

SCIENTIFIC ARTICLE

Costs and benefits of nursing clinical education for hospital institutions

Olivério Ribeiro^{a,*}, Margarida Vieira^b, Madalena Cunha^a

^aEscola Superior de Saúde de Viseu, Instituto Politécnico de Viseu, Viseu, Portugal

^bUniversidade Católica Portuguesa, Lisboa, Portugal

KEYWORDS

Education;
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Citizen satisfaction;
Care

Abstract

Introduction: The Nursing Degree Course (NDC) internships realization is assumed as a pertinent study problem for the teaching and hospital institutions, in a way to improve the learning processes and the efficiency of management.

Objective: To identify the clinical teaching formation costs of nursing students in hospital institutions it was decided to measure through the analysis of a structure indicator the material resources, through a process indicator the human resources on the time spent by nurses provisioning care to patients, and through a results indicator the degree of citizen satisfaction, always having in mind the comparative analysis of hospital costs between the presence and absence of nursing students in Clinical Teachings.

Material and method: A descriptive-correlational and transversal study was realized on the Hospital, on the year 2011, involving Medicine and Surgery Services, where the Clinical Teachings of the Health School NDC take place.

Results: The research protocol included a "Documental Corpus" with a list of 26 consumed supplies of the year, an observation grid, for the registration of time of direct cares provided by nurses during 159 observations, and a Citizen Satisfaction Facing Nursing Care Scale, in a sample of 115 citizens inpatient in the services.

Conclusion: The inferences show that the presence of students in Clinical Teachings in the hospitals leads to a positive balance of 21.57 € per day and service, with a positive reinforcement associated to the resulting citizens satisfaction facing student rendered cares.

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*Corresponding author.

E-mail: oribeiro@essv.ipv.pt (O. Ribeiro).

Introduction

The high number of nursing schools in Portugal and consequent immoderate number of students in formation, which went from 2195 in 1999 to 15 851 in 2007,^{2-4,15} led to the need for a greater number of internship fields in hospitals, associating cost increases on the formation.⁷⁻¹¹

The search domains result from these assumptions, based on personal and professional experiences in hospital and formative context,^{13,23} whose process of interinstitutional collaboration, has been problematic.^{5,14,28} Under the administrative point of view,⁷ this collaboration referred to as “cordial”,⁹ involves the pedagogic component, material, human and physical resources, leading to an increase in costs to the hospital, not always reasoned.

We this way question whether the care provided by nursing students in clinical education (CE) increases hospital costs regarding materials consumption, decreased time of permanence of nurses with the patients and decreased degree of citizen satisfaction, having as goals of the research: *a)* to identify the cost of material consumption associated with the nursing care on medical and surgical services, per student and clinical education; *b)* to assess whether the presence of nursing students decreases the time available for the nursing care; and *c)* compare the degree of citizens satisfaction facing the nursing care provided by nurses and students.

Materials and methods

Investigation of quantitative and observational nature, and descriptive-correlational analysis, integrating 3 studies, developed in a hospital unit of Portugal's center region, integrating 4 medicine and 4 Surgery services, having previously been requested authorization for the collection of the documentary corpus on the consumption of materials, implementation of the observations and accounting of the time of direct care provided to patients by nurses in the services, and evaluation of citizen's satisfaction with the care provided by nursing professionals. These studies were carried out in the course of the year of 2011.

The research's schematic representation seeks to describe the influence of the Health School of Viseu's (HSV) students in CE, in the months of January, May, June, July, November and December, in hospital organizational results in terms of material consumption as a structure indicator, on time of care provided by nurses as process indicator, and satisfaction of the citizen facing the nursing care provided as a result indicator compared to the period of their absence in the months of February, March, April, August, September and October (Fig. 1).

