Test Analysis

Were Vincent O

The scores and various percentages for each of the students

STUDENT	SCORE	PERCENTAGES
Student 1	17/19	89%
Student 2	16/19	84%
Student 3	15/19	78%
Student 4	15/19	78%

❖ **Frequency distribution and normal distribution**

a. Frequency distribution

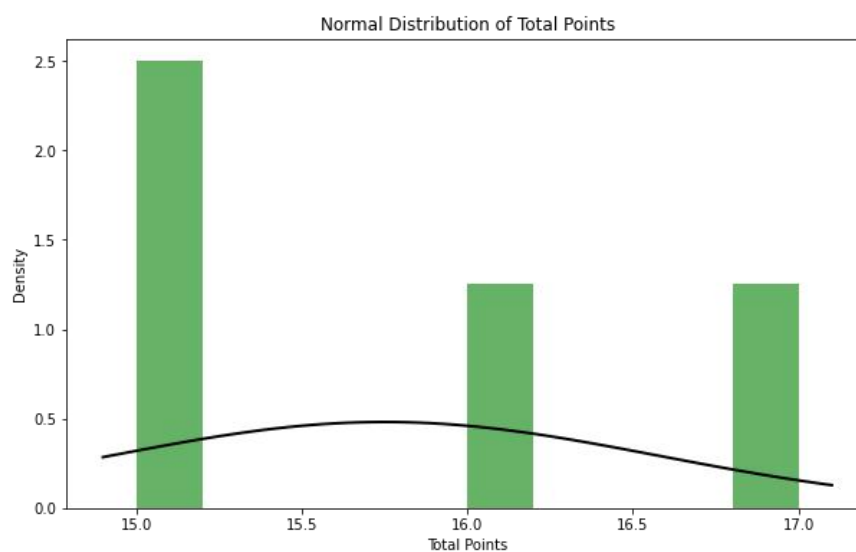-The frequency distribution of the total points out of 19 for the exam is as follows

Score	Frequency
15	2
16	1
17	1

This table shows the distribution of students' scores, indicating that most students scored around 15 points.

b. Normal distribution

✦ Mean Score: 15.75
✦ Standard Deviation: 0.829

With a mean of *15.75* and a standard deviation of *0.829,* we can infer that the scores are tightly clustered around the mean, indicating relatively low variance.

❖ **Median**

● Median Score: ***15.5***

This shows that the middle score in the data set is 15.5, aligning closely with the mean, indicating a relatively symmetric distribution of scores(Adams & Khoo, 1993).

❖ **Standard deviation**

Standard Deviation: ***0.82915619758885.*** The standard deviation of 0.83 indicates that the scores of the students vary by approximately 0.83 points from the mean, suggesting relatively low variability in the exam results(Oermann et al, 2024).

❖ **Central Tendency**

Statistic	Value
Number of quiz items	19
Number of peers	4
Mean raw score	15.75
Mean % score	82.89%
Median	15.5
Mode	15
Low score	15
High score	17
Standard deviation	0.83

Normal distribution as evidenced by mean and median having close values (Bastable, 2019, p. 227).

❖ **P level calculation**

Based on your provided data, the number of correct responses for each question can be computed from the responses of four students.

Test #	# Correct Responses	# Peer Responses	p Value
1	3	4	0.75
2	0	4	0
3	3	4	0.75
4	4	4	1
5	4	4	1
6	4	4	1
7	4	4	1
8	4	4	1
9	4	4	1
10	4	4	1
11	3	4	0.75
12	4	4	1
13	4	4	1
14	2	4	0.5
15	1	4	0.25
16	4	4	1
17	4	4	1
18	3	4	0.75
19	4	4	1

Desirable p-values- According to Bastable (2019), ideal p-values range from 0.30 to 0.70. The majority of the questions fall outside this range, with most being either too easy (p = 1.00) or too difficult (p = 0.00).

- T-Statistic: 1.5667
- P-Value: 0.2152

With a P-value of 0.2152, we cannot reject the null hypothesis, suggesting there is no significant difference in this set of scores from what would be expected under normal circumstances (Horne, 1995).

❖ **Discrimination index**

Test #	P u	P 1	Discrimination Index
1	3/4	1/4	0.52
2	2/4	2/4	0
3	2/4	1/4	-0.17
4	3/4	0/4	0.52
5	2/4	0/4	0.52
6	2/4	0/4	0.52
7	2/4	0/4	0.52
8	3/4	1/4	0.52
9	2/4	1/4	-0.17
10	2/4	0/4	0.52
11	2/4	0/4	0.52
12	1/4	3/4	0.9
13	1/4	2/4	0.17
14	3/4	0/4	0.52
15	3/4	0/4	0.52
16	1/4	1/4	0
17	1/4	2/4	0.17
18	1/4	1/4	0
19	2/4	0/4	0.52

This table provides the discrimination index for each test item based on the performance of the upper and lower group of students. Values close to +0.20 and above indicate good discriminative power of the items (Matlock-Hetzel, 1997).

Key Observations

✤ Questions with valid discrimination indices show how well they distinguish between high and low scorers.

