplies, storage facilities, and sophisticated life support apparatus and interventions.⁽²⁾

Indoor environmental quality (IEQ) constitutes a pivotal component of sustainable building performance due to its significant influence on occupant comfort, productivity and health.⁽³⁾ Research indicates that augmenting ventilation rates may mitigate the incidence of sick building syndrome (SBS), enhance work performance and decrease short-term absenteeism resulting in an estimated economic benefit of \$38 billion annually in the United States.⁽⁴⁾

Within educational settings Indoor Environmental Quality (IEQ) has been associated with student learning outcomes and academic performance in subjects such as mathematics and reading.⁽⁵⁾ In healthcare facilities IEQ is critical for ensuring a nurturing and comfortable environment for patients while inadequate IEQ can yield adverse physiological consequences affecting patients' recovery processes.⁽⁶⁾ Given its significance, this study concentrated on the domain of IEQ assessment that necessitates modification as a substantial portion of individuals allocate approximately 90% of their daily activities within indoor environments.⁽⁷⁾

The level of patient satisfaction concerning nursing care may be influenced by a multitude of factors which encompass patient-specific variables (e.g. domicile, prior hospitalization history) as well as contextual elements (e.g. accessibility of designated nurse(s), conduct of nursing staff and the physical environment in which care is delivered).⁽⁸⁾ Numerous facets of patient satisfaction have been recognized

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encompassing health care services from the admission phase through to the discharge process, the duration of wait times for care and encompassing both medical treatment and interpersonal communication. Furthermore, it has been documented that the interpersonal and technical competencies of health care providers represent the two distinct dimensions that play a critical role in a patient's evaluation of hospital care.⁽⁹⁾

According to the American Nursing Association (ANA), patient satisfaction concerning nursing care is characterized as the degree of value and disposition patients hold regarding the care administered by nursing personnel throughout their hospital stay.⁽¹⁰⁾ Patient satisfaction regarding nursing care is regarded as a crucial metric for assessing the quality of healthcare services rendered in hospitals and serves as one of the methodologies for appraising the efficacy of healthcare delivery.⁽¹¹⁾

Determinants affecting patients' satisfaction with nursing care include age, gender, educational attainment and the healthcare system in which they receive care.⁽¹²⁾

Methods

Design of the study

This study was conducted using a descriptive correlational design to determine the strength and direction of the relationship between the variables.

Setting of the study

The researcher will select multiple hospitals and centers in Babylon governorate and this study was conducted at Imam Al-Sadeq Teaching Hospital, Marjan medical city and Shaheed al-mihrab center for cardiac surgery and catheterization specialized in treating patients with cardiac problem.

Sample and sampling method

The study sample was selected the Participants who had been admitted to hospitals in critical care units. In the current study, a purposive sampling method was utilized. This approach is commonly known as judgment sampling or selective sampling. The

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application of purposive sampling in this study was based on the premise that the researcher possesses the necessary expertise to choose sample participants according to their familiarity with the subject's community.

Sample size

The minimum sample size was (316) calculated according to sample size calculator, selected according to the total population (1750) during November and December 2024 obtained from statistical records in three Hospitals with a margin of error of (5%), a confidence level of (95%) as well as three patients refuse participated in the study and five patients incomplete answer on questionnaire finally the response rate was 97%, which is calculated by dividing the number of valid responses (308) by the total number of responses requested (316).

Instruments of the study

1. Demographic Information

This section encompasses demographic data which includes, but is not limited to, sex (male or female), age, marital status, educational level, job, With this time, how many times have you been hospitalized in the past two years, How many days has it been since you were admitted to the hospital, Are you staying in a room, Are any of your relatives accompanying you, Are any of your relatives accompanying you and Do you suffer from chronic diseases.

2 Patient Satisfaction with Nursing Care Quality Questionnaire-Arabic (PSNCQQ-Ar)

Patient satisfaction with nursing care (PSNC) quality is conceptually defined as “the extent to which a patient is content with the care received from nurses and influenced by patient characteristics and expectations”. The PSNCQQ-Ar is a 17-item, self-reported questionnaire that operationalizes PSNC quality during the hospital stay based on the patient perceptions. The PSNCQQ-Ar consists of two factors; satisfaction with provided care and satisfaction with provided information as well as the overall

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Cronbach's alpha coefficient for the PSNCQQ-Ar was excellent and similar across different hospital units (.96). The split-half coefficients were .91 and .95 for Parts 1 and 2, respectively, with a Guttman split-half coefficient of .94.⁽¹³⁾

3. Indoor environmental quality questionnaire

The study is based on the development of the questionnaire of IEQ and productivity which were tested in previous research studies. The questionnaire consisted of three sections relating to IEQ, productivity, and personal data as well as we collected and analyzed the data to develop the questionnaire and to check its reliability. Then, to check the internal consistency of the questions, we conducted Cronbach's α and exploratory factor analysis.⁽¹⁴⁾

Data collection

After the official approvals are issued by the Iraqi Ministry of Health and the hospitals and centers concerned to conduct the study, the researcher went to these settings, meet with the patients, introduced herself and clarified the purpose of the study to the participants in order to get their verbal and written agreement and distributed the questionnaire to them. The participants' answered the questionnaire independently. Each self-report questionnaire filling took nearly 15 to 20 minutes and Data collected started from December 26th, 2024 to November 30th, 2024.

Ethical considerations

The official permission to the protocol of this study will be getting from the Research Ethical Approval Committee, University of Baghdad, College of Nursing, Ministry of Higher Education & Scientific Research with ID number Ref :14 Date: 28/10/2024. The researcher delivered an extensive narrative of the research project, encompassing the problem statement, objectives and the research questionnaire, to the Ministry of Planning (Central Statistical Organization) to secure formal authorization for the execution of the study, the Babylon Health Directorate ((Human Development and

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Training Center) carefully assessed and there after authorized the research protocol planned for application in the appropriate settings. The researcher undertakes after obtaining the approval of the hospitals in which the samples will be collected, to also obtain the approval of the study participants and inform them that their private information will be confidential and for the purpose of scientific research only and that they have the right not to participate or withdraw from participation.