As strategy for data collection, for the first study, the monthly listings of 26 items related to nursing care, ordered to the warehouses of clinical and hotelier material from the Hospital were used. For the accounting of on-call time of

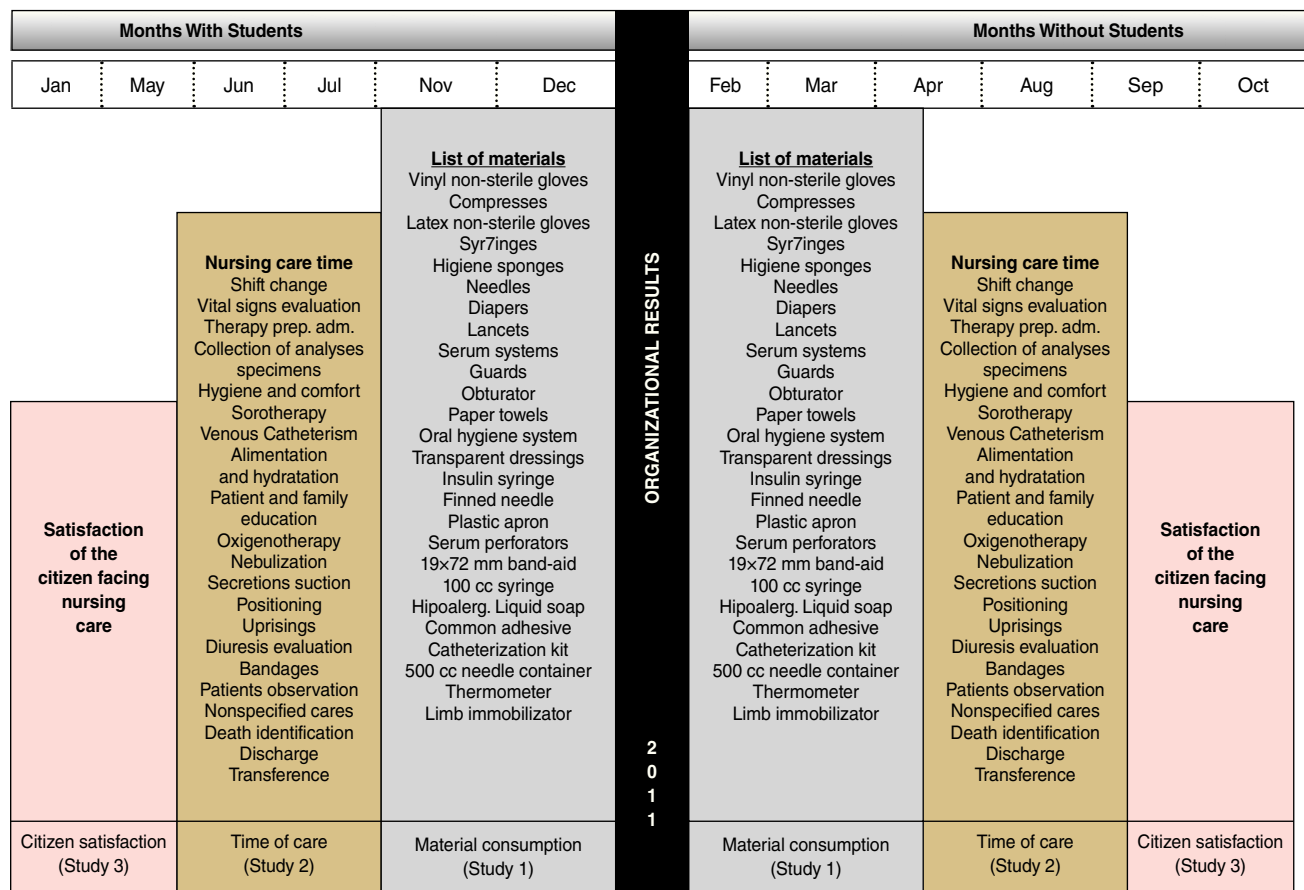


Figure 1 Conceptual schema of research.

nurses in care delivery, an Excel supported observation grid, by Ribeiro, Vieira and Cunha²³ was used, having been registered 159 observations, performed between the 15th April and the 5th of September in the 8 am to 4 pm shift. For the satisfaction evaluation, with prior authorization, the “scale of satisfaction of the citizen facing nursing care” (SSCNC),²⁶ translated and validated for the Portuguese population, was applied, focusing the aspects related to the *experience* lived by the citizen in need of care in 28 items, and their *opinion* in terms of satisfaction with the nursing care received on 19 items.

The opinion of the Ethics Committee of the HSV was requested, as well as the term of consent of the participants, having been incorporated a sample of 115 patients, corresponding to 9.7% of the total 1284 patients, whose inclusion criteria were being users aged greater or equal to 18 years old, know how to read and write, being conscious and oriented, being provided nursing cares from nurses and students who voluntarily and spontaneously agreed to participate in the study.

