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Impact of mathematics in nursing

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RESUME:
Cet article a pour objectif de faire le point sur l'impact de la mathématique en sciences infirmières, discipline éliminée du cursus avec l'actuelle reforme et pourtant cette dernière s'avère indispensable en soins infirmiers et plus particulièrement sur la recherche dans ce domaine. Dans cet article, nous rappellerons quelques notions élémentaires de mathématiques d'usage courant en nursing et ensuite, nous présenterons quelques constats sur la situation dans ce domaine dans nos milieux après un test adressé aussi bien aux finalistes en sciences infirmières qu'aux praticiens au regard de l'expérience. Découlant de ces constats, notre étude a montré qu'il était préoccupant de retourner cette discipline en sciences infirmières, car les anciens s'en sortent mieux à la suite de leur expérience mais les débutants accusent de nombreuses lacunes sur la titrimétrie, calcul de doses et autres.
Mots clés : mathématique, soins infirmières, calcul, erreurs.

ABSTRACT :
This work aims at showing the impact of mathematics in nursing because mathematics has been removed from the curriculum since the last reforms, while it is important for nursing and research in nursing. This work will deal with some mathematics bases used in nursing and will show some observations on the situation after a test given to both students in last year of nursing and nurse practitioners focusing on experience. From these observations, our study has shown that it is important that the discipline be part of the curriculum, because experienced practitioners manage to use mathematics well thanks to their exprience while the beginners have many problems
Keywords : mathematics in nursing, dose calculation in nursing, titrimetric errors in nursing.

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I. INTRODUCTION

Mathematics is a very old discipline and hence the teaching of mathematics has a long tradition. Mathematics is often used in medical professions. There are entire courses taken by pharmacists focusing on medical terminology, abbreviation, units of measurement, and clinical calculations.

As a medical profession, nursing is a profession which proficiency in mathematics is necessary for safety administration of medications and intravenous fluids. So, Math proficiency is considered one of the requirements of nursing since mathematical competencies are necessary for accurate computation of medication dosages [1].

However, in today's university the number of students needing to apply for some disciplines of mathematics in their studies is no more increasing, while the need of people who use efficiently math in their daily activities is rapidly increasing.

This research has been made to see how nurse practitioners and students in nursing are aware of mathematical bases that they are likely to deal with in their work. It intends to give nurses and students in nursing a taste of the math used in determining drug doses for patients. It is imperative that the patient receives the correct dosage of any medication since any incorrect calculations could be life threatening. In most cases, drug doses will be prescribed in metric units. This International System of Units will eventually become the only system used in drug doses.

Furthermore, we notice that in the curriculum of nursing the teaching of mathematics, even the very basic notions are nearly abandoned. In practice, difficulties encountered by nurses and students in this field are alarming with regard to units conversion, calculation of doses, as well as the timing of medication administration to patients[2].

For the sake of good organization, this paper is divided into three sections:

The first section deals with some mathematical bases, the second section emphasizes on the research methodology, and the third and last section will deal with the presentation of the results, discussions and suggestions.

II. MATERIAL AND METHODS

II.1. Essential math review for medication calculations

This part contains all of mathematics needed for calculating medicine dosages. The nurse is being confident in his own ability to understand and interpret basic arithmetic and do the basic math to reduce chances of error.

Time is precious for students, staff nurses, and patients. Being skilled with the medication arithmetic frees up needed time for other aspects of nursing care. No one wants to wait a

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half-hour for a medication while the nurse laboriously attempts to calculate the dosage [3].

Essential math vocabulary and concepts
Basic mathematical symbols are graphic representations of mathematical expression. Many symbols such as ÷, ×, and → are easily understood. Others may be misinterpreted and lead to errors. The first four symbols below are examples of symbols that are seen in patient-related records (Table I).

Table I. basic mathematical symbols

Read	Write	Example
<	Less than	The baby weighs < 5 pounds
>	Greater than	The total cholesterol was high (>200)
≥	Greater than or equal to	Give the medications if the systolic pressure ≥ 160
≤	Less than or equal to	Hold the medication if its temperature is ≤ 100
√	Square root	$\sqrt{16}$ means the square root of 16

Clinical relevance

Keep in mind the potential effect on a patient receiving a medication that was supposed to be held for a pulse <50 because the nurse misinterpreted that symbol as "greater than"[4].

Whole numbers
A whole number is a number that is evenly divisible by the number and 1.

- Multiplying and dividing whole numbers by the number 1

Working with whole numbers is easier than working with fractions and decimals.