Data analysis

Analyzing data is an essential step in nursing research, wherein various methods are employed to describe and assess information gathered by the researcher. The choice of analysis method depends on the nature of the collected data, with quantitative research specifically utilizing descriptive and inferential statistics to analyze numerical data.

The data were analyzed and interpreted through use of the application of Statistical Package for Social Sciences (SPSS), version 26.0 which includes Descriptive Statistical Tests that encompass Frequency (f), Percentage (%), mean of score and Inferential Statistical Tests that encompass Cronbach Alpha (α) , Fisher's Exact Test , Pearson Correlation rank correlation coefficient.⁽¹⁵⁾

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The results:

Table (1): Distribution of Participants according to their Socio-demographic Characteristics

| No. | Characteristics | | | |
|-----|--------------------------|----------------|-----|-------|
| | | | f | % |
| 1 | Age (year) | 20-30 | 31 | 10.1 |
| | | 31-40 | 46 | 14.9 |
| | | 41-50 | 73 | 23.7 |
| | | 51-60 | 89 | 28.9 |
| | | 61 and more | 69 | 22.4 |
| | | Total | 308 | 100.0 |
| 2 | Sex | Male | 198 | 64.3 |
| | | Female | 110 | 35.7 |
| | | Total | 308 | 100.0 |
| 3 | Marital status | Unmarried | 29 | 9.4 |
| | | Married | 221 | 71.8 |
| | | Divorced | 6 | 1.9 |
| | | Widowed/ er | 52 | 16.9 |
| | | Total | 308 | 100.0 |
| 4 | Educational level | Elementary | 72 | 23.4 |
| | | Secondary | 80 | 26.0 |
| | | Diploma | 65 | 21.1 |

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| | | | |
|--|-------------------|-----|-------|
| | Bachelor's | 83 | 26.9 |
| | Master's/Doctorat | 8 | 2.6 |
| | Total | 308 | 100.0 |

| No. | Characteristics | f | % |
|-----|--------------------|-----|-------|
| 5 | Occupation Student | 4 | 1.3 |
| | Employed | 140 | 45.5 |
| | Retired | 61 | 19.8 |
| | Unemployed | 68 | 22.1 |
| | Housewife | 35 | 11.3 |
| | Total | 308 | 100.0 |

No: Number, f: Frequency, %: Percentage

The table (1) shows that patients are with age group of “51-60” years as reported (28.9%) followed by those with age group “41-50” reported as (23.7%). Regarding sex of patients, more than half of them are males as reported among 64.3%. The marital status refers to married among 71.8% of patients. Concerning educational level, the larger portion of participants are graduated with bachelor degree (26.9%). Finally, (45.5%) of patients are employed according to occupational dimension.

Table (2): Distribution of Participants according to their Clinical Characteristics

| No. | Characteristics | | |
|-----|-----------------|----|------|
| | | f | % |
| 1 | Number of 1 | 37 | 12.0 |

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| | | | |
|------------------------|--------------|------------|--------------|
| hospital visits | 2 | 90 | 29.2 |
| | 3 | 66 | 21.4 |
| | 4 | 48 | 15.6 |
| | 5 | 33 | 10.7 |
| | 6 | 16 | 5.2 |
| | 7 | 9 | 2.9 |
| | 8 | 4 | 1.3 |
| | 10 | 4 | 1.3 |
| | 11 | 1 | .3 |
| | Total | 308 | 100.0 |

| No. | Characteristics | f | % | |
|-----|------------------------------|--------------|------------|--------------|
| 2 | Residency in hospital | 1-7 days | 224 | 72.7 |
| | | 7-14 Days | 72 | 23.4 |
| | | 14-21 Days | 11 | 3.6 |
| | | 21-30 Days | 1 | .3 |
| | | Total | 308 | 100.0 |
| 3 | Room type | Single | 51 | 16.6 |
| | | Double | 20 | 6.5 |
| | | Multiple | 237 | 76.9 |
| | | Total | 308 | 100.0 |
| 4 | Family present | Yes | 284 | 92.2 |
| | | No | 24 | 7.8 |
| | | Total | 308 | 100.0 |
| 5 | Chronic conditions | Yes | 179 | 58.1 |
| | | No | 129 | 41.9 |
| | | Total | 308 | 100.0 |

No: Number, f: Frequency, %: Percentage

The table (2) reveals that 29.2% of patients have visit the hospital for two times as a number of hospital visits, and (72.7%) stay

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in hospital for residency period ranged between (1-7days) in hospital. According to room type, most of patient's resident in multiple room type (76.9%). The family member accompanies the patient when they enter the hospital (92.2%). More than half of patients (58.1%) diagnosed with chronic medical conditions.

Table (3): Assessment of Patient's Satisfaction to the Quality of Nursing Care

| No. | Items | Scale | F | M | Ass. |
|-----|---|--------------|-----|------|------|
| | | | | | |
| 1. | Is the information provided to you by the nurses clear and comprehensive? | Poor | 1 | 3.82 | G |
| | | Accepted | 21 | | |
| | | Good | 101 | | |
| | | very Good | 94 | | |
| | | Excellent | 91 | | |
| | | Total | 308 | | |
| 2. | Guidance given to you by your nurses regarding | Poor | 3 | 3.81 | G |
| | | Accepted | 18 | | |
| | | Good | 90 | | |
| | | very Good | 122 | | |
| | | Excellent | 75 | | |
| | | Total | 308 | | |
| 3. | How willing are nurses to answer your questions? | Poor | 1 | 3.83 | G |
| | | Accepted | 18 | | |
| | | Good | 95 | | |
| | | very Good | 113 | | |
| | | Excellent | 81 | | |
| | | Total | 308 | | |
| 4. | How do nurses communicate with patients, their families, and doctors? | Poor | 3 | 3.70 | G |
| | | Accepted | 27 | | |
| | | Good | 91 | | |
| | | very Good | 124 | | |
| | | Excellent | 63 | | |
| | | Total | 308 | | |