Results

Material's consumption related to nursing care

The consumptions of the 26 items related to nursing care were accounted for and distributed according to the ABC analysis, (20/80) or *Management by Exception*,¹⁷ being grouped in the A Group the diapers, the Serum Systems, non-sterile Latex Gloves, paper towels, finned needles, non-sterile Vinyl gloves, guards, syringes, lancets and the Hygienic Sponge, in the B Group the Serum Perforators, Oral Hygiene systems, transparent dressings, hypoallergenic liquid soap, 100cc feeding syringes, needles, Catheterization Kits and the thermometers. In the C Group, the common Adhesives, shutters, compresses, insulin syringes, plastic aprons, 500cc needle and perforators containers, upper limbs immobilizers and the 19x72mm Band-Aids.

In terms of costs, the 3 259 687 products cost 178 678.40 €, corresponding the portion concerning the presence of the students to the value of 90 623.64 € (50.72%), and in their absence to 88 054.76 € (49.28%) being the differential of 2568.88 € with average differences not statistically significant ($t = 0.480$; $P = .633$).

The items whose consumption differential were superior with the presence of students, in the A Class, were the finned needles (55.1%) non sterile vinyl gloves (53.4%) and hygienic sponges (51.9%). The remaining articles in A class (serum systems, guards and diapers) didn't get to 51% of consumption with students. In the B class consumptions fell in oral hygiene systems (53.9%) and transparent dressings (51.85%). In the needles and hypoallergenic liquid soap the differential didn't reach 51%. In the C class the plastic aprons (54%), the shutters (54.47%), the band-aids (55.53%) and compresses (51.06%) are highlighted, with insulin syringes and the adhesives not reaching the 51% in the differential.

The consumptions whose percentual values are higher in the absence of the students, in the A class were the lancets (51.51%) syringes (50.81%) paper towels (50.74%) and non-sterile latex gloves with 50.20%. In class B, the consumptions were superior in thermometers (57.34%) serum perforators (50.66%) 100 cc syringes (50.63%) and catheterization kits (50.24%). In class C were the upper limb immobilizers (65.87%) and 500 cc needle and perforators containers (50.70%).

Analyzing the consumptions cost per service, taking into consideration a total of 96 students (48 in medicine services and 48 in surgery services), we note that the CE has led to an increase of 2 568.88 €, corresponding to the amount of 31,71 €/day, a student/day cost of € 0.33. Per CE, we note that the CE II – Surgery, was more expensive than the CE I – Medicine, being of 0.416 € and 0,245 € respectively. Considering the presence of 10 students in each of the 8 services, in 2011, there was an expenses/day increase of 3,3 € per service (Table 1).

Time to provide direct nursing care to patients

For the 159 observations of nurses for the counting of time for providing care to patients with the greater needs, selected according to the Patients Classification System whose average was at 5.5 h (51% of patients completely dependent, 16% partially dependent and 33% independent), informations were previously transmitted to teams about the presence of the researcher in the infirmary, his non-intervention on the procedures and non-participation in the distribution of nurses, being 64 made without the presence of students and 95 with their presences, held at each of the

Table 1 Material costs per service and day of clinical education

| Description | Months with students (absolute value) 6 months/184 days | | Months without students (absolute value) 6 months/ 181 days | | Difference between year periods (absolute value) (with students period-period without students) | | Amount spent by day of CE (CE I and II-81 days) | Value by student/ day CE |
|-----------------------|---|-----------------|--|-----------------|--|------------------|--|--------------------------------|
| Student by service | Quant. | Cost total € | Quant. | Cost total € | Difer. quantity | Difer. cost € | Cost € by day/CE | Student cost/day € |
| Medicine (48) | 1 030 986 | 55 510.22 | 1 011 868 | 54 558.43 | 19 118 | 951.79 | 11.75 | 0.245 |
| Surgery (48) | 624 334 | 35 113.42 | 592 499 | 33 496.33 | 31 835 | 1617.09 | 19.96 | 0.416 |
| Global (96) | 1 655 320 | 90 623.64 | 1 604 367 | 88 054.76 | 50 953 | 2568.88 | 31.71 | 0.331 |

8 services at the beginning, middle and end of the CE, taken 94.3% on female nurses, whose average age was 37 years and 12 years of service.

