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ORIGINAL ARTICLE

COST ANALYSIS OF CUSTOMERS WITH SYRINGE USED IN HEART INSUFFICIENCY

ANÁLISE DE CUSTO DAS SERINGAS UTILIZADAS EM CLIENTES COM INSUFICIÊNCIA CARDÍACA

ANÁLISIS DE COSTOS DE LOS CLIENTES CON JERINGA USADOS EN LA INSUFICIENCIA CARDIACA

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ABSTRACT

Objective: to determine the cost and the amount of medium-sized syringes 1, 3, 5, 10 and 20 ml used weekly in a cardiovascular ward for clients with heart failure. **Method:** an exploratory study and evaluation, quantitative approach, in which four forms were used for data collection. It was used as a technique to count syringes sector, analysis of the application form and receipt of material, medical prescriptions online and search the websites of the Ministry of Health price list of hospital supplies used by SUS. This study was approved by the Ethics in Research under CAAE 009.0.328.313-10. **Results:** the average cost of used syringes week was R\$ 1.11, R \$ 4.49 monthly and forecast annual average cost of R\$ 53.93. **Conclusion:** the nurse must acquire knowledge about management and costs, to control the inputs of the sector and avoid waste. **Descriptors:** Nursing; Hospital Costs; Heart Failure.

RESUMO

Objetivo: determinar o custo e o quantitativo médio de seringas de tamanho 1, 3, 5, 10 e 20 ml usadas semanalmente numa enfermaria cardiovascular por clientes com insuficiência cardíaca. **Método:** estudo exploratório e avaliativo, de abordagem quantitativa, no qual foram utilizados quatro formulários para a coleta dos dados. Utilizou-se como técnica a contagem de seringas do setor, a análise do formulário de requisição e recebimento de material, das prescrições médicas e busca online nos sites do Ministério da Saúde da tabela de preços de materiais hospitalares utilizada pelo SUS. Estudo aprovado pelo Comitê de Ética em Pesquisa sob CAAE 009.0.328.313-10. **Resultados:** o custo médio das seringas utilizadas semanalmente foi de R\$ 1,11, mensalmente de R\$ 4,49 e com previsão de custo anual médio de R\$ 53,93. **Conclusão:** o enfermeiro deve adquirir conhecimento sobre gerência e custos, para controlar os insumos do setor e evitar desperdícios. **Descritores:** Enfermagem; Custos Hospitalares; Insuficiência Cardíaca.

RESUMEN

Objetivo: determinar el costo y la cantidad de pequeñas y medianas jeringas 1, 3, 5, 10 y 20 ml, usadas semanalmente en una sala cardiovascular para los clientes con insuficiencia cardíaca. **Método:** estudio exploratorio y evaluación, el enfoque cuantitativo, en el que cuatro formas se utilizaron para la recolección de datos. Fue utilizado como una técnica para contar jeringas sector, el análisis de la solicitud y recepción de material, recetas médicas en línea y buscar en los sitios web del Ministerio de Salud de la lista de precios de insumos hospitalarios utilizados por el SUS. Este estudio fue aprobado por el Comité de Ética en Investigación bajo CAAE 009.0.328.313-10. **Resultados:** el coste medio de la semana jeringas usadas fue de R\$ 1,11, R \$ 4,49 mensual y previsión del costo anual promedio de R\$ 53,93. **Conclusión:** la enfermera debe adquirir conocimientos sobre la gestión y los costes, para el control de los insumos del sector y evitar el despilfarro. **Descriptores:** Enfermería; Costos Hospitalarios; La Insuficiencia Cardíaca.

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INTRODUCTION

Nowadays the health sector has shown remarkable increase in costs related to care provided to their users, which increases the concern of institutions and states that adopt these strategies in an attempt to ensure their viability.¹ This actually ends up determining the professionals who manage the various hospital units, to develop their knowledge in thematic costs, in order to assist them in decision making and resource allocation aware, as these professionals are considered cost drivers within the institutions.¹ Moreover, the increasing demand of the health sector brings implementation of new technologies, the fact that labor demand increasingly complex and sophisticated, further increasing costs.²

The big health challenge is to find balance between quality of care and costs, so that they are viable, since healthcare organizations live moments of great competitiveness.

Among health professionals, nurses are seen as one with the greatest potential to promote effective assistance to costs. This finding is substantiated by scholars of global trends which stated that nurses may be responsible for 40-50% of hospital billing.² Another factor that contributes to rising costs is the aging population, which directly increases with the incidence of chronic diseases, burdening the healthcare system. Among these chronic diseases, stress the heart failure was considered a disease of increasing incidence and, consequently, ends up generating more spending on institutions.⁴

In the United States, at least 5 million people have heart failure, being diagnosed each year 550,000 new cases.⁵ It is estimated that the economic burden generated by the treatment of heart failure in this country is 25.8 billion dollars in direct costs and indirect, where 53% of this total are related to hospital costs. The incidence of this disease increases with age and is more common in people over 65 years of age.⁵

It is worth noting that in the United States, 25% of customers with heart failure who were discharged end up being readmitted for treatment.⁶ This is one of the factors by which the cost of treatment rises.