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| | | | | |
|--|--------------|-----|--|--|
| | Total | 308 | | |
|--|--------------|-----|--|--|

| No. | Items | Scale | F | M | Ass. |
|-----|---|--------------|-----|------|------|
| 5. | How often nurses communicate with your family and friends | Poor | 10 | 3.48 | F |
| | | Accepted | 45 | | |
| | | Good | 93 | | |
| | | very Good | 107 | | |
| | | Excellent | 53 | | |
| | | Total | 308 | | |
| 6. | How often do the nursing staffs allow your family and friends to help with your care? | Poor | 5 | 3.71 | G |
| | | Accepted | 26 | | |
| | | Good | 88 | | |
| | | very Good | 122 | | |
| | | Excellent | 67 | | |
| | | Total | 308 | | |
| 7. | How much kindness and respect did you receive from the nurses | Poor | 2 | 3.90 | G |
| | | Accepted | 18 | | |
| | | Good | 86 | | |
| | | very Good | 104 | | |
| | | Excellent | 98 | | |
| | | Total | 308 | | |
| 8. | Nurses' attention and concern for your condition | Poor | 2 | 3.74 | G |
| | | Accepted | 29 | | |
| | | Good | 87 | | |
| | | very Good | 118 | | |
| | | Excellent | 72 | | |
| | | Total | 308 | | |
| 9. | Caring | Poor | 1 | 3.84 | G |

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| | | | | | |
|--|---------------------|--------------|-----|--|--|
| | about your opinions | Accepted | 27 | | |
| | | Good | 74 | | |
| | | very Good | 125 | | |
| | | Excellent | 81 | | |
| | | Total | 308 | | |

| No. | Items | Scale | F | M | Ass. |
|-----|--|--------------|-----|------|------|
| 10. | Taking your needs into consideration | Poor | 2 | 3.79 | G |
| | | Accepted | 25 | | |
| | | Good | 95 | | |
| | | very Good | 99 | | |
| | | Excellent | 87 | | |
| | | Total | 308 | | |
| 11. | Daily routine for nurses | Poor | 5 | 3.65 | F |
| | | Accepted | 39 | | |
| | | Good | 85 | | |
| | | very Good | 108 | | |
| | | Excellent | 71 | | |
| | | Total | 308 | | |
| 12. | How well can the nurses reassure you and make you feel comfortable ? | Poor | 2 | 3.80 | G |
| | | Accepted | 31 | | |
| | | Good | 79 | | |
| | | very Good | 112 | | |
| | | Excellent | 84 | | |
| | | Total | 308 | | |
| 13. | Nurses' response speed when called | Poor | 5 | 3.82 | G |
| | | Accepted | 24 | | |
| | | Good | 73 | | |
| | | very Good | 125 | | |
| | | Excellent | 81 | | |
| | | Total | 308 | | |
| 14. | Skill and | Poor | 1 | 3.85 | G |
| | | Accepted | 24 | | |

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| | | | | |
|----------------------|--------------|-----|--|--|
| efficiency of nurses | Good | 82 | | |
| | very Good | 115 | | |
| | Excellent | 86 | | |
| | Total | 308 | | |

| No. | Items | Scale | F | M | Ass. |
|-----|---|--------------|-----|------|------|
| 15. | Regulating hydration | Poor | 4 | 3.83 | G |
| | | Accepted | 23 | | |
| | | Good | 78 | | |
| | | very Good | 118 | | |
| | | Excellent | 85 | | |
| | | Total | 308 | | |
| 16. | The calm atmosphere provided by the nurses | Poor | 8 | 3.76 | G |
| | | Accepted | 26 | | |
| | | Good | 83 | | |
| | | very Good | 107 | | |
| | | Excellent | 84 | | |
| | | Total | 308 | | |
| 17. | How considerate are nurses of your privacy? | Poor | 6 | 3.78 | G |
| | | Accepted | 23 | | |
| | | Good | 87 | | |
| | | very Good | 109 | | |
| | | Excellent | 83 | | |
| | | Total | 308 | | |
| 18. | What was the quality of care | Poor | 6 | 3.80 | G |
| | | Accepted | 26 | | |
| | | Good | 91 | | |
| | | very Good | 85 | | |
| | | Excellent | 100 | | |
| | | Total | 308 | | |
| 19. | In general, how is your health? | Poor | 2 | 3.74 | G |
| | | Accepted | 36 | | |
| | | Good | 91 | | |
| | | very Good | 90 | | |
| | | Excellent | 89 | | |
| | | Total | 308 | | |

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| | | | | |
|--|--------------|-----|--|--|
| | Total | 308 | | |
|--|--------------|-----|--|--|

| No. | Items | Scale | F | M | Ass. |
|--------------|---|--------------|-----|------|------|
| 20. | In general, what was the quality of care you received from the nurses | Poor | 3 | 3.96 | G |
| | | Accepted | 21 | | |
| | | Good | 60 | | |
| | | very Good | 125 | | |
| | | Excellent | 99 | | |
| | | Total | 308 | | |
| 21. | Based on the nursing care I received, I advise those close to me and my friends | Poor | 1 | 4.03 | G |
| | | Accepted | 9 | | |
| | | Good | 76 | | |
| | | very Good | 117 | | |
| | | Excellent | 105 | | |
| | | Total | 308 | | |
| Total | | | | 3.79 | G |

Ass: Assessment, M: Mean, (Poor= 1-2.33, Fair= 2.34-3.67, Good= 3.68-5).