The results without students show that nurses spend more time for the implementation of interventions associated with the assessment of the Vital Parameters, hygiene care, serum therapy, peripheral venous catheterization, food/hydration, oxygen therapy and nebulizations, with statistically significant difference when compared with the runtime in the presence of students.

The exception lies in interventions related to the observation of patients and not specified cares with statistically significant differences, as well as for patients and family education and secretions aspiration, but without statistically significant difference. On the morning shift (8/16), the average time of care provided by nurses was in global 31', being in the service of Medicine of 37' and 26' in surgery.

By comparing the times of care between the presence and absence of students, it was found that *without students*, the average was 38 minutes and *with students* 27 minutes, statistically significant difference ($t = 3.109$; $P = .002$), trend maintained in the 8 am to 12 pm period ($t = 2.926$; $P = .004$), being verified in the presence of students a reduction in the time of direct care provision to patients by nurses.

The use of multiple linear regression, for the estimation, and of the Enter method for the determination of the predictive variables, has identified that only the time of professional service was a valid predictor for the shift's (8-16) time of care, with a standardized coefficient of determination of -0.439 ($P = .034$), showing that the longer the professionals time of service, the lower the time of direct care provided at the shift.

Accounting the basal remuneration of the service's nurses in analysis, it was found that the overall cost per nurse was 65 248 € (0,149 €/minute) being 58 768 € for medicine and 71 656 € for surgery, corresponding to an average time cost of 7 346 € for medicine and for 8 957 € for surgery (0.122 €/minute and 0.136 €, respectively), being in the global 8156 €.

Facing the reduction of care time of 11.43 minutes, and based on the distribution of students by 16 patients, we can see the provision of a free service of 22.31 € for each of the medicines and 27.25 € for each one of the surgeries, being the global average of 24.87 €.

Citizen satisfaction with care provided by nursing students

From the factorial analysis of the scale resulted a very good *Cronbach's alpha* coefficient of 0.94. On the sub-scale *modified opinion*, adapting the 19 items in the dimension for "students", the factorial analysis showed an also very good *Cronbach's alpha* coefficient of 0.96.

The sample was constituted in equal percentages by citizens of both sexes, with an average age of 63.7 years in females and 57.6 years in males, 72.2% married or in a consensual union, and only 27.8% living alone, 81.7% have low literacy, 52.2% do not have any professional qualification and 33.9% used the hospital for reasons associated with the digestive forum affections.

The overall average satisfaction score was 254.5 (maximum of 291 and the minimum of 177), being expected 291 and 47, respectively, with a standard deviation of 26.12 and a variation coefficient of 10.27 representing a weak dispersion around the average. Relatively to the dimensions scores, in *experience* the score was 173.92 and in *opinion* about the care provided by nurses of 80.58. The results of the citizen satisfaction *opinion* subscale facing the nursing care provided by students were 83.78, with a standard deviation of 10.29 and a coefficient of variation of 12.28, representing a weak dispersion around the average, superior to the 80.58 obtained by nurses, being the difference statistically significant ($t = -4.511$; $P = .000$) (Table 2).

Comparing the results of satisfaction among students and nurses, we observe that all the scores are higher for nursing students, except the item O4 related to "*the knowledge about the care*" and the item O13 relative to the *type of "transmitted information to citizens about their condition and treatment or situation"*. The lowest score falls in item 7, "*the amount of information given about their condition and treatment/situation*", both for nurses and students, being of 3.98 for nurses and 4.03 for students. The highest average score of 4.62 falls in the care provided by nursing students, in item 14 on the "*treatment of the citizen as a person*", and in item 19 on "*how much attentive to their needs*" (Table 3).

