

The waste of assistance material perceived by nursing students

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ABSTRACT

The study aimed to identify the opinion of nursing students about the waste of assistance materials in practical learning activities. We conducted an exploratory, descriptive study with a quantitative approach. One hundred and eighty-six students composed the sample and they answered to an instrument with affirmatives measured by a Likert-type scale. More than half of students believed that institutions where they are interns waste materials; 76% of fourth grade students ($p<0.001$) acknowledged to waste materials during their internships and, 89% of the same year ($p<0.001$) attributed waste to conducting a procedure for the first time. The study allowed the discussion about waste materials during nursing training, alerting about the importance of adequate management of these resources besides the nursing responsibility with the environment and sustainable practices.

Descriptors: Education, Nursing; Material Resources in Health; Cost Control.

INTRODUCTION

Materials used in health assistance are essential resources that directly affect the quality of the provided care. They significantly consume part of financial resources from health institutions and, they represent 15 to 25% of total expenses in these institutions⁽¹⁾. Thus, materials assume a noted role for health organizations due to the cost increase in the sector and to the challenges faced by these organizations in offering quality services at viable costs. The adequate material management reduces costs and wastes⁽²⁾, being important strategies in this scenario.

The World Health Organization (WHO) in the 2010 report, argued about the financing of health systems with topics like: "To promote the efficiency and to eliminate the waste", it discussed the importance to assure the use resources efficiently, highlighting the opportunity for these actions in all countries. The final report also pointed waste and corruption as the main causes of inefficiency in health systems, representing

about 20% to 40% of all health costs⁽³⁾.

In 2013, the Brazilian Health Ministry published a material designated to all cities, describing actions to improve SUS and to guarantee a quality attention to users. Within the main actions, there was the fight against the waste of resources and the management refinement⁽⁴⁾.

One of the actual concerns in the health scenario is the system sufficiency to meet all population demands, being the allocation of resources a critical aspect of health management⁽⁵⁾.

In the presented context, the nurse has a noted role in managing assistance materials, coordinating the nursing care and, determining the needed material for its execution. Thus, the nurse is directly involved in the decision making of these resources⁽⁶⁾. The nurse rationalizes available material resources through assessing patient's and nursing team's needs, aiming to care safety and quality⁽⁷⁾.

Despite the significant nursing action, four waste-related studies conducted in three Brazilian hospitals and, in one American hospital pointed materials as one of the most wasted items⁽⁸⁻¹¹⁾.

Nursing has a major responsibility about the use of assistance materials with consequences of equal magnitude, about the care quality, to the financial results or the impact caused on the environment.

Considering the increased garbage generated by health care, especially when not adequately treated, it brings direct consequences to the population's quality of life once it impacts the whole environment⁽¹²⁾. The reflection about material waste is an urgent exercise that should start during nursing training, so professionals can act in consonance with the reality where they are inserted, promoting changes to benefit all SUS users and, the general population.

Studies show gaps in the training of future nurses referred to knowledge about material costs used in assistance⁽¹³⁾ and how much this knowledge can influence the waste of these supplies⁽¹⁴⁾. Thus, a study with nursing students about material waste can contribute to the reflection of the adequate use of supplies, promoting the conscience about sustainable development and subsidizing teaching to future nurses.

The present study had the following objectives: to identify the opinion of nursing students about assistance material waste about its eventual occurrence in practical teaching activities; to identify contents transmitted by professors and possible factors causing waste; to describe wasted materials and, student's suggestions for its reduction.

METHODS

We conducted a descriptive, exploratory study with a quantitative approach. It took place at Paulista Nursing School (EPE) – Universidade Federal de São Paulo. The undergraduate nursing course is full-time, every year, 88 students are enrolled, and, it is divided into four school grades and minimal conclusion time of four years. Practical activities are conducted in several scenarios, depending on content specificity to be addressed: laboratories, hospital admittance units and, equipment for primary health care. Internships start during the first year with minimum internship hours with gradual increments according to the student's progression in the course. Third and fourth grades are noted due to higher percentages of internship hours,

being 53% and 85%, respectively. On the other hand, first and second grades have lower rates (14% and 39%)⁽¹⁵⁾. In some internships, students experience the real situation of health assistance, and they are in contact with the nursing team, patients, and all other professionals.

Nursing students enrolled in the second, third and fourth grades constituted the study population. We excluded students from the first grade because, during the data collection period, they did not have completed the Curriculum Unit to start conducting specific procedures to develop technical nursing abilities using assistance materials. We included students from all other grades (2nd, 3rd, and 4th) who were present during data collection dates. One hundred and eighty-six students composed the convenience sample.