This table presents the items of Patient's Satisfaction to the Quality of Nursing Care; the total average among participants reveals that patients' have good level of satisfaction about quality of nursing care.

Table (4): Overall Level of Patient's Satisfaction to the Quality of Nursing Care

| | | F | % | M. | Ass. |
|-------------------------------|------|-----|------|-----|------|
| <i>Patients' Satisfaction</i> | Poor | 9 | 2.9 | 2.6 | G |
| | Fair | 103 | 33.4 | | |

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| | | | | | |
|--|-------|-----|-------|--|--|
| | Good | 196 | 63.6 | | |
| | Total | 308 | 100.0 | | |

Ass: Assessment, M: Mean, (Poor= 1-1.66, Fair= 1.67-2.33, Good= 2.34-3)

This table reveals that, good level of satisfaction as overall among participants.

Table (5): Assessment of Indoor Environmental Quality

| No. | Items | Scale | F | M | Ass. |
|-----|--|-------------------|-----|------|------|
| | | | | | |
| 1. | The number of patients in the ward allows for easy breathing | Strongly Disagree | 10 | 3.59 | F |
| | | Disagree | 25 | | |
| | | Neutral | 95 | | |
| | | Agree | 128 | | |
| | | Strongly Agree | 50 | | |
| | | Total | 308 | | |
| 2. | There is enough natural air in the ward | Strongly Disagree | 10 | 3.80 | G |
| | | Disagree | 24 | | |
| | | Neutral | 65 | | |
| | | Agree | 129 | | |
| | | Strongly Agree | 80 | | |
| | | Total | 308 | | |
| 3. | There are enough filters in the ward to purify the air | Strongly Disagree | 14 | 3.69 | G |
| | | Disagree | 23 | | |
| | | Neutral | 73 | | |
| | | Agree | 134 | | |
| | | Strongly Agree | 64 | | |
| | | Total | 308 | | |
| 4. | I breathe easily in the ward | Strongly Disagree | 12 | 3.83 | G |
| | | Disagree | 23 | | |
| | | Neutral | 54 | | |
| | | Agree | 134 | | |
| | | Strongly Agree | 85 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|---|-------------------|-----|------|------|
| 5. | The temperature of the ward is appropriate | Strongly Disagree | 7 | 3.96 | G |
| | | Disagree | 19 | | |
| | | Neutral | 43 | | |
| | | Agree | 149 | | |
| | | Strongly Agree | 90 | | |
| | | Total | 308 | | |
| 6. | The humidity of the ward is appropriate | Strongly Disagree | 11 | 3.79 | G |
| | | Disagree | 23 | | |
| | | Neutral | 62 | | |
| | | Agree | 136 | | |
| | | Strongly Agree | 76 | | |
| | | Total | 308 | | |
| 7. | The sunlight enters the ward | Strongly Disagree | 17 | 3.77 | G |
| | | Disagree | 24 | | |
| | | Neutral | 67 | | |
| | | Agree | 106 | | |
| | | Strongly Agree | 94 | | |
| | | Total | 308 | | |
| 8. | There are enough windows to natural light to enter the ward | Strongly Disagree | 16 | 3.83 | G |
| | | Disagree | 15 | | |
| | | Neutral | 62 | | |
| | | Agree | 128 | | |
| | | Strongly Agree | 87 | | |
| | | Total | 308 | | |
| 9. | Lighting suits the nature of work in the ward | Strongly Disagree | 7 | 3.97 | G |
| | | Disagree | 16 | | |
| | | Neutral | 52 | | |
| | | Agree | 138 | | |
| | | Strongly Agree | 95 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|---|-------------------|-----|------|------|
| 10. | My concentration work is distracted by side conversations | Strongly Disagree | 23 | 3.40 | F |
| | | Disagree | 27 | | |
| | | Neutral | 111 | | |
| | | Agree | 97 | | |
| | | Strongly Agree | 50 | | |
| | | Total | 308 | | |
| 11. | Sounds of machines are bothering | Strongly Disagree | 24 | 3.42 | F |
| | | Disagree | 36 | | |
| | | Neutral | 93 | | |
| | | Agree | 98 | | |
| | | Strongly Agree | 57 | | |
| | | Total | 308 | | |
| 12. | Sounds of the phones for patients and staff | Strongly Disagree | 26 | 3.42 | F |
| | | Disagree | 37 | | |
| | | Neutral | 92 | | |
| | | Agree | 87 | | |
| | | Strongly Agree | 66 | | |
| | | Total | 308 | | |
| 13. | The patients and staff movement in the ward is disturbing | Strongly Disagree | 19 | 3.57 | F |
| | | Disagree | 35 | | |
| | | Neutral | 73 | | |
| | | Agree | 113 | | |
| | | Strongly Agree | 68 | | |
| | | Total | 308 | | |
| 14. | The sounds of the area around the ward are disturbing | Strongly Disagree | 26 | 3.49 | F |
| | | Disagree | 36 | | |
| | | Neutral | 72 | | |
| | | Agree | 109 | | |
| | | Strongly Agree | 65 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|--|-------------------|-----|------|------|
| 15. | There are enough spaces for movement in the ward | Strongly Disagree | 20 | 3.66 | F |
| | | Disagree | 23 | | |
| | | Neutral | 74 | | |
| | | Agree | 115 | | |
| | | Strongly Agree | 76 | | |
| | | Total | 308 | | |
| 16. | There is enough space to receipt stakeholder s in the ward | Strongly Disagree | 23 | 3.59 | F |
| | | Disagree | 27 | | |
| | | Neutral | 69 | | |
| | | Agree | 123 | | |
| | | Strongly Agree | 66 | | |
| | | Total | 308 | | |
| 17. | There is enough space to storage purposes | Strongly Disagree | 19 | 3.59 | F |
| | | Disagree | 30 | | |
| | | Neutral | 81 | | |
| | | Agree | 106 | | |
| | | Strongly Agree | 72 | | |
| | | Total | 308 | | |
| 18. | The walls paint of the ward with colors that incentive to work | Strongly Disagree | 23 | 3.72 | G |
| | | Disagree | 16 | | |
| | | Neutral | 99 | | |
| | | Agree | 95 | | |
| | | Strongly Agree | 74 | | |
| | | Total | 308 | | |
| 19. | The spaces are properly used in the ward | Strongly Disagree | 13 | 3.67 | F |
| | | Disagree | 23 | | |
| | | Neutral | 85 | | |
| | | Agree | 120 | | |
| | | Strongly Agree | 67 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| | | | | |
|--|--------------|-----|--|--|
| | Total | 308 | | |
|--|--------------|-----|--|--|