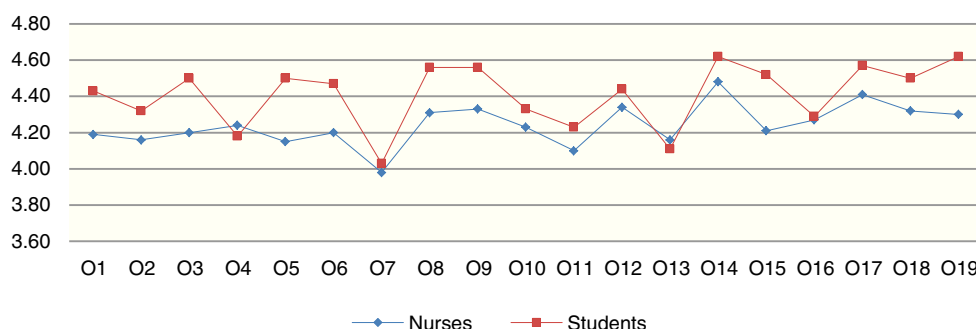
The degree of citizen satisfaction with nursing care, evaluated by the *opinion* dimension is globally higher relatively to care provided by nursing students, results consistent with other authors^{26,17} (Fig. 2).

Table 2 Citizen Satisfaction with Nursing Care scale Statistics

| Dimensions | Satisfaction | | | | | | | |
|-----------------------|--------------|-----|--------|-------|--------|----------|---------|-------|
| | Min | Max | Mean | Dp | CV (%) | SK/error | K/error | K/S |
| Experience | 122 | 196 | 173.92 | 16.21 | 9.32 | -2.619 | -0.349 | 0.001 |
| Opinion on the nurses | 46 | 95 | 80.58 | 12.32 | 15.29 | -2.039 | -1.440 | 0.000 |
| Total ESCCE | 177 | 291 | 254.50 | 26.12 | 10.27 | -2.120 | -0.810 | 0.001 |
| Opinion on students | 56 | 95 | 83.78 | 10.29 | 12.28 | -2.478 | -1.190 | 0.000 |

Table 3 Citizen's opinion with the care provided by nurses and students

| Opinion items | Care providers | | | | Levene (t) | t | P |
|---|----------------|-------|-----------|-------|------------|--------|------|
| | Nurses | | Students | | | | |
| | \bar{x} | dp | \bar{x} | dp | | | |
| O1. Time spent with you | 4.19 | 0.771 | 4.43 | 0.664 | 0.000 | -3.624 | .000 |
| O2. Ability to play their activities | 4.16 | 0.823 | 4.32 | 0.767 | 0.000 | -2.627 | .010 |
| O3. Being always around when needed | 4.20 | 0.881 | 4.50 | 0.693 | 0.000 | -3.651 | .000 |
| O4. How much they knew about the care they should provide me | 4.24 | 0.779 | 4.18 | 0.801 | 0.000 | 0.927 | .356 |
| O5. How fast they came when called | 4.15 | 0.929 | 4.50 | 0.718 | 0.000 | -4.450 | .000 |
| O6. How they made you feel like home | 4.20 | 0.819 | 4.47 | 0.653 | 0.000 | -3.900 | .000 |
| O7. The amount of information given on about your condition and treatment/situation | 3.98 | 0.936 | 4.03 | 0.917 | 0.000 | -0.669 | .505 |
| O8. The frequency they asked if you were OK | 4.31 | 0.788 | 4.56 | 0.580 | 0.000 | -3.624 | .000 |
| O9. The help you received | 4.33 | 0.792 | 4.56 | 0.610 | 0.000 | -3.048 | .003 |
| O10. The way you were explained things | 4.23 | 0.806 | 4.33 | 0.758 | 0.000 | -1.645 | .103 |
| O11. The way they reassured your relatives or friends | 4.10 | 0.872 | 4.23 | 0.806 | 0.000 | -1.892 | .061 |
| O12. How they did their job | 4.34 | 0.760 | 4.44 | 0.665 | 0.000 | -1.645 | .103 |
| O13. The type of information they gave about your condition and treatment/situation | 4.16 | 0.875 | 4.11 | 0.934 | 0.000 | 0.554 | .581 |
| O14. How they treated you as a person | 4.48 | 0.654 | 4.62 | 0.571 | 0.000 | -2.526 | .013 |
| O15. How they heard your concerns | 4.21 | 0.843 | 4.52 | 0.680 | 0.000 | -4.203 | .000 |
| O16. The freedom they gave you within the service | 4.27 | 0.809 | 4.29 | 0.747 | 0.000 | -0.245 | .807 |
| O17. The goodwill they responded your requests with | 4.41 | 0.700 | 4.57 | 0.593 | 0.000 | -2.531 | .013 |
| O18. The privacy that they gave you | 4.32 | 0.767 | 4.50 | 0.598 | 0.000 | -2.982 | .004 |
| O19. How they were attentive to your needs | 4.30 | 0.774 | 4.62 | 0.555 | 0.000 | -5.032 | .000 |
| The total satisfaction | 80.58 | 12.32 | 83.78 | 10.29 | 0.000 | -4.511 | .000 |