We invited the students to participate in the study in the classrooms before or after classes, in random dates. We collected data between May and July of 2014. Those who agreed to participate in the study signed the Free and Informed Consent Term after the researchers informed them about the objectives and the research and waited for the students to fill in the instrument.

We built the data collection instrument based on the literature review about material waste and the authors' experience. After, the instrument was submitted to analyses by two Ph.D. nursing professors experienced in financial resources and materials. The agreement between the two assessors was 88%, and we considered the suggestions and modified the instrument. We conducted a pre-test with 11 students to make sure the comprehension was adequate, to identify any possible difficulties while completing it, and the representativeness in situations experienced by students in their practice field. We excluded those who participated in the pre-test.

The instrument resulted in open questions about student's characteristics, wasted materials during practical activities at internship fields and, suggestions to reduce waste. It also contained ten affirmations measured through a Likert-type scale addressing student's opinion about material waste, used contents and their possible causes.

In our study, we understood used assistance materials during practical learning activities as those disposable items used to perform nursing procedures, consumed at the moment when the student provided care and, that was given by health services where the internship took place.

We categorized study variables, coded and stored them in a Microsoft Excel[®] spreadsheet. For comparisons, we used the Fisher's Exact test, Chi-Square test or the Chi-Square test of maximum likelihood when appropriate. We assessed quantitative variables according to their normal distribution using the Shapiro-Wilk's test, and we expressed them as median, first and third quartiles (Q1 and Q3). For all tests, results were significant when the descriptive level (p-value) was lower than 0.05. We conducted all tests using SAS program for Windows, version 9.2 (SAS Institute Inc., Cary, NC, USA) with a statistician help. We analyzed categorical variables descriptively.

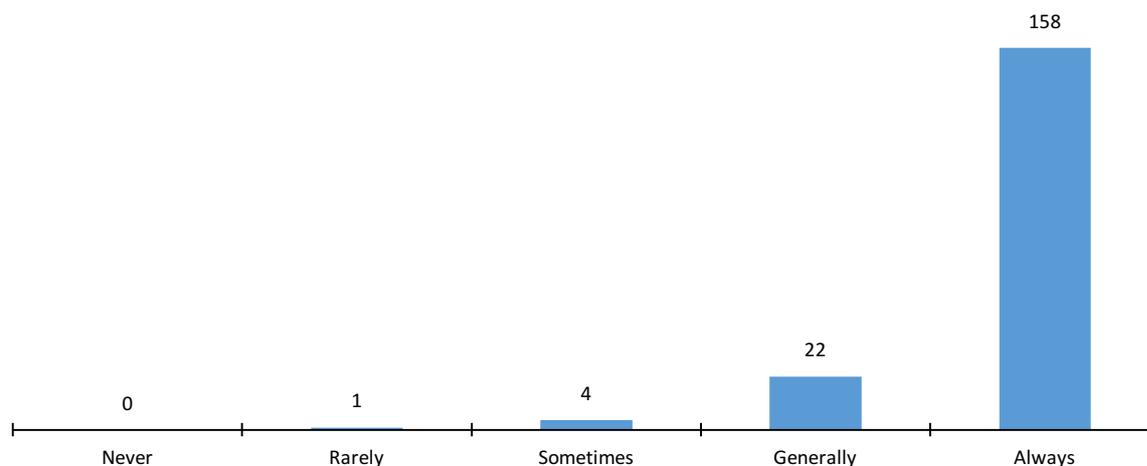
The study followed ethical principle needed to conduct studies with human beings and, it was approved by the Ethics in Research Committee from Universidade Federal de São Paulo, CAAE: 24410014.4.0000.5505.

RESULTS

Of the 238 total students enrolled in the investigated grades, we obtained the participation of 186 (78.2%) distributed as follows: 38.7% from the fourth grade, 33.3% from the second grade and, 28.0% from the third. From the total, 93.5% were females, of minimum age 21 years (Q1 – 20 years and Q3 – 23 years), 70.4% never worked before, and 90.8% were working towards their first bachelor's degree. Student's adherence to affirmations was 99.5%.

In their opinion, almost half (53.2%) believed the institutions that receive nursing students waste more materials ($p=0.0144$); 68.2% affirmed to worry about institutions due to expenses caused by wasted materials during student's training; and, 76% of the fourth grade students ($p<0.001$) admitted having wasted materials during practical activities in their internships.

Regarding the content transmitted, 56.9% reported that during their internships, professors taught about the importance of rational use of materials and, 44.6% affirmed that the waste was little addressed during theoretical classes. Almost all students (96.7%) comprehended that material waste has an impact on health institutions' expenses (Figure 1). Part of the students (47.3%) referred to have had received guidance for an adequate planning of materials that would be used in procedures, avoiding waste.



Figure

1: Opinion of students about the affirmative "The waste of materials have an impact in expenses of health institutions" São Paulo, SP, Brazil, 2014.