In Brazil, the heart failure is considered the leading cause of cardiovascular hospitalization. These hospitalizations for heart failure conducted in unified health system (SUS) increase with age, with decreasing values in a group of elderly aged over 80 years.⁷

In the period from 1998 to 2000, were accounted for by SUS 1,181,843 hospitalizations for heart failure, suggesting that the disease is highly prevalent in Brazil.⁷

From the data presented, it is clear that heart failure has become a public health problem worldwide, generating high hospital costs for the treatment of patients with customers, besides the loss of sensitive quality of life of the patient population.⁸ It is also considered the leading cause of disability and morbidity; it undermines the professional performance of their carriers and performs their daily activities.⁹

To perform the therapy of heart failure is demanded a high consumption of materials. Among these materials, syringes given prominence by presenting an eminent consumption and are classified as material assistance. The materials care represent around 80% of all items at a hospital and stand out by presenting a considerable consumption in assistance provided by nursing staff, reflecting significant costs to the institution.¹

Drug treatment of heart failure comprising administering drugs orally and intravenously, as carvedilol, digoxin, furosemide, haldol, dobutamine hydrochloride, among others.¹⁰⁻¹¹ The administration of intravenous medications such as furosemide, the haldol and dobutamine require syringes for its preparation and administration, reflecting the consumption of this input.

In the market, there are different degrees of syringes. There is an importance in the existence of this diversity, as each size is intended for a specific procedure. There are drugs that do not require large syringes with graduations; so picks up less volume for the preparation and administration of medications. This critical thinking in choosing the best material for the procedure is of great importance because it reflects the reduction of waste and hospital costs as the largest undergraduate syringes usually have a higher cost compared to those of lower rank.

Given this scenario, it was found to be of great value to develop a study that addressed the issue of cost of syringes used in the treatment of heart failure with clients so that they could become aware of the costs that this input is an institution for the treatment of these customers and the importance that nurses have in controlling these costs.

Thus, as an object of study established the cost of syringes 1ml, 3ml, 5ml, 10ml and 20ml weekly used in treating clients with heart failure within a cardiovascular ward. Thus, for

the study were drawn the following objectives:

- Determining the amount of medium sized syringes 1, 3, 5, 10 and 20 milliliters (mL) in a ward cardiovascular weekly used;
- Valuing the cost of syringes 1, 3, 5, 10 and 20 ml cardiovascular used weekly in a ward.

METHOD

Exploratory and evaluative quantitative approach, as it refers to the quantity of syringes used in the treatment of clients with heart failure. We used direct observation as techniques for quantifying the syringes existing sector before and after the arrival of the required material to the warehouse, document analysis of requisition forms and receiving material made by nurses and medical prescriptions for the amount of spent syringes in the treatment of the customers. It was also used to search online on the website of the Ministry of Health (MOH) for raising the price of materials used by SUS hospital for further calculation of the cost of syringes.

The survey was conducted in cardiovascular ward of the university hospital Gaffrée-Guinle located in the city of Rio de Janeiro / RJ / Brazil providing hospital services to the community, besides functioning as a center for research and teaching. This study was approved by the Ethics in Research HUGG, under no protocol 64/2010 and CAAE 009.0.328.313-10.

During the survey, were hospitalized in a total of 29 clients with heart disease (16 male and 13 female), where 5 of these (3 male and 2 females) had a picture of Heart Failure, showing a prevalence of 60 % in males. Among those customers who were hospitalized, one had readmission in a period less than one month after discharge received. The average hospitalization time of these customers with heart failure was approximately 21 days.

The study was conducted from September to December 2011, totaling 17 weeks. The frequency of data collection was three days a week, with ace 2nd, 5th and 6th fairs, in time of 7 hours, shortly after the passage of duty. In December, the frequency increased to five days a week, being held from 2nd to 6th, Thursday at the same time.

The application of the material to the warehouse was held on Mondays and received by the nurse on Thursday of the same week.

The receipt of material occurred before 12 hours, since this was the time of the close of business diarist nurse responsible for receiving the same.

To survey data were used as instruments four forms, the first being the amount of syringes on existing ward, the second on the quantity of used syringes daily to treat clients with heart failure, the third to record the customers' heart disease found in the fourth ward on the cost of materials.