- Remember that a number divided by or multiplied by 1 will not change in value.
  To write a whole number as a fraction, write the whole number as a numerator with the number 1 as the denominator.
  The *numerator* (N), the number above the dividing line, indicates the number of parts out of a total number of equal parts, the *denominator* (D), designated below the dividing line [5].

Examples: division by 1

$$\frac{500}{1} \frac{Numerator}{Denominator} = 50030 = \frac{30}{1}\frac{N}{D} = 30 \quad 10 = \frac{10}{1}\frac{N}{D} = 10$$

Implied Decimal Points and Trailing Zeros
A whole number has an implied decimal point immediately following the whole number (e.g., 1. And 20.)

➢ Do write 1 and 20; do not write 1. And 20.
Implied decimal points, if written, can be misread as commas, zeros, or the number one.
Zeros that follow the last number after a decimal point is called trailing zeros. Do write 1.3; do not write 1.30. Trailing zeros are only appropriate for printed laboratory reports and statistical reports.

➢ Avoid writing implied decimal points and trailing zeros.

Examples: Decimals can be mistaken for commas. Trailing zeros contribute to reading errors.

20.0 403~~.0~~ 8~~.000~~ 50.9~~0~~ 400~~.000~~ 2.4~~00~~

- Do not remove zeros that occur within a number. The number 3.08 would be read as 3.8 if this error was made, resulting in a ten times error.
- Do not remove zeros that occur before a decimal point. They alert the reader to a decimal that follows the zero immediately.
  0.04 0.4 0.004
- Always place a zero in front of a decimal point that is not preceded by a whole number.
- Always eliminate implied decimal points and trailing zeros that follow a whole number. Implied decimal point and trailing zeros do not change the value, but they do lead to reading errors and medication dosage errors.

Dividing a number or fraction by itself
A number or fraction divided by itself equals 1
A number or fraction divided by 1 equals itself
Examples:

Equals the number 1: $\frac{500}{500} = 1 \frac{3}{3} = 1 \quad \frac{10}{10} = 1$

Equals itself: $\frac{500}{1} = 500 \quad \frac{3}{1} = 3 \quad \frac{10}{1} = 10$

Sum
A sum is the result of addition
Examples:
The sum of 3 and 6 is 9 the sum of 2 and 2 is 4

Product
A product is the result of multiplication of numbers, decimals, fractions, and other numerical values.
Examples:
The product of 3 and 6 is 18 the product of $\frac{1}{3}$ and $\frac{1}{8}$ is $\frac{1}{24}$

Factor
A factor is any whole number that can divide another number evenly without a remainder. For example, in addition to 1 and 18, the numbers 2, 3,6 and 9 are factors of 18. Seventeen only has factors of 1 and 17. No other whole numbers divide 17.
Examples:

3 has factors of 1 and 3
25 has factors of 1, 5, and 25
60as factors of 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, and 60

- A factor can only be less than or equal to a given whole number. One and the number itself are always factors. "Factoring" the number 9 gives you 1, 3, 9.
- Factor also has other meanings. It also can be used as a general term to describe relevant data. For example, "He examined all the factors in the

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case" or "A dimensional analysis equation permits all the factors to be entered in one equation"

II.2. Metric Measurements

The Modern metric measurement system is logical, precise, and easy to work with because it's a standardized decimal system using multiples (powers) of 10 similar to our monetary structure which is also based on a decimal structure. With a little practice and repetition nurses will be very comfortable with it.

It has been adopted by most countries of the world for standardized weight and measurements. Known as the International System of Units *(SI),* it is the Modern form of the former French metric system. It is required for admission to the European Union. Resistance to change and expense involved have slowed the U.S "metrication" progress except in the scientific community.

This paper focuses on understanding the metric measurements used in medication orders and records, on medication labels, in laboratory reports, and nursing practice. It also includes examples of household measurements. Household measures are used for some medications taken at home, primarily liquids. Nurses need to know the metric care practice, for patient and family discharge and home care teaching. Teaspoon A does not equal teaspoon B.

Metric Measurements: Base Units

Three base units are commonly used in the medical field. Two are used mainly for medication doses (gram and liter) and one (meter) is used occasionally for topical medications.