The results referred to possible material waste causes in internships showed that 46.8% of students observed the presence of a professor causing some tension or embarrassing influence never or rarely. To conduct a procedure for the first time was pointed as a waste cause by 41.3% of students with a significant difference in the fourth grade ($p<0.001$), with 89% of students agreeing with the affirmative. The variety of available materials in practice fields was not pointed as a possible waste factor by 83.3% of students, according to Figure 2.

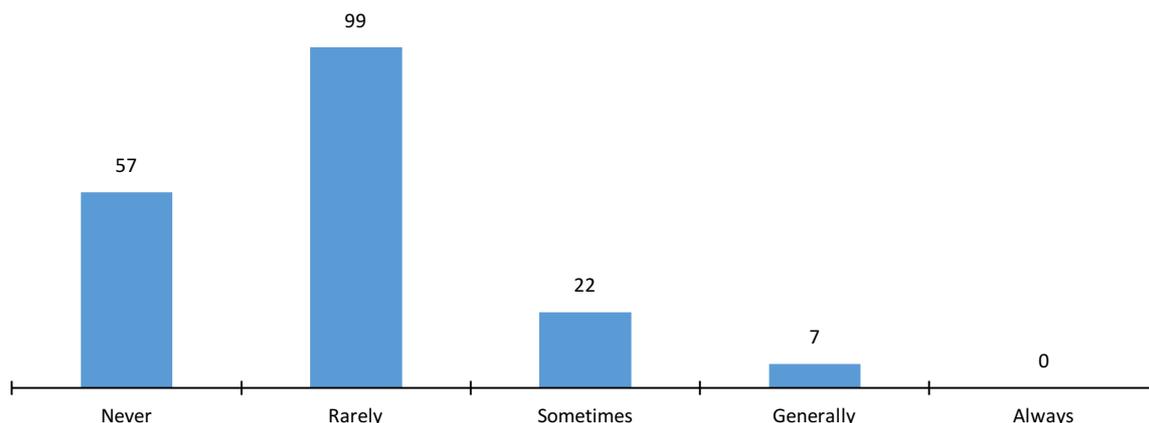


Figure 2: Opinion of students about the affirmative: "Waste in internships due to material variety". São Paulo, SP, Brazil, 2014.

When observing the wasted materials in internships (Table 1), we could identify the main ones being: gauze (21.7%), syringe (19.6%), needle (19.0%) and, gloves (17.1%), with small differences in frequencies between grades. These items represented most (77.4%) part of materials cited by students.

Table 1: Wasted materials during internships according to students. São Paulo, SP, Brazil, 2014.

Materials	2 nd Grade		3 rd Grade		4 th Grade		Total	
	n	%	n	%	n	%	n	%
Gauze	32	21.5	38	23.9	57	20.6	127	21.7
Syringe	23	15.4	34	21.4	58	20.9	115	19.6
Needle	23	15.4	32	20.1	56	20.2	111	19.0
Gloves	31	21.0	25	15.7	44	15.9	100	17.1
Cotton	15	10.0	14	8.8	8	2.9	37	6.3
Intravenous devices	7	4.7	-	-	23	8.3	30	5.1
Hypoallergenic adhesive tape	5	3.3	10	6.3	6	2.1	21	3.6
70% Alcohol	9	6.0	-	-	8	2.9	17	3.0
Fluid infusion line	-	-	-	-	11	4.0	11	1.9
Adhesive plaster	-	-	6	3.8	3	1.1	9	1.5
Others	4	2.7	-	-	3	1.1	7	1.2
Total	149	100	159	100	277	100	585	100

Suggestions to reduce material waste during internships totaled 171 citations, being 86 (50.3%) from the fourth grade, 43 (25.1%) from the second and, 42 (24.6%) from the third. The main suggestions were: larger approach about material waste during theory and practice (43.3%); to separate the adequate quantity of materials to conduct procedures (30.4%) and, student's awareness about material cost (9.4%), as shown in Table 2.

Table 2: Suggestions from students to reduce material waste during internships. São Paulo, SP, Brazil, 2014.

Suggestions	n	%
To address material waste more in theory and practice.	74	43.3
To separate the adequate quantity of materials to perform procedures.	52	30.4
To inform students about material costs and waste.	16	9.4
Less pressure from a professor during practical activities.	15	8.8
More training in the realistic simulation laboratory.	10	5.8
Others	4	2.3
Total	171	100

Despite the expressive number (n=131) of students that had never worked before, we compared the affirmations from those with the group who worked, and there was no statistical difference found between these groups. Because more than 90% students were enrolled in their first bachelor's degree course, we did not compare groups based on it.