**Figure 2** Results of subscale "opinion concerning care provided by nurses and nursing students".

Discussion

The increase in health costs verified along the past 4 decades has been one of the main concerns of Governments, a situation exacerbated in countries with lower economic growth, noting as it is difficult to ensure the financing of health care without limitations.⁶ This increase, greater than the countries' wealth growth, highlights the need for creation of measures aimed at the distribution and rationalization of different health resources.¹⁶

The analysis indicators of structure, process and results,⁸ associated with materials consumption, time of care, users' satisfaction and care, as fundamental elements for the quality of health services,^{10,21} as presented in the theoretical model designed (Fig. 3), highlights that, by associating the results of increased materials consumption of 3.3 € to the availability of time of care resulting from the presence of students in CE of 24.87 €, the result is an organizational benefit of 21.57 €/day, showing the gains resulting from the involvement of nursing students in CE conducted in hospitals.

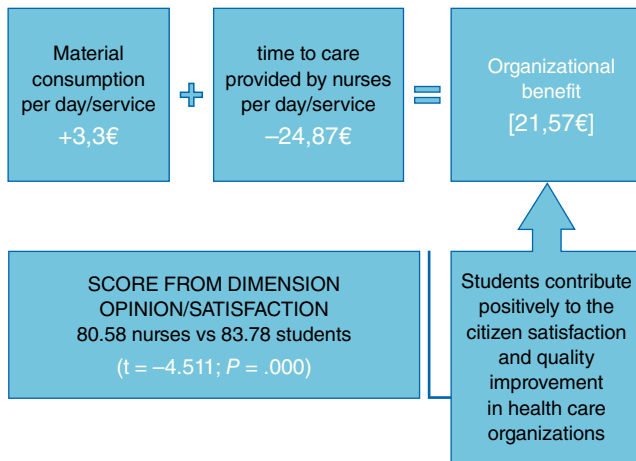


Figure 3 Theoretical model.

We conclude that, statistically, it wasn't proved that the presence of students in CE increases the costs relatively to the consumption of materials, but that their presence in CE offers nurses time to provide other cares, and that students in CE increase citizen satisfaction facing the nursing care provided to them. It is thus documented the "relative" increased spending on materials, but contradicted the perspective of the need for more time to monitor the students.¹² It effectively exists, evidenced by the availability of time proportionate to nurses with the presence of students in CE. The results of the third study confirm that the presence of students in clinical education contributes positively to the satisfaction of citizens and improvement of the quality of care.

The exponential increase of the expectations and requirements of citizens leads to the increased responsibility of health professionals, with attention focused on the results, appropriate use of the available resources and implementation of continuous quality improvement methodologies, whose various stakeholders – customers, healthcare providers, managers and politicians, should contribute to increase the satisfaction of citizens.¹⁸⁻²⁵

What we know about the theme

There are no known studies on the spending costs of materials associated with the care provided by nursing students in clinical education in hospitals, neither on the runtime of direct care provided to patients by nurses, in the presence of students in hospital clinical education.

What we get out the study

It was possible to quantify the spending costs of materials associated with the nursing care resulting from the presence of students in clinical education, as well as to highlight the time available to nurses to perform other actions, resulting from the interventions made by students in clinical education.

Is outdated the perspective of students as "workforce" for hospitals, the vision of teachers as "guests" in hospitals and the existence of problems associated with teaching as "theirs", and problems associated with hospitals, as "ours".¹

Institutional partnerships cannot be merely "cordial"⁹ suggesting a new training paradigm, nearer the world of work, in a culture where professionals, more informed and enlightened, develop stronger and more participated institutional partnerships, thus obtaining greater gains in health, and so dignifying Being a Nurse.²⁸

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Conflicts of interest

The authors declare that there are no conflicts of interest.

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