Table II. ***Base units***

Dimensions	Metric base units	Approximate system equivalent
Weight (or mas)	Gram (g)	About 1/30 ounce dry weight
Volume	Liter (l)	About 4 measuring cups, a little more than a quart
Length	Meter (m)	About 39 inches, a little more than a yard

The table II show that, the abbreviation for the base unit liter is capitalized (L) to avoid the misreading as the number 1. The base unit abbreviations for gram (g) and meter (m) are written in lower case letters. No other abbreviations are authorized [10].

Metric Units Number Line

The following metric unit number line illustrates the relationship of the values for selected metric prefixes.

Table III. Metric unit's prefixes

Prefix	Abbreviation	Value
Kilo	K	1000
Hector	H	100
Deka	Da	10
Deci	D	0,1
Centi	C	0,01
Milli	M	0,001
Micro	Mc	0,000001

II.3. Metric Notation

The following are examples of correctly written metric quantities: 100 mg, 10 L, 250 cm, 2500 mcg, and 1,0000,000 kg.
Do not write an (m) to look like a (w) or a (u). Do capitalize (L) for liter.
Metric abbreviations are case sensitive. Do not close up a© so that (cm) looks like (am). Do use commas to group numbers with more than three consecutive zeros in groups of three from right to left.
Do not make up your own metric abbreviations and do not pluralize metric abbreviations.

Table IV. Guide to metric notation and examples

Guide to metric notation	Examples
Abbreviations are always used when accompanied by a number. The number followed by a space, precedes the abbreviation.	10 mg, 2g, 5 L Metric terms are written out when unaccompanied by a number, as illustrated in the following sentence: "write out grams and milligrams".
Metric abbreviations are always singular. They are not pluralized.	Milligram is abbreviated mg Liter is abbreviated L Write mg, not mgs; g, not gs; and L, not Ls
There is no period after metric abbreviations except when they fall at the end of a sentence.	Give 2 mg, not 1 mg. He drank 2 L of water, followed by 1 L.

Slashes appear in many drug and laboratory references. The nurse must be able to interpret them. Do not write them. They have been mistaken for the number one (1) the word "per" is to be written out instead of a slash.

Equivalence Metric Measurement of Volume

A liter is slightly greater than a quart (1L = 1,06qt; 1 qt = 0,9L). Many intravenous solutions are delivered in 1L containers. Examine a water or soda bottle.
Does it contain 250 mg or 1 L. Write 240 ml or 8 – 07 measuring cup at home. Drink 240 ml of water several times a day instead of 8 ounces or 1 cup.

In many part of the world, gasoline is purchased and paid for by liter. If you normally buy 10 gal, you buy about 40 L. While this conversion is not exact, using it when buying gas abroad will assist you in deciding how much to buy and give you an idea of what you will owe. Making a quick conversion is safer than saying, "Fill the tank".

The abbreviation for cubic centimeter (cc) is often written to indicate milliliters (mL). The recommended and preferred abbreviation for milliliter s mL because cc has been misread as two zeros (00), resulting in medication errors.

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Interpret 1cc as 1 m L, write 1 mL. We can memorize 1000 mL = 1 L. In clinical agencies, liquids are usually ordered and supplied in milliliters and liters. A special calibrated medicine teaspoon holds 5 mL of fluid. Plastic liquid medicine cups, referred to as ounce cups, hold 80 mL, which is approximately 10z. Think 30 mL for an ounce. Intravenous medications are also supplied in milliliter and liters[10].

II.4. Equivalent Metric Measurement of Length

When you are assisting with cardiopulmonary resuscitation (CPR), it is helpful to know that fully dilated pupils (10 mm, or 1 cm) can indicate that the patient has been without oxygen for more than 4 minutes. Assessment of the patients of the eye provides a clue as to a pupil (1 – 2 mm) may be a reaction to strong light or to contain narcotics or other medications. Familiarity with millimeters and specified areas, such wounds or scars, or in documenting the application of ointments in the clinical setting.

We can memorize: 10 mm = 1 cm
100 cm = 1 meter
1000 mm = 1 meter

Once you have established some personal landmarks in millimeters and centimeters, you can estimate the size of skin lesions at the bedside by comparing them with your own lesions without searching for a ruler. Topical prescription ointments usually supply paper tape rulers when exact measurements are needed. Note that some ointment may be prescribed and measured in inches.

II.5. Finding Equivalents: changing milligrams to grams and grams to milligrams

Grams and milligrams are the units most frequently encountered in the administration of tablets and capsules [8]. Equivalent amounts within units of the metric system are found by moving decimal places. Moving a decimal point three places to the right or left is needed to convert grams and milligrams.