| No. | Items | Scale | F | M | Ass. |
|-----|--|-------------------|-----|------|------|
| 20. | The decoration is suitable for the nature of work | Strongly Disagree | 16 | 3.67 | F |
| | | Disagree | 20 | | |
| | | Neutral | 77 | | |
| | | Agree | 132 | | |
| | | Strongly Agree | 63 | | |
| | | Total | 308 | | |
| 21. | Electrical outlets are distributed appropriately in the ward | Strongly Disagree | 11 | 3.73 | G |
| | | Disagree | 21 | | |
| | | Neutral | 79 | | |
| | | Agree | 126 | | |
| | | Strongly Agree | 71 | | |
| | | Total | 308 | | |
| 22. | I can make changes in the ward by moving appliances | Strongly Disagree | 21 | 3.54 | F |
| | | Disagree | 28 | | |
| | | Neutral | 93 | | |
| | | Agree | 97 | | |
| | | Strongly Agree | 69 | | |
| | | Total | 308 | | |
| 23. | Office windows look at nature in the ward | Strongly Disagree | 20 | 3.65 | F |
| | | Disagree | 27 | | |
| | | Neutral | 72 | | |
| | | Agree | 112 | | |
| | | Strongly Agree | 77 | | |
| | | Total | 308 | | |
| 24. | There are fountains for water in the ward | Strongly Disagree | 16 | 3.68 | G |
| | | Disagree | 26 | | |
| | | Neutral | 75 | | |
| | | Agree | 115 | | |
| | | Strongly Agree | 76 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|--|-------------------|-----|------|------|
| 25. | There are green areas available in the ward | Strongly Disagree | 15 | 3.78 | G |
| | | Disagree | 18 | | |
| | | Neutral | 68 | | |
| | | Agree | 125 | | |
| | | Strongly Agree | 82 | | |
| | | Total | 308 | | |
| 26. | There are beautiful paintings in the ward | Strongly Disagree | 23 | 3.56 | F |
| | | Disagree | 35 | | |
| | | Neutral | 68 | | |
| | | Agree | 110 | | |
| | | Strongly Agree | 72 | | |
| | | Total | 308 | | |
| 27. | The hospital location is close to transportation | Strongly Disagree | 19 | 3.93 | G |
| | | Disagree | 16 | | |
| | | Neutral | 63 | | |
| | | Agree | 118 | | |
| | | Strongly Agree | 92 | | |
| | | Total | 308 | | |
| 28. | The hospital location is close to health clinics | Strongly Disagree | 19 | 3.70 | G |
| | | Disagree | 26 | | |
| | | Neutral | 63 | | |
| | | Agree | 119 | | |
| | | Strongly Agree | 81 | | |
| | | Total | 308 | | |
| 29. | The hospital location is close to entertainment venues | Strongly Disagree | 23 | 3.69 | G |
| | | Disagree | 31 | | |
| | | Neutral | 59 | | |
| | | Agree | 99 | | |
| | | Strongly Agree | 96 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|---|-------------------|-----|------|------|
| 30. | The hospital location is close to restaurants | Strongly Disagree | 19 | 3.74 | G |
| | | Disagree | 23 | | |
| | | Neutral | 67 | | |
| | | Agree | 108 | | |
| | | Strongly Agree | 91 | | |
| | | Total | 308 | | |
| 31. | The hospital location is close to places of worship | Strongly Disagree | 19 | 3.79 | G |
| | | Disagree | 17 | | |
| | | Neutral | 67 | | |
| | | Agree | 113 | | |
| | | Strongly Agree | 92 | | |
| | | Total | 308 | | |
| 32. | My healing increases with ventilation quality | Strongly Disagree | 6 | 4.15 | G |
| | | Disagree | 10 | | |
| | | Neutral | 41 | | |
| | | Agree | 127 | | |
| | | Strongly Agree | 124 | | |
| | | Total | 308 | | |
| 33. | My healing increases with the appropriate temperature | Strongly Disagree | 8 | 4.11 | G |
| | | Disagree | 9 | | |
| | | Neutral | 30 | | |
| | | Agree | 155 | | |
| | | Strongly Agree | 106 | | |
| | | Total | 308 | | |
| 34. | My healing increases with the quality of lighting | Strongly Disagree | 6 | 4.00 | G |
| | | Disagree | 10 | | |
| | | Neutral | 58 | | |
| | | Agree | 139 | | |
| | | Strongly Agree | 95 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

