

DOI: <https://doi.org/10.36489/saudecoletiva.2021v11i61p4898-4905>

# Analysis of the percentage of waste from human milk and child formulas in neonatology service

Análisis del porcentaje de residuos de leche humana y fórmulas infantiles en el servicio de neonatología

Análise do percentual de desperdício do leite humano e de fórmulas infantis em serviço de neonatologia

## ABSTRACT

**Objective:** to evaluate the waste of breast milk and infant formula in a neonatology service. **Method:** cross-sectional study, carried out from June to December 2019 in a maternity school in Natal-RN. The descriptive analysis of continuous variables was performed by median and percentiles. For categorical variables, the analysis was performed using absolute and relative frequencies. The Mann-Whitney test and the Chi-square test were applied. **Result:** there was a greater waste of infant formula in the Neonatal Intensive Care Unit ( $p < 0.01$ ) and the most common justification for not using the formula was the need for a procedure in neonates. **Conclusion:** considering the importance of breast milk and infant formula for newborns hospitalized in the units studied, we warn that greater control of the distributions of these diets is necessary due to the impact on child health and hospital costs

**DESCRIPTORS:** Breast milk; Infant formulas; Food wast.

## RESUMEN

**Objetivo:** Evaluar el desperdicio de leche materna y fórmula infantil. **Método:** estudio transversal, realizado de junio a diciembre de 2019 en una escuela de maternidad en Natal-RN. El análisis descriptivo de las variables continuas se realizó por mediana y percentiles. Para las variables categóricas, el análisis se realizó mediante frecuencias absolutas y relativas. Se aplicó la prueba de Mann-Whitney y la prueba de Chi-cuadrado. **Resultado:** Hubo un mayor desperdicio de fórmula infantil en la Unidad de Cuidados Intensivos Neonatales ( $p < 0.01$ ) y la justificación más común para no usar la fórmula fue la necesidad de un procedimiento en el recién nacido. **Conclusión:** Considerando la importancia de la leche materna y la fórmula infantil para los recién nacidos hospitalizados en las unidades estudiadas, advertimos que es necesario un mayor control de las distribuciones de estas dietas por el impacto en la salud infantil y los costos hospitalarios.

**DESCRIPTORES:** Leche materna; Fórmulas para lactantes; Desechos alimentarios.

## RESUMO

**Objetivo:** avaliar o desperdício de leite materno e fórmula infantil em serviço de neonatologia. **Método:** estudo transversal, realizado no período de junho a dezembro de 2019 em uma maternidade escola de Natal-RN. A análise descritiva das variáveis contínuas foi realizada pela mediana e percentis. Para as variáveis categóricas a análise foi realizada por meio de frequências absolutas e relativas. Foi aplicado o teste de Mann-Whitney e o teste Qui-quadrado. **Resultado:** houve maior desperdício de fórmula infantil na Unidade de Terapia Intensiva Neonatal ( $p < 0,01$ ) e a justificativa mais comum para o não aproveitamento da fórmula foi a necessidade de procedimento nos neonatos. **Conclusão:** considerando a importância do leite materno e fórmula infantil para os recém-nascidos hospitalizados nas unidades estudadas, alertamos que se faz necessário um maior controle das distribuições dessas dietas em função do impacto na saúde infantil e nos custos hospitalares.

**DESCRIPTORES:** Leite materno; Fórmulas infantis; Desperdício de alimentos.

RECEIVED ON: 11/24/2020 APPROVED ON: 12/08/2020

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**INTRODUCTION**

**N**utritional support is essential for hospitalized newborns, being essential for improving metabolic changes in the first 24 to 48 hours of hospitalization.<sup>1</sup> In this context, breast milk (BM) is considered a complete food which brings benefits to the digestive system, nervous system, immune system, maintains the child's normal growth and development and prevents the adhesion and colonization of respiratory bacterial pathogens, among others.<sup>2</sup>

Despite all the scientific evidence of these benefits, in the Brazilian reality, especially in the North and Northeast regions, the rates of exclusive breastfeeding are still below that recommended by the World Health Organization (WHO) and the Ministry of Health, as disclosed by the National Health Study. Infant Food and Nutrition (Enani), only 47% of children received exclusive breastfeeding during the first six months and 60% until the fourth month of life.<sup>3</sup>