Table V. Rule to change milligrams to grams and gams to milligrams

To change milligrams, divide milligrams by 1000. Divide milligram by 1000 moving the decimal place (implied or existing) three places to the left: 2500 mg = 2.5 mg	To change grams to milligrams by 1000. Multiply grams by 1000 by moving the decimal place (implied or existing) three place to the right: 2.5 g = 2500 mg

For example, how many milligrams are in 1.5 grams?
Conversion factor: 1 000 mg = 1 g
Step 1: step 2 × step 3 = Answer

Desired: starting × Given Quantity and = Estimate, multiply
Answer unit factor and conversion factor(s) Evaluate

mg: $\frac{1000\ mg}{1\ g} \times \frac{1.8\ g}{1} = 1500$ mg

Cancel units

stop and check setup
The final equation will be written like this:

mg: $\frac{1000\ mg}{1\ g} \times \frac{1.8\ g}{1} = 1500$ mg in 1.8 g

Analysis: the simple conversion equation contains the desired answer unit and the given information. The selected starting factor, a conversion factor, is in the correct orientation. The given unwanted units, gram are canceled.
A number 1 is placed as a denominator under 1.5 g to hold the 1.5 g in the numerator position. This mains alignment and helps prevent multiplication errors.
Evaluation: only mg remains in the answer. My estimate that the number would be 1.5 times 1000 is supported by the answer. (Math check: 1000 x 1.5 = 1500) the equation is balanced [10].

II.5.1. Examining Micrograms

The metric equivalents of micrograms are as follows: 1000 mcg = 1 mg
1000 000 mcg = 1 g
Milligrams and grams are among the commonest measurement in medications. Of the two, milligrams are used more frequently. In order to avoid errors, it is advisable to avoid using decimals and to select an equivalent that can be stated in whole numbers. Micrograms are very small units. Microgram and milligram conversions are needed for intravenous calculations and occasionally for very small doses of powerful medications. Just as with milligrams and grams, it is helpful to examine the prefix to determine the equivalent unit.
To change microgram to milligram, divide microgram by 1000.
To change milligrams to micrograms, multiply milligrams by 1000.

II.6. Drug dosage Calculations

Drug calculations vary depending on whether you are dealing with liquid or solid medications, or if the dose is to be given over a period of time. In this section we will go over each of these situations in turn.
It is very important that you know how drug dosages are worked out, because it is good practice to always check calculations before giving medication, no matter who worked out the original amount. It is far better to point out a mistake on paper than overdose a patient.

a) Tablets

Working out dosage from tablets is simple.

Formula for dosage:

$$\frac{Total dosage required}{dosage per tablet} = Number of tablets required$$

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Note-If your answer involves small fractions of tablets, it would be more sensible to try to find tablets of a different strength rather than try to make $\frac{2}{3}$ of a tablet for example.

Examples

1. A patient needs 500mg of X per day. X comes in 125mg tablets. How many tablets per day does he need to take?
Total dosage required is 500mg,
Dosage per tablet is 125mg
So our calculation is $\frac{500}{125} = 4$
He needs 4 tablets a day

b) Liquid Medicines

Liquid medicines are a little trickier to deal with as they will contain a certain dose within a certain amount of liquid, such as 250mg in 50ml, for example.
To work out the dosage, we use the formula:

$$\frac{Whatyouwant}{Whatyou'vegot} \times Whatit'sin$$

Note: In order to use this formula, the units of measurement must be the same for 'What you want' and 'What you've got'; i.e. both mg or both mcg etc.

Examples

2. We need a dose of 500mg of Y. Y is available in a solution of 250mg per 50ml.
In this case,
What we want = 500
What we've got = 250
What it's in = 50
So our calculation is $\frac{500}{250} \times 50 = 100$
We need 100ml of solution.

c) Medicine over Time

1) Tablets/liquids

This differs from the normal calculations in that we have to split our answer for the total dosage into 2 or more smaller doses.
Look at Example 1 again. If the patient needed the 500mg dose to last the day, and tablets were taken four times a day, then our total of 4 tablets would have to be split over 4 doses.

$$\frac{\text{Total amount of liquid/tablets for day}}{\text{Number of doses per day}} = \text{Amount to be given per dose}$$

We would perform the calculation: 4÷4=1
So he would need 1 tablet 4 times a day.