| No. | Items | Scale | F | M | Ass. |
|-----|--|-------------------|-----|------|------|
| 35. | My healing increases with lower noise | Strongly Disagree | 7 | 4.16 | G |
| | | Disagree | 10 | | |
| | | Neutral | 32 | | |
| | | Agree | 136 | | |
| | | Strongly Agree | 123 | | |
| | | Total | 308 | | |
| 36. | My healing increases with the quality of interior design | Strongly Disagree | 7 | 4.01 | G |
| | | Disagree | 11 | | |
| | | Neutral | 54 | | |
| | | Agree | 135 | | |
| | | Strongly Agree | 101 | | |
| | | Total | 308 | | |
| 37. | My healing increases with the quality of the Biophilia | Strongly Disagree | 5 | 4.11 | G |
| | | Disagree | 11 | | |
| | | Neutral | 40 | | |
| | | Agree | 140 | | |
| | | Strongly Agree | 112 | | |
| | | Total | 308 | | |
| 38. | My healing increases with the quality of ward | Strongly Disagree | 4 | 4.11 | G |
| | | Disagree | 12 | | |
| | | Neutral | 44 | | |
| | | Agree | 135 | | |
| | | Strongly Agree | 113 | | |
| | | Total | 308 | | |
| 39. | My healing increases with the quality of services | Strongly Disagree | 5 | 4.25 | G |
| | | Disagree | 8 | | |
| | | Neutral | 33 | | |
| | | Agree | 120 | | |
| | | Strongly Agree | 142 | | |
| | | Total | 308 | | |

Association between Indoor Environmental Quality and Patients' Satisfaction to the Quality of Nursing Care in Critical Care Units

| | | |
|-------|------|---|
| Total | 3.77 | G |
|-------|------|---|

Ass: Assessment, M: Mean, (Poor= 1-2.33, Fair= 2.34-3.67, Good= 3.68-5).

This table presents the items about Indoor Environmental Quality; the total average among participants reveals that good level as Indoor Environmental Quality.

Table (6): Overall level about Indoor Environmental Quality

| | | F | % | M. | Ass. |
|-------------------------------------|----------|-----|-------|------|------|
| Indoor Environmental Quality | Low | 9 | 2.9 | 2.57 | G |
| | Moderate | 114 | 37.0 | | |
| | High | 185 | 60.1 | | |
| | Total | 308 | 100.0 | | |

Ass: Assessment, M: Mean, (Low= 1-1.66, Moderate= 1.67-2.33, High= 2.34-3)

This table reveals that, high level of Indoor Environmental Quality as overall among participants.

Table (7): Relationship between Indoor Environmental Quality and Patients' Satisfaction

| | | Indoor Environmental Quality | | | Total | Pearson Chi-Square | Sig. |
|-------------------------------|------|------------------------------|----------|------|-------|--------------------|------|
| | | Low | Moderate | High | | | |
| Patients' Satisfaction | poor | 8 | 1 | 0 | 9 | 501.276 | .000 |
| | fair | 1 | 102 | 0 | 103 | | |
| | good | 0 | 11 | 185 | 196 | | |
| Total | | 9 | 114 | 185 | 308 | | |

This table displays that there is high significant relationship between **Indoor Environmental Quality and patients' satisfaction** at p-values=.00.

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

Table (8): Tests of Normality

The result in table (7) does not follow the normal distribution.

Tests of Normality

| | IEQ | Kolmogorov-Smirnov ^a | | | Shapiro-Wilk | | |
|--------------|------|---------------------------------|-----|--------------|--------------|-----|--------------|
| | | Statistic | df | Significance | Statistic | Df | Significance |
| Satisfaction | poor | .519 | 9 | .000 | .390 | 9 | .000 |
| | Fair | .514 | 114 | .000 | .391 | 114 | .000 |
| | good | . | 185 | . | . | 185 | . |

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

Table (9): Association between Indoor Environmental Quality and sociodemographic data

| List | Indoor Environmental Quality Socio-demographic data | Relationship | Association Sig. |
|------|--|--|------------------|
| 1. | Indoor Environmental Quality and Age | <i>Pearson Correlation</i> = .019 P-value= .744 | N.S. |
| 2. | Indoor Environmental Quality and Sex | <i>Pearson Correlation</i> = .004 P-value= .951 | N.S. |
| 3. | Indoor Environmental Quality and Marital status | <i>Pearson Correlation</i> = .054 P-value= .348 | N.S. |
| 4. | Indoor Environmental Quality and Educational level | <i>Pearson Correlation</i> = .087 P-value= .128 | N.S. |
| 5. | Indoor Environmental Quality and Occupational Status | <i>Pearson Correlation</i> = .106 P-value= .063 | N.S. |

This table reveals that there are not significant relationships between Indoor Environmental Quality and sociodemographic data at p-value= 0.05.

The discussion

1. Discussion of Sociodemographic Characteristics of Patients

1.1. Age Group (51–60 years – 28.9%)

The study found that the largest age group of ICU patients was between 51–60 years (28.9%). This is consistent with a study in which 30.2% of ICU patients were aged between 50–60 years, indicating that middle-aged and older adults are the most likely to require intensive care due to chronic diseases and surgical complications.⁽¹⁶⁾

The findings from Table (1) indicate that the majority of patients in the study fall within the 51–60 years age group (28.9%), followed by those aged 41–50 years (23.7%). This aligns with the nature of critical care admissions, which are more common among older adults due to the increased risk of chronic illnesses such as cardiovascular and respiratory diseases. According to Hirschman et al. (2011), older patients are more likely to require intensive care services due to age-related decline in health and increased incidence of comorbid conditions. This age-related distribution reflects the typical population profile in critical care units.

care admissions, which are more common among older adults due to the increased risk of chronic illnesses such as cardiovascular and respiratory diseases. According to Hirschman et al. (2011), older patients are more

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

care admissions, which are more common among older adults due to the increased risk of chronic illnesses such as cardiovascular and respiratory diseases. According to previous study older patients are more likely to require intensive care services due to age-related decline in health and increased incidence of comorbid conditions. This age-related distribution reflects the typical population profile in critical care units.⁽¹⁷⁾

1.2. Sex – Males (64.3%)

In this study, males constituted 64.3% of ICU patients. A similar proportion was reported in Saudi Arabia, where 65.8% of ICU admissions were male. This aligns with the global trend of higher critical illness incidence among men due to lifestyle, comorbidities, and occupational risk factors.⁽¹⁸⁾