DISCUSSION

Results showed different opinions between students from the fourth grade compared to the rest. This group also had significant results about higher perception in regards to their material waste during practical activities in the course. It was also the grade with more suggestions to avoid waste. It is expected that fourth-grade students, who are in a building knowledge process and competence development, to have a broader and critical vision, contextualizing their professional future, due to heavier workload in their practice field, as well as, theoretical subsidies⁽¹⁶⁾.

The study showed that students recognized a larger material waste in institutions where nursing students were received as interns for practical activities and, the financial impact of this waste at the institutions. This result corroborates with other studies pointing teaching hospitals with expensive structures and with costs higher than others, is one of the causes for activities developed to train health-related human resources⁽¹⁷⁾.

The students mentioned that part of the students highlighted the importance to use material resources adequately, not excessively, during practical activities; a fact confirmed by answers where they seem concerned with the expenses that health institutions can have when material waste is common among nursing interns. This students' opinion is consistent with the actual moment when health organizations need to improve their cost control and efficient use of resources to survive⁽¹⁶⁻¹⁷⁾.

Regarding the content taught about waste, the results showed the need for a reflection about material planning about the adequacy of material quantity designated to perform nursing procedures. Such fact is based on the lack of academic training about environmental aspects⁽¹⁸⁾ propitiating the indiscriminate use of assistance material. A study⁽¹⁹⁾ conducted in five nursing undergraduate courses in the south region of Brazil showed the importance of professors to be sensitized with socio-environmental demands, as this is the condition for them to awaken in future nurses responsibility values with the environment and society.

The students pointed the need to reinforce the waste theme in theoretical classes and, in practical activities. It is noteworthy that professors have a fundamental role in preventing waste, as they are the ones guiding students. Teachers act as an example for students, and it is essential that they are aware of the noted role that nursing plays in cost management^(17,20-21), besides the responsibility due to their capacity for the competent exercise of their actions⁽²²⁾.

One of the main causes for material waste was the inexperience of students. A waste study related to materials also pointed the inexperience and little ability of students in the hospitalization unit as causes for waste⁽⁸⁾.

The most cited wasted materials were gauze, syringe, needle, and gloves. These results coincide with two studies conducted in university hospitals where gloves, gauze, and syringe were also the most wasted materials⁽⁸⁻⁹⁾. In another study conducted in the Neonatal Intensive Care Unit, gauze and gloves were the most wasted materials⁽¹⁰⁾.

Thus, we can affirm that these most cited materials by students in our study are very used during internships to develop technical nursing abilities, as the preparation and administration of drugs, venous puncture, dressings, besides the use of gloves as individual protection equipment. A study showed the most used materials in assistance representing 31.3% of the material classes of higher cost in a university hospital⁽²³⁾, reinforcing the importance of the nurse action and the nursing team to decrease waste.

About students' suggestions, besides the ones mentioned, the awareness about the material cost was pointed by 9.4%. Previous knowledge about material cost can be a preventive waste measure according to nurses, nursing technicians, assistants, professors and students⁽¹⁴⁾, as well as, an initial training about the theme before the practice activities in the hospital⁽¹¹⁾.

The knowledge about costs is fundamental for nurses to respond to challenges and demands from the economic management of health organizations⁽²¹⁾. Considering the low knowledge of students about material costs⁽¹³⁾, guidance from professors about material costs when using them is a practice that should be quickly introduced.

More training of the technical abilities in the realistic simulation laboratory was another student's suggestion, despite being pointed out by a small group that it needs a rigorous analysis. The use of realistic simulation has been showing positive results for Nursing Education. It has been broadly used, as practical experiences with patients are limited many times, and the opportunities are insufficient due to the number of students and the number of abilities to develop⁽²⁴⁾. A study about a realistic simulation during the internship of nursing students in a hospital scenario was effective to enhance knowledge and safety, according to nursing students⁽²⁵⁾. To reinforce the use of simulations for practical situations, improving technical abilities of future nurses can be a strategy to reduce material waste, besides improving the quality and safety of the provided assistance.

CONCLUSION

The present study showed that nursing students waste materials while developing practical activities during their training, and the main reason was the little technical ability to perform procedures. The investigation allowed the discussion about the importance of the efficiency of material management for future nurses with an emphasis on the waste reduction and the conscience about sustainable practices from the financial and environmental points of view.

The study also highlighted teachers' performance when training students from the optimization of materials point of view, suggesting the need of theoretical contextualization about costs of materials, especially during practical activities, as well as, the use of new teaching strategies to increase the ability of

students when performing care practice.

The study was an initial approximation of the material waste theme during nursing training, with results stimulating new studies to broaden the theme that is so important for nursing practice. The present study has limitations, as we analyzed the opinion of nursing students from only one institution, and different results can be obtained if applied to other scenarios.

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