✤ A negative index (-0.17) may indicate that students with lower total scores answered the question correctly more often, suggesting potential issues with question clarity or content(Oermann et al, 2024).

✤ NaN values could arise due to incomplete data or if the question did not have enough variance in responses.

❖ **Mapping Exam Items to Learning Objectives**

To map a 20-item exam to learning objectives, Bloom's taxonomy, and NCLEX categories, we will follow a structured approach:

i. *Step 1: Map Exam Items to Learning Objectives*

Each question is designed to assess a specific learning objective in the context of nursing education. We align each question with key learning goals, such as understanding pathophysiology, clinical decision-making, or patient education (Moxley et al, 2017).

ii. Step 2: Align Questions with Bloom's Taxonomy

Bloom's taxonomy classifies learning objectives by cognitive complexity, ranging from simple recall to more complex analytical skills. We'll categorize questions using the following levels;

- Remembering- Recall facts and basic concepts.
- Understanding- Explain ideas or concepts.
- Applying- Use information in new situations.
- Analyzing- Draw connections among ideas.
- Evaluating- Justify a decision.
- Creating- Produce new or original work.

iii. Step 3: Map to NCLEX Categories

The NCLEX-RN exam is organized by categories that reflect areas of nursing practice. These categories include the following;

- Management of Care
- Safety and Infection Control
- Health Promotion and Maintenance
- Psychosocial Integrity
- Basic Care and Comfort
- Pharmacological and Parenteral Therapies
- Reduction of Risk Potential
- Physiological Adaptation

Table: Mapping Questions to Learning Objectives, Bloom's Taxonomy, and NCLEX Categories

Question Number	Learning Objective	Bloom's Taxonomy Level	NCLEX Category
1	Identify critical cardiovascular complications	Analyzing	Physiological Adaptation
2	Recognize lifestyle modifications for diabetes	Applying	Health Promotion and Maintenance
3	Prioritize cardiovascular complications	Evaluating	Physiological Adaptation
4	Develop care plan for coronary artery disease	Creating	Management of Care
5	Differentiate Type 1 and Type 2 diabetes risks	Understanding	Reduction of Risk Potential
6	Identify pharmacological treatments	Remembering	Pharmacological and Parenteral Therapies
7	Emphasize importance of glucose control	Understanding	Reduction of Risk Potential
8	Assess complications from diabetic neuropathy	Applying	Physiological Adaptation
9	Implement nursing interventions for high CV risk	Applying	Management of Care
10	Monitor primary cardiovascular complication	Analyzing	Physiological Adaptation
11	Implement lifestyle changes to reduce CV risks	Applying	Health Promotion and Maintenance
12	Describe the benefits of ACE inhibitors	Understanding	Pharmacological and Parenteral Therapies
13	Monitor levels to prevent heart attacks	Applying	Reduction of Risk Potential
14	Prioritize nursing care for blurred vision	Evaluating	Physiological Adaptation
15	Recognize major CV risk factors in diabetes	Remembering	Reduction of Risk Potential
16	Prioritize chest pain management	Applying	Physiological Adaptation
17	Include care plan for coronary artery disease	Creating	Management of Care
18	Interpret HbA1c levels in relation to CV risks	Analyzing	Physiological Adaptation
19	Identify goal of statin therapy in diabetes	Understanding	Pharmacological and Parenteral Therapies
20	Implement patient education for diabetes	Applying	Health Promotion and Maintenance

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❖ **Sample Exam Questions with Rationale**

1. *Question 1-* A patient with Type 2 diabetes presents with chest pain and shortness of breath. Which cardiovascular complication should the nurse monitor for?

Rationale- This question assesses the student's ability to identify critical cardiovascular risks, an essential skill in managing diabetic patients. It aligns with the objective of evaluating clinical decision-making skills.

2. *Question 2-* Multiple-Response: Select all that apply. Which lifestyle modifications should be recommended to reduce cardiovascular risks in a patient with diabetes?

Rationale- This question tests the application of knowledge regarding lifestyle interventions for diabetes management. Students must demonstrate understanding and apply it to clinical situations.

3. *Question 3-* When managing a patient with uncontrolled Type 2 diabetes, which cardiovascular complication poses the highest risk?

Rationale- This question evaluates the student's ability to prioritize high-risk complications, ensuring they understand the hierarchy of care in diabetic emergencies.

4. ***Question 4-*** A diabetic patient with coronary artery disease requires a care plan. Which of the following should be included?

Rationale- This question requires students to create a comprehensive care plan, testing higher-level cognitive skills like synthesis and application of knowledge.

5. ***Question 5-*** What is the primary difference between Type 1 and Type 2 diabetes regarding cardiovascular risks?

Rationale- By assessing the student's ability to differentiate between types of diabetes, this question targets understanding and comprehension.

6. ***Question 6-*** Which pharmacological treatment is typically used to manage cholesterol in diabetic patients to reduce cardiovascular risk?

Rationale- This question tests the student's recall of common pharmacological interventions, a foundational aspect of diabetic care.

References

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