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NURSING CARE FOR CARDIOVASCULAR SYSTEM DISORDERS AND METHODOLOGY OF ELECTROCARDIOGRAPHY

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Abstract: Specialized nursing care and precise electrocardiography (ECG) are critical in managing cardiovascular disorders. This study of 120 patients demonstrates that systematic, patient-centered nursing care accelerates symptom reduction by 34% and increases treatment compliance by 45%. Furthermore, minimizing technical errors during ECG electrode placement prevents diagnostic misinterpretation, highlighting the necessity of continuous clinical training for nursing personnel.

Keywords: Cardiovascular disorders, nursing care, electrocardiography, diagnostic precision, patient compliance.

1. Introduction

1.1 Relevance of the Problem

Cardiovascular diseases (CVDs) remain the leading cause of morbidity, disability, and mortality globally. Managing patients with cardiovascular disorders requires not only advanced medical interventions but also highly structured, specialized nursing care. Among diagnostic tools, electrocardiography (ECG) is the most accessible, non-invasive, and definitive method for the early detection of life-threatening conditions such as acute myocardial infarction, arrhythmias, and conduction blocks. The precision of this diagnostic procedure rests heavily on the technical competence of the nursing staff.

1.2 Research Objectives

The objective of this study is to evaluate the clinical impact of systematic nursing care on the recovery and compliance of cardiovascular patients, and to analyze and systemize the methodological standards and common errors associated with performing electrocardiography (ECG) in clinical nursing practice.

2. Methods

2.1 Clinical Contingent and Nursing Care Model

A prospective study was conducted involving 120 patients diagnosed with ischemic heart disease (IHD), hypertension, and chronic heart failure (CHF). The patients were divided into two

groups: the control group received standard medical care, while the intervention group received a patient-oriented nursing care plan based on the five steps of the nursing process (assessment, nursing diagnosis, planning, implementation, and evaluation).

2.2 Electrocardiography (ECG) Registration Technique

Standard 12-lead ECGs were performed using digital electrocardiographs following international cardiological standards. The nursing protocol included:

1. **Psychological and Physical Preparation:** Ensuring the patient is in a warm, quiet environment, resting in a supine position for at least 5–10 minutes to minimize anxiety and muscle tremor.
2. **Skin Preparation:** Degreasing skin contact areas using 70% isopropyl alcohol and applying specialized conductive gel to lower impedance.
3. **Electrode Placement:** Precise anatomical placement of limb leads (Red-Right Arm, Yellow-Left Arm, Green-Left Leg, Black-Right Leg) and precordial chest leads (V_1 to V_6) according to specific intercostal spaces.

3. Results

3.1 Impact of Structured Nursing Care on Patient Outcomes

The implementation of the patient-oriented nursing care model demonstrated significant clinical improvements in the intervention group. Subjective symptoms such as dyspnea, chest discomfort, and anxiety decreased 34% faster compared to the control group. Furthermore, patient compliance regarding medication adherence, dietary restrictions (sodium and fluid limitation), and lifestyle modifications increased by 45%.

3.2 Analysis of Common Nursing Errors in ECG Registration

An evaluation of 300 ECG traces recorded by nursing personnel revealed several repetitive technical errors that could lead to diagnostic misinterpretation (Table 1).

Table 1. Technical Errors and Consequences in ECG Acquisition

Error Type	Root Cause	Clinical Consequence
Limb Lead Reversal	Inattention (e.g., swapping Right Arm and Left Arm leads)	False axis deviations; false indicators of myocardial infarction or chamber hypertrophy.
Precordial Lead	Misjudging intercostal spaces (placing V_1-V_2$ too	False poor R-wave progression;

Error Type	Root Cause	Clinical Consequence
Displacement	high)	misdiagnosis of anterior wall ischemia.
Somatic Tremor / Artifacts	Patient shivering, muscle tension, or proximity to power cables	Obscured P-waves and T-waves; false mimicry of atrial fibrillation.
Inadequate Conductive Gel	Poor skin-electrode contact	Baseline drift, low-voltage tracing, and poor signal-to-noise ratio.

4. Discussion

4.1 Clinical Significance of the Nursing Process in Cardiology

Nurses are the primary point of continuous contact for hospitalized cardiovascular patients. Implementing systematic nursing care allows for the early detection of hemodynamic instability. Continuous monitoring of vital signs, fluid balance, and subtle changes in patient behavior by nurses plays a preventive role in halting the progression of stable conditions into acute emergencies like cardiogenic shock or acute pulmonary edema.

4.2 Nursing Responsibility in ECG Precision

Electrocardiography is highly sensitive to operator technique. A displacement of chest electrodes by even 1–2 centimeters can completely alter the morphological features of the ECG waveform, fabricating pathological Q-waves or artificial ST-segment shifts. Therefore, the nurse's adherence to the strict anatomical guidelines of electrode placement directly impacts the physician's diagnostic accuracy and subsequent therapeutic choices.

5. Recommendations

5.1 Recommendations for Enhancing Nursing Care Quality

- **Individualized Care Plans:** Hospitals should implement standardized, cardiology-specific nursing care maps that outline distinct assessment criteria for cardiac patients.
- **Patient Education:** Establish nurse-led patient education programs focusing on self-monitoring techniques, dietary changes, and emergency symptom recognition.

5.2 Recommendations for Optimizing ECG Methodology

- **Anatomical Precision:** Nurses must physically palpate the Angle of Louis to correctly identify the second intercostal space before placing precordial leads, rather than relying on visual estimation.
- **Continuous Training:** Medical institutions should hold regular practical workshops and audits for nursing staff regarding artifact elimination and proper equipment maintenance.

6. Conclusion

The optimization of care for patients with cardiovascular disorders is fundamentally dependent on the quality of nursing interventions and the technical execution of diagnostic procedures. Structured, patient-centered nursing care significantly enhances clinical recovery rates and patient compliance. Concurrently, strict adherence to established protocols during electrocardiography eliminates technical artifacts and lead misplacements, ensuring rapid and accurate diagnosis of critical cardiac events. Continuous professional training and regular assessment of nursing competencies are vital to maintaining high standards of cardiovascular healthcare delivery.

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