2) Drugs delivered via infusion

For calculations involving infusion, we need the following information:

- The total dosage required
- The period of time over which medication is to be given
- How much medication there is in the solution

Example

4. A patient is receiving 500mg of medicine X over a 20 hour period.
X is delivered in a solution of 10mg per 50ml.
What rate should the infusion be set to?
Here our total dosage required is 500mg

Period of time is 20 hours
There are 10mg of X per 50ml of solution
Firstly we need to know the total volume of solution that the patient is to receive.
Using the formula for liquid dosage we have:

$\frac{500}{10} \times 50 = 2500$ So the patient needs to receive 2500mls [6,9].

We now divide the amount to be given by the time to be taken: $\frac{250}{20} = 125$
The patient needs 2500mls to be given at a rate of 125mls per hour

Note: Working out medicines over time can appear daunting, but all you do is work out how much medicine is needed in total, and then divide it by the amount of hours/doses needed

d) Drugs labeled as a percentage

Some drugs may be labeled in different ways to those used earlier.

V/V and W/V

Some drugs may have V/V or W/V on the label.
V/V means that the percentage on the bottle corresponds to volume of drug per volume of solution i.e 15% V/V means for every 100ml of solution, 15ml is the drug.
W/V means that the percentage on the bottle corresponds to the weight of drug **per volume** of solution. Normally this is of the form 'number of grams per number of milliliters'. So in this case 15% W/V means that for every 100ml of solution there are 15 grams of the drug.
If we are converting between solution strengths, such as diluting a 20% solution to make it a 10% solution, we do not need to know whether the solution is V/V or W/V.

Examples

5. We need to make up 1 liter of a 5% solution of A. We have stock solution of 10%.
How much of the stock solution do we need? How much water do we need?
We can adapt the formula for liquid medicines here:

$$\frac{\mathbf{Whatwewant}}{\mathbf{Whatwe'vegot}} \times \mathbf{Whatwewantittobein}$$

We want a 5% solution. This is the same as $\frac{5}{100}$ or $\frac{1}{20}$
We've got a 10% solution. This is the same as $\frac{10}{100}$ or $\frac{1}{10}$
We want our finished solution to have a volume of 1000ml.
Our formula becomes:

$\frac{\frac{1}{20}}{\frac{1}{10}} \times 1000 = \frac{1}{20} \times \frac{10}{1} \times 1000$ (using the rule for dividing fractions)
$= \frac{1}{2} \times 1000 = 500$. We need 500mls of the A solution.

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Which means we need 1000 - 500 = 500mls of water.

(Alternatively you can use the fact that a 5% solution is half the strength of a 10% solution to see that you need 500ml of solution and 500ml of water)

Note In very rare cases, a drug may be labeled with a ratio. If this is the case, refer to the Drug Information Sheet for the specific medication in order to be completely sure how the solution is made up [6,9].

II.7. Test methodology

This test is given to 3 types of respondents: the finalist students in nursing, the nurses with more or less three years of experience and finally the nurses with more than three years of experience.
The test is based on the following: first of all the numeration, next the measurement systems and finally the dose calculation.

Each type must therefore answer the three kinds of subjects selected for the test. The test consists of about five questions for each subject including the numeration, fractions and decimals for subject 1, measurement for subject 2 and dose calculation for subject 3.

The respondent is asked to tick or solve the elementary dose calculation based on age and weight. Every question question is scored on the 0 to 2 scale.

- 2 for a correct answer,
- 1 for half answer,
- 0 for unacceptable answer.

The purpose of our research is to assess the basic mathematical knowledge of daily nursing practice of the finalists in nursing and caregivers since the withdrawal from the mathematics course in the nursing curriculum.

III. RESULTATS

III.1. Descriptive analysis

Table VI. Respondents' scores in the numerical test

Numeration	N	%
Poor	7	8,8
Good	28	35,0
Very good	45	56,3
Total	80	100,0

Table VI show that 8,8% of the respondents obtained a poor score, 35% had an average score and 56% had an excellent grade in the numerical test.

Table VII. Respondents' scores in the measurement test

MeasurementTest	N	%
Poor	12	15,0
Good	31	38,8
Very good	37	46,3
Total	80	100,0

In the measurement test, 15% had a poor score, 38,8 % obtained an average score and 46,3% had an excellent note (table VII).

Table VIII. Notes obtained by the respondents in the dose calculation test

Dose calculation test	N	%
Poor	23	28,8
Good	20	25,0
Very good	37	46,3
Total	80	100,0

As for dose calculation test, 28,8 % had a poor score, 25 % had an average score and 46,3% had an excellent score (table VIII).