The first instrument was used for the realization of the quantitative count of syringes existing industry. It contained data about the day that was being made to count the number of syringes available in the infirmary, and a framework to be noted the amount of syringes that had been required by the nurse to the warehouse. This picture was completed only on Thursday, shortly after the arrival of the material, in order to document whether the amount requested had been delivered to the warehouse sector. The second instrument was designed to collect data from medical records. In it was noted the amount of used syringes in the provision of care to clients with heart failure within 24 h. The third instrument allowed documenting the amount of clients admitted to the ward, specifying the heart of each and every time that one remained hospitalized. Through this it was possible to identify which customers were suffering from heart failure. In the last instrument was recorded the amount consumed of each syringe size during the weeks of research and their cost. For the identification of the monetary value of syringes, it was used the Bank Rates in Health, the official website of the Ministry of Health, which contains data on the values of hospital supplies and medicines bought through bidding. The choice of the database was due to this being the closest to the field researched, a public institution. Therefore, it was researched the average value found in sessions for each syringe size and used as the basis of calculating the cost.

The calculation was done as follows: used syringes were added by customers with Heart Failure this week, only separating them according to each specific size. Then we multiplied the number of syringes consumed that week, the monetary values that each was purchased by the UHS in electronic auctions. These monetary values are presented as shown in Figure 1.¹²

Syringe Volume (ml)	Unit Cost (R\$)
1	0,13
3	0,12
5	0,13
10	0,21
20	0,39

Figure 1. Unit cost of syringes purchased by the UHS in electronic auctions. Source: Brazil. Health Ministry. DATASUS Stock Prices in Health

Thus, it was possible to calculate the cost of consumption of syringes that week. This same calculation was performed individually with the 17 weeks study, as each week had a different use of syringes, later to be averaged syringes consumed weekly during this period. After they found the average total cost of consumption and syringes per week, it proceeded to the division of the total quantity of clients with heart failure who were hospitalized in this study period. Thus, it was possible to find the average weekly consumption and cost of syringes for each customer.

RESULTS AND DISCUSSION

During the study we observed the ward routine and understand the dynamics of syringes inside it, ie: requiring the syringes made by the nurse to the warehouse, receiving this material in the infirmary, the

amount used to treat the customers with heart failure. Besides taking knowledge about the dynamics of syringes in the industry, was also possible to know the total cost that the syringes used by each client represent the institution.

Analyzing the application form materials, it can be seen that, eventually, the number of syringes delivered to the sector was lower than requested by the nurse, which can be explained by the unavailability of materials in the warehouse or the amount reduced by the same, necessitating a more equitable for the units. This fact is shown in Figure 2.

Weeks	Syringes											
	1ml		3ml		5ml		10ml		20ml		Total syringes	
	S	R	S	R	S	R	S	R	S	R	S	R
1	0	0	0	0	0	0	0	0	200	200	200	200
2	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	75	75	200	150	100	100	375	325
4	0	0	0	0	0	0	500	450	675	675	1175	1125
5	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	750	450	0	0	750	450
9	180	100	0	0	100	100	200	0	0	0	480	200
10	180	100	75	75	100	100	200	200	175	0	730	475
11	150	100	0	0	75	0	0	0	175	150	400	250
12	300	300	0	0	150	100	150	150	100	0	700	550
13	0	0	0	0	0	0	0	0	0	0	0	0
14	150	100	100	100	0	0	100	0	175	0	525	200
15	300	300	350	300	350	300	500	0	200	200	1700	1100
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	300	300	0	0	300	300	600	600
Total of syringes	1260	1000	525	475	1150	975	2600	1400	2100	1625	7635	5475

Figure 2. Requesting and receiving syringes a week. S = Quantity of syringes required (units), R = quantity of syringes received (units). Source: Research data

Another explanation is the difficulty of the warehouse and into the infirmary manages their inventories resulting in incorrect handling of the material flow. Among the most frequently reported reasons that lead to this difficulty we highlight the great diversity

of materials and lack of computerization in the industry.¹

To have an efficient control of stored materials is necessary for the supervision and administration of these inputs is coordinated by qualified professionals, which are able to

promote a planning ideal purchasing, storage and inventory, and distribution scheme and supervision. The failure to follow this planning activities can result in the waste of materials and consequently in increased costs to the institution.¹³

This waste can be exemplified by the use of syringes with undergraduate major in lieu of specific undergraduate syringes, in performing certain procedures when there is a lack of this input in the sector, but also in the application of this material in an amount exceeding actual needs of the ward, where this not being consumed within the period of its validity, because the high quantity stored, needs to be despised, reflecting waste to the institution.

In this context, the nurse must know not only the equipment and supplies you use within hospitals, but also know the cost of them, in an attempt to minimize waste and guide the team of professionals to optimize and justify its use.

Regarding counting the number of existing syringes in the industry, there was a quantitative often divergent to that documented in the form of receiving sometimes higher, sometimes lower, indicating that the number of needles in the ward not correspond to an amount which had been documented by the nurse.