In terms of gender, the data shows that 64.3% of the patients are males, which is consistent with previous research indicating that men are more frequently admitted to intensive care units than women. This could be attributed to the higher prevalence of certain high-risk behaviors, occupational exposures, and higher incidence of acute cardiac events among males, especially in middle and older age groups. Reported similar gender patterns in critical care utilization.⁽¹⁹⁾

1.3. Marital Status – Married (71.8%)

In the current study, 71.8% of the patients were married. This is close to findings who reported that 70.5% of ICU patients were married. Marital status is often associated with stronger emotional and logistical support systems, which is crucial for coping during critical illness.⁽²⁰⁾

The marital status distribution shows that 71.8% of patients are married. This is an important factor in patient recovery and satisfaction, as married individuals often benefit from emotional and practical support, which can positively impact their adherence to treatment and their outlook on care. Marital support is linked to better health outcomes and lower stress levels among hospitalized individuals.⁽²¹⁾

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

1.4. Education – Bachelor's Degree (26.9%)

In the present sample, 26.9% had a bachelor's degree. This is very close to findings who found that 28.1% of ICU patients held university degrees. This reflects a growing trend of better-educated patients accessing tertiary care hospitals.⁽²²⁾

Regarding educational level, 26.9% of the participants hold a bachelor's degree, indicating a relatively educated sample. Educational background can influence patients' understanding of their health condition, interaction with healthcare providers, and expectations of nursing care. As noted, higher educational levels are associated with better health literacy, which may affect satisfaction levels and engagement in decision-making.⁽²³⁾

1.5. Employment – Employed (45.5%)

In terms of employment, 45.5% of the participants were employed. A comparable percentage (47%) was found in their study on ICU patients in Egypt. Employment status may influence patients' health-seeking behaviors and their expectations of the healthcare environment.⁽²⁴⁾

Finally, the employment status of participants shows that 45.5% are employed. Employment may influence how patients perceive healthcare environments, especially in terms of time, cost, and communication. Employed patients may also experience higher stress related to their illness and its impact on productivity. Suggest that employment status can indirectly affect health outcomes and satisfaction due to differences in healthcare accessibility and support systems.⁽²⁵⁾

2. Discussion of Hospital Visit and Residency Variables

2.1. Number of Hospital Visits – Two Times (29.2%)

The result that 29.2% of patients visited the hospital twice suggests a moderate pattern of recurring health issues or follow-ups. A similar trend was reported in where 27.6% of ICU patients had a history of two hospital visits within the past year. Repeated hospitalizations may reflect either poor disease control or chronic illness progression.⁽²⁶⁾

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

2.2. Length of Hospital Stay – 1 to 7 Days (72.7%)

Most patients (72.7%) stayed in the hospital between 1 to 7 days, indicating relatively short-term ICU admissions, often due to stabilization or post-operative monitoring. This finding is comparable with reported that 70.1% of ICU stays lasted less than 7 days. Shorter lengths of stay are typically associated with better prognoses and fewer complications.⁽²⁷⁾

2.3. Room Type – Shared Rooms (76.9%)

The majority of patients (76.9%) were admitted to shared rooms, a common arrangement in many ICUs due to bed availability and space constraints. A similar percentage (78%) was found in studied ICU settings in public hospitals. However, shared rooms may compromise patient privacy and increase noise levels, which can affect satisfaction.⁽²⁸⁾

2.4. Family Accompaniment – 92.2%

A high percentage of patients (92.2%) reported being accompanied by family members, indicating the strong role of family support in hospital admissions. This aligns with findings by who noted that 93% of ICU patients in Middle Eastern settings were accompanied by a close family member, reflecting cultural norms that prioritize familial presence during illness.⁽²⁹⁾

2.5. Chronic Medical Conditions – 58.1%

More than half of the patients (58.1%) were diagnosed with chronic diseases, which is in line with the nature of ICU admissions that often stem from decompensation of chronic conditions. A comparable rate (60%) was reported by their multicenter ICU study. Chronic illness is a key factor in determining both hospital utilization and patient outcomes.⁽³⁰⁾

3. Discussion of Overall Patient Satisfaction to the quality of the Nursing Care

The results reveal that patients reported a good level of satisfaction with the overall quality of nursing care. This suggests that patients admitted to critical care units perceived the nursing

Association between Indoor Environmental Quality and Patients Satisfaction to the Quality of Nursing Care in Critical Care Units

staff as competent, responsive, and attentive to their needs. High satisfaction levels are typically associated with clear communication, timely assistance, and emotional support, which are essential elements in critical care settings.

A study that supports this finding, reporting that 68.4% of ICU patients in their sample expressed high satisfaction with nursing care . They attributed this satisfaction to the professional conduct and technical skills of nurses, especially in critical and high-stress environments.⁽³¹⁾

Similarly found that over 70% of patients in intensive care units in Kuwait were satisfied with the quality of nursing care. They emphasized that good interpersonal interactions, effective pain management, and frequent nurse presence positively influenced patient perceptions.⁽³²⁾

Moreover identified that patient's satisfaction increases significantly when they feel respected and informed. In that study, 67% of patients in Jordanian hospitals reported being satisfied with nursing care, highlighting the importance of clear explanation of procedures and involvement in decision-making.⁽³³⁾

4. Discussion of Overall Indoor Environmental Quality (IEQ)

The results indicate that participants perceived a high level of Indoor Environmental Quality (IEQ) in the critical care units. This suggests that key environmental factors such as cleanliness, noise levels, ventilation, temperature, lighting, and general comfort were well maintained and positively influenced patients' hospital experiences. A well-designed environment plays a crucial role in reducing patient stress, enhancing recovery, and improving satisfaction with care.