Table IX. Test duration

Test duration	**n**	**%**
0-15 min	56	70,0
More than 15 min	24	30,0
Total	80	100,0

70% of students took less than 16 minutes to complete the test, compared to 30% who took more than 15 minutes (table IX).

Table X. Seniority of nurses

Seniority	**n**	**%**
No seniority	20	25,0
1-3 years	30	37,5
More than 3 years	30	37,5
Total	80	100,0

37,5 % of nurses had seniority of more than 3 years, 37,5% seniority of between one to three years and 25% had no experience.

III.2. Bi-varies analysis

Table XI. Test duration and obtained grades relationship

Variables	Duration of the test		χ^2	P	S
	0-15 min n=56	More than 15 min n=24			
Numeration Test					

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Poor	1,8% (1)	25,0% (6)			
Good	32,1% (18)	41,7% (10)	13,9	0,001	**
Very good	66,1% (37)	33,3% (8)			
Measurement Test					
Poor	5,4% (3)	37,5% (9)			
Good	35,7% (20)	45,8% (11)	18,5	0,0001	***
Very good	58,9% (33)	16,7% (4)			
Dose calculation test					
Poor	12,5% (7)	66,7% (16)			
Good	23,2% (13)	29,2% (7)	30,5	0,0001	***
Very good	64,3% (36)	4,2% (1)			

The proportion of nurses who did less than 15 minutes on the test and scored excellent in the different tests is higher than the others. In addition, there is a statistically significant relationship between the duration of the test and grades obtained by the nurses. (p<0,05).

Table XII. Seniority and grades obtained relationship

Variables	Seniority		χ^2	P	S
	1 and more n=50	No seniorityn=30			
Numeration Test					
Poor	14,0% (7)	0,0% (0)			
Good	28,0% (14)	46,7% (14)	6,13	0,046	*
Very good	58,0% (29)	53,3% (16)			
Measurement Test					
Poor	20,0% (10)	6,7% (2)			
Good	30,0% (15)	53,3% (16)	5,26	0,07	NS
Very good	50,0% (25)	40,0% (12)			
Dose calculation test					
Poor	32,0% (16)	23,3% (7)			
Good	18,0% (9)	36,7% (11)	3,509a	0,173	NS
Very good	50,0% (25)	40,0% (12)			

The proportion of nurses who had a seniority of at least three years, scored an excellent grade the numerical tests than the others. In addition, there was a statistically significant link between the professional seniority and the excellent score obtained in the numerical test. (p<0,05). However, the proportion of nurses with at least one year of seniority had a good score on the measurement test and the dose calculation. On the other hand, there was no statistically link between professional seniority and the grades obtained by nurses on the measurement test and the calculation of the dose. (p>0,05).

IV. DISCUSSION

In view of the results obtained, it can be seen that, for the numeration test for the three types of respondents are good, this test is based on purely elementary notions for everyone who has attended primary and post-primary
On the other hand, the test 2, takes again the notions of measures studied at the primary school, deepened in the secondary and would have been recapitulated in the college. Hence, the finalists of Nurse Sciences interviewed met some difficulties to recover the time allotted and answer correctly to the related questions since they did not revise the notions. However experienced nurses who did not receive these notions at the college level did well thanks to their experience. Which at the end proves the increase of poor results from 8.8% to 15% and the decrease of good results from 56.3% to 46.3%.
Finally, for test 3, which refers to the calculation of dose, the conversion from mass measurement to capacity measurement, of three simple rule and dose calculation.
The global result is poor; only two groups have been able, just by their experience including 3 years of experience or more.
As for the duration of the test, the 20% is linked to non-experienced respondents, especially for tests 2 and 3.

V. CONCLUSION

This research has been made to see how nurse practitioners and students in nursing are aware of mathematical bases that they are likely to deal with in their work. It intends to give nurses and students in nursing a taste of the math used in determining drug doses for patients. It is imperative that the patient receives the correct dosage of any medication since any incorrect calculations could be life threatening. In most cases, drug doses will be prescribed in metric units.
In this study, we wanted to highlight the importance of mathematics in nursing.
This program once existed in nursing but with the current reforms, the course is not given during the last 2 decades.
Given the importance of this science and its impact on nursing and the shortcomings noted in the case of nursing practitioners and learners, we were called upon to administer a 3-level test, for the finalist and nurse of 3 years of experience and more.
The test based on the numeration, the measurement systems, and the doses calculation.
This test shows that our concern is confirmed by the fact that only experienced respondents were able to do it in time and get good grades, due to their experience.

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