Aiming to improve this reality, since 1981 the Human Milk Banks (HMB) were created, responsible for the collection, processing, quality control and distribution to a vulnerable population, regulated by RDC 171 of September 4th, 2006. However, the volume of donated LM available in banks is still insufficient to supply all the existing demand. A study carried out in the HMB of a public hospital in Paraná found

that of the 402,7 liters of donated milk, 61,5L were neglected (15%), with the main reason being the presence of dirt. The authors warned of the importance of investing in the training of professionals in order to optimize the use of SCI, contributing to the reduction of expenses with artificial formulas and infant mortality.<sup>4</sup>

The advantages of BM over infant formulas (IF) are undeniable, however, there are situations in which the use of these formulas is necessary: in the context of infeasibility of using breast milk, due to clinical contraindication for lactation, or in risky situations, for example, mothers with the Human Immunodeficiency Virus (HIV) 5 or to complement the caloric intake of the newborn.<sup>4</sup> At the institution studied, which is part of the Baby Friendly Hospital Initiative (BFHI), priority is given to offering raw or pasteurized breast milk to newborns (NBs) in the Neonatal Intensive Care Unit (NICU) and Neonatal Intermediate Care Unit Kangaroo (Unidade de Cuidados Intermediários Neonatais Canguru - UCINca), since the newborns hospitalized in these units are unable to breastfeed and dependent on the nutritional supply of the breastfeeding.

In the meantime, aware of the importance of breast milk and infant formulas for hospitalized NBs, as well as the institutional cost of neonatal diet therapy, the question arises: are there any waste of diets in the researched unit? What are the factors that generate these wastes?

Thus, this study aimed to assess the existence of waste and what are its generating factors, in a Maternity School in the city of Natal/RN.

**METHOD**

This is a cross-sectional study carried out from June to December 2019. The research was carried out in the lactation of a maternity school in Natal/RN. The data used in the collection were secondary, coming from the lactation diet registers books of the researched institution. The following variables of interest were extracted: amount of total diet distributed (ml), amount of total diet wasted (ml), distribution sector and reasons for discarding diets (occurrence of procedure, breastfeeding, complications and others).

After data collection, they were stored in an electronic spreadsheet using SPSS for Windows, version 22.0. The Kolmogorov-Smirnov normality test was used to verify the adherence of continuous variables to the normal distribution. For variables that did not show a normal distribution, the median, the 25th and 75th percentiles, in addition to the non-parametric Mann-Whitney test were used. The analysis of categorical variables was performed using absolute and relative frequencies. The Chi-square test was used to analyze the association between variables of a categorical nature. In all analyzes, the 5% significance level was adopted.

The study complied with the recommendations of Resolution No. 466/2012, which deals with research involving human beings, and is assessed by the Research Ethics Committee of Hospital Onofre Lopes (HUOL) and approved in accordance with CAAE No. 5634019.2.0000.5292.

## RESULTS

The comparison of the percentage of waste between the NICU and UCIN sectors of the 424 offers of milk and formulas that occurred during 212 days was

analyzed, with a higher level of waste in the NICU for infant formula ( $p < 0,01$ ), as shown in the table 1.

When investigating the reasons for wasting breast milk and infant formula in the sectors, the following results were observed: in the NICU, breast milk and infant formula were wasted mainly by the occurrence of a procedure in the newborn in 33 and 39% of cases, respectively; in UCINca, 42% of the infant formula was also not used due to the need for procedures in newborns and 40% of breast milk for other reasons, as shown in figure 1.

## DISCUSSION

In this study, there was a higher frequency of waste from diets distributed in the NICU under the justification of carrying out procedures in newborns. The NICU is a sector characterized by its own complex dynamics, where the care provided requires specialized skills and work processes established by clinical and care protocols.<sup>6</sup> This intense dynamics, with a high number of procedures/day performed associated with the nursing undersizing, may have contributed to the greater waste of diets in

Table 1- Comparative analysis of diet waste at the NICU and UCINca, from June to December 2019. Natal-RN, 2019.