This finding is in line with the study by who emphasized those optimal environmental conditions in hospital rooms—including adequate lighting, minimal noise, proper ventilation, and cleanliness—can reduce anxiety, enhance patient comfort, and contribute to faster healing. In their research, more than 70% of

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

patients reported a positive perception of their indoor hospital environment when these factors were present.⁽³⁴⁾

Similarly found that patients who rated their hospital's environmental quality as high were significantly more likely to report satisfaction with overall care, regardless of the medical outcome. The presence of natural light, reduced crowding, and quiet surroundings were especially appreciated in critical care settings.⁽³⁵⁾

A study conducted by Middle Eastern hospitals also found that over 75% of ICU patients rated indoor environmental factors such as cleanliness, air quality, and noise control as satisfactory or excellent. These environmental features were strongly correlated with higher ratings of care satisfaction and reduced stress during hospitalization.⁽³⁶⁾

5. Discussion of the Relationship between Indoor Environmental Quality and Patient's Satisfaction to the quality of the nursing care

The current finding reveals a highly significant relationship between Indoor Environmental Quality (IEQ) and patient's satisfaction to the quality of the nursing care in critical care units ($p = .00$). This statistically significant result emphasizes that patients who perceived a better hospital environment were more likely to report greater satisfaction with nursing care. This aligns with the theory of "healing environments", which suggests that environmental conditions directly influence patient's psychological comfort, perception of care, and healing outcomes.

A similar strong association was reported by previous study that concluded that improvements in IEQ—especially in aspects such as noise control, lighting, air quality, and spatial design—were linked to higher satisfaction scores in both general and intensive care units. Their study emphasized that patients often judge nursing care partly through their environmental experiences.⁽³⁷⁾

Moreover found that environmental variables accounted for nearly 40% of the variance in patient's satisfaction scores, particularly in ICU and high-stress units. Their results highlighted

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

that quietness, room temperature, and cleanliness were critical factors affecting patients' perceived quality of nursing care.⁽³⁸⁾

Another relevant study in Middle Eastern hospital settings also found a statistically significant correlation ($p < .01$) between indoor environmental quality and overall patient satisfaction. They suggested that well-maintained and comfortable environments helped reduce patient stress, thereby improving their satisfaction with nursing communication, attentiveness, and competence.⁽³⁹⁾

6. Discussion of the Lack of Significant Relationship between Indoor Environmental Quality and Sociodemographic Data

The results indicate that there is no statistically significant relationship between Indoor Environmental Quality (IEQ) and patient's sociodemographic characteristics such as age, gender, marital status, education level, and employment ($p \geq 0.05$). This suggests that patients across different demographic groups perceived the hospital environment similarly, regardless of their background. This finding is supported by previous found that environmental perceptions were largely consistent across age and gender groups, especially in critical care environments where patients are highly dependent on nursing staff and less influenced by external demographic factors.⁽⁴⁰⁾

Similarly, a study by previous study who reported no significant differences in perceived environmental quality by demographic variables such as age, gender, or education in a hospital setting. They noted that patients tend to evaluate the environment based on immediate experience—such as cleanliness, lighting, and noise—rather than personal background.⁽⁴¹⁾

Furthermore studies concluded that the psychological and emotional response to the hospital environment was more universally human than demographically influenced. Their findings showed that supportive environments had consistent positive effects across different patient populations.⁽⁴²⁾

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

7. Conclusion of the Research Results

The findings of this study demonstrate that a majority of the participants were middle-aged (particularly in the 51–60 age range), predominantly male, and mostly married. A significant proportion held a bachelor's degree and were employed, reflecting a relatively educated and active demographic.

The study revealed that participants perceived a high level of Indoor Environmental Quality (IEQ) within the critical care units, and overall satisfaction among patients was also rated as good. Most notably, the results established a highly significant positive relationship between Indoor Environmental Quality and patient satisfaction ($p = .00$). This reinforces the importance of the internal healthcare environment—such as lighting, cleanliness, noise control, ventilation, and comfort—as a key determinant of how patients perceive their care experience.

Conversely, the study found no significant relationship between Indoor Environmental Quality and sociodemographic characteristics ($p = 0.05$). This suggests that all patients, regardless of age, gender, education, or occupation, tend to evaluate the environmental aspects of care similarly, emphasizing the universal importance of a well-maintained clinical environment.

In conclusion, these findings highlight the critical role of environmental conditions in shaping patient satisfaction and support the integration of environmental quality standards into quality improvement initiatives in critical care settings.

8. Recommendation

1. Conduct Longitudinal Studies

Future research should adopt longitudinal designs to explore how changes in indoor environmental quality over time impact patient satisfaction and clinical outcomes in critical care settings.

2. Examine Specific IEQ Components

Researchers are encouraged to isolate and examine

Association between Indoor Environmental Quality and Patient's Satisfaction to the Quality of Nursing Care in Critical Care Units

specific environmental factors (e.g., lighting, noise, air quality) to determine which have the greatest effect on satisfaction with nursing care.

3. Expand to Other Healthcare Settings

Similar studies should be conducted in other hospital departments (e.g., surgical, maternity, outpatient) to compare perceptions of environmental quality and care satisfaction across different units.

4. Include Diverse Patient Populations

Future studies should include larger and more diverse samples, considering variations in culture, age, health conditions, and hospital types to enhance the generalizability of results.

5. Incorporate Qualitative Methods

Using qualitative approaches such as interviews or focus groups can provide deeper insights into how patients perceive their environment and how it affects their emotional well-being and satisfaction with nursing care.

6. Link Environmental Quality with Health Outcomes

Research should explore the direct impact of indoor environmental quality on measurable health outcomes, such as length of stay, stress levels, sleep quality, and recovery rates.

7. Assess Staff Perceptions

Including nurses' and healthcare staff's perspectives on environmental quality could provide a more holistic understanding and reveal how environmental factors influence both patient care and staff performance.

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