This finding attentive to possible failures in the control of the materials sector. Several situations can lead to this problem, for example, the loan documents between the wards, a practice commonly performed in order to quickly resolve the lack of supplies and where it is not normally done any flow control, resulting in unmatched quantitative expected.

This problem can be solved by performing a provision of optimal materials for the nurse,

who must act to prevent the failure of these materials, or at least minimize the time of shortage thereof. However the role of this nurse is not managing the lack of these inputs, but managing the sector so that there is a lack of them.¹⁴

The lack of specific undergraduate syringes results in the need of nurses improvises using separate syringes graduation in order to replace the missing stuff. This practice generates waste and spending, even if the goals are achieved, because these materials end up getting a function different from that originally intended, in order to meet the specific material missing.¹³

In the documentary analysis of 591 patient records were identified syringes used during the study period, with the 5ml more consumed by each customer, with an average consumption of 4.16 units / week (59.94%), followed by 10ml, whose average consumption per customer was 1.21 units / week (17.43%); 1ml syringes had an average consumption of 0.8 units / week (11.53%) of the 20 ml of 0.49 units / week (7.06%) and 3 ml of 0.28 units / week (4.03%). Please note that these numbers may vary due to complications presented by customers, such as the worsening of symptoms, which would require greater use of this material for your treatment.

After identifying the consumption pattern of the ward was possible to calculate the average cost per customer that this material represented the institution, whose monetary values were derived from electronic auctions, as shown in Figure 3.¹²

Syringe Volume (ml)	Unit cost of each syringe (R\$)	Average amount used / client (units)			Average cost of syringes / customer (R\$)		
		Weekly	Monthly	Annual	Weekly	Monthly	Annual
1	0,13	0,8	3,2	38,4	0,1	0,42	4,99
3	0,12	0,28	1,12	13,44	0,03	0,13	1,61
5	0,13	4,16	16,64	199,68	0,54	2,16	25,96
10	0,21	1,21	4,84	58,08	0,25	1,02	12,2
20	0,39	0,49	1,96	23,52	0,19	0,76	9,17
Average total cost / customer (R\$)					1,11	4,49	53,93

Figure 3. Average cost of used syringes. Source: Brazil. Health Ministry. DATASUS. Stock Prices in Health.

It could be observed that the total quantity of used syringes in the industry showed a remarkable variability, when compared to the results of this daily consumption. This is due to the fact that often occur admission and discharge of patients in the ward, reflecting the changing requirements, and leading to a variable cost and consumption of syringes.

The average weekly cost of used syringes in the infirmary to treat each client admitted with heart failure was R\$ 1,11, R\$ 4,49 monthly forecast and annual average cost of R\$ 53,93.

In 2001, there were 385,758 hospitalizations in Brazil caused by heart failure causing the government a cost of R\$ R\$

201.939.410,42 for the treatment of this pathology. If we look at the weight that the average annual cost of syringes has within the context Brazil, they represent approximately 0.1% of this total. Thus, it is important that nurses acquire knowledge about management and costs, to be able to promote a more active and conscious assistance, aiming to reduce failures in management and therefore costs with these materials.

One of the main causes that elevate this cost is readmissions. In this study there was an example where the first hospitalization were required 6 units of syringes 3ml, 5ml of 82 units and 44 units of 10ml to treat a customer, representing a total cost of R\$ 20,62 to the Institution. On admission, the number of syringes was higher, being used 20 units (u) 1ml, 3ml of 16u, 95u 5ml, 10ml 35U and 23U 20ml, resulting in a total cost of R\$ 30,89 for the institution.

This data allowed us to note that, besides the readmission Customer patient with heart failure represent greater expense to the institution; the cost of used syringes was still higher than the value of the first hospitalization.

Given this reality it is presented to highlight the importance of the role of a nurse, for when promoting a planned customer care patient with heart failure, it is able to reduce the episodes of decompensation, readmission and treatment costs.¹⁶

CONCLUSION

The survey identified the cost of syringes used in the treatment of clients with heart failure hospitalized in studied. However, when the counting of the quantity of syringes existing in the sector, it was possible to note a divergence in quantitative expected since they were found syringes not required or her absence without justifiable cause, proving the presence of faults in the control of the material.

This finding confirms the relevance of the study, as highlights the importance of the nurse's role in controlling the costs of these materials, being the professional that is in direct contact with these inputs, in addition to being one that makes more use of these.

The correct management of materials directly reflects the hospital's budget, a fact that requires professional nursing a more active and conscious to promote cost reduction and conscious use of available resources thereby decreasing the waste in them, since this is the professional responsible

by sector management, including human and material resources.

We conclude that there is a need for nursing professionals will gain knowledge management and related costs, to be able to develop activities of supervision and control of these materials within the industry always seeking cost reduction and optimization of their assistance.

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