Variáveis	Setor de distribuição		P valor <sup>a</sup>	Total
	UTIN	UCINca		
Leite materno distribuído (ml)	1.980 (1.736 – 2.232)	944 (612 – 1.278)	$p < 0,01$	1.572 (944 – 2.048)
Leite materno desperdiçado (ml)	32 (18 – 54)	30 (20 – 37)	0,662	30 (19 – 53)
Percentual de leite materno desperdiçado	1,18%	0,31%	---	0,89%
Fórmula infantil distribuída (ml)	2.301 (1.806 – 2.968)	1.594 (1.089 – 1.926)	$p < 0,01$	1.880 (1.475 – 2.466)
Fórmula infantil desperdiçada (ml)	54 (45 – 75)	33 (19 – 41)	$p < 0,01$	50 (35 – 65)
Percentual de Fórmula infantil desperdiçada	0,87%	0,14%	---	0,59%

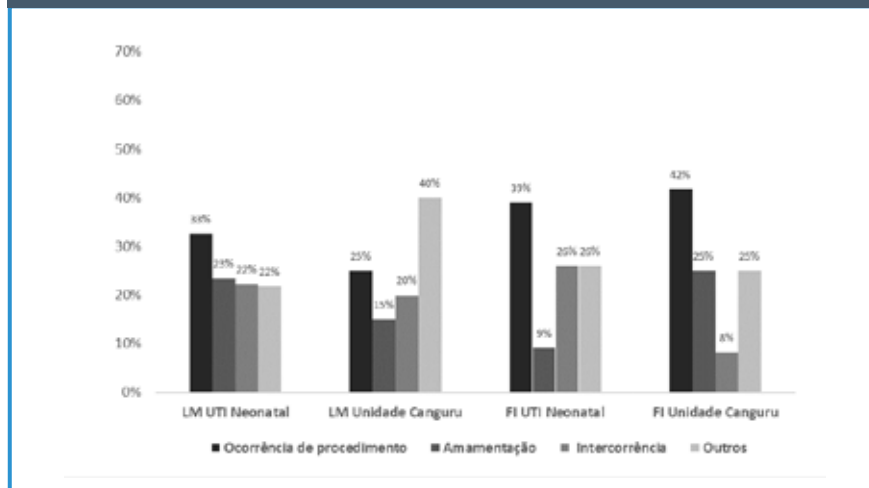
<sup>a</sup>Significance of the difference between the groups using the Mann-Whitney test. Percentage of wasted breast milk = total amount of wasted breast milk (ml)/total amount of breast milk (ml) delivered. Percentage of wasted formula = total amount of infant formula (ml) wasted/total amount of infant formula (ml) distributed. Continuous data are expressed as median and 25th percentile (P25) and 75th percentile (P75); Median (P25 – P75).

Bold values indicate significance at  $p < 0,05$ .

Abbreviations: UTIN: Neonatal Intensive Care Unit (Unidade de Terapia Intensiva Neonatal); UCINca: Kangaroo Neonatal Intermediate Care Unit (Unidade de Cuidados Intermediários Neonatais Canguru); ml: milliliters.

Source: lactation diet registers books of the researched institution.

Table 1- Comparative analysis of diet waste at the NICU and UCINca, from June to December 2019. Natal-RN, 2019.



LM- Breast milk (leite materno); FI- Infant formula (fórmula infantil)  
Source: lactation diet registers books of the researched institution.

the NICU. This finding corroborates with other studies which indicate that the underestimated number of nursing professionals in ICUs is especially related to the weakening of care management activities, work overload and, consequently, possible negative repercussions on the quality and safety of care<sup>7</sup>, which includes the difficulty of communicating with the breastfeeding to warn about new prescriptions which ends up causing the waste of diets.

It is known that although the service has a human milk bank (HMB) that supplies the institution's milk, the amount of Processed Human Milk dispensed is insufficient to meet the institution's demands. In this scenario, for every ml of human milk wasted, a life can be harmed, since breastfeeding is related to the clinical improvement

of the NB and to the reduction of hospitalization time.<sup>8,9</sup>

The use of infant formulas is indicated when the use of breast milk is not feasible, however, we must pay attention to the fact that the cost of infant formulas is high, especially when it comes to specialized formulas for premature and allergic newborns. According to Oldenburg<sup>4</sup> the existence of waste implies an increase in costs, and it is known that when it comes to public health, one of the main pillars for changing any practice is the need to reduce financial expenses. The reduction of expenses for public coffers is relevant, particularly at times when resources are scarce, and in Brazil, currently, less than 4% of GDP is invested in public health.<sup>10,11</sup>

The reasons for wasting diets in the NICU and the UCINca are associated with the occurrence of procedures, bre-

astfeeding and complications with the newborns. Such findings reveal flaws in the flow of distribution of diets. Solfa<sup>12</sup> and Siqueira et al.,<sup>13</sup> found in their studies flaws in the process related to the non-administration of the volumes of prescribed enteral diets, due to suspension, non-compliance with the prescribed actions regarding enteral therapy in the pre-established time, constant changes in the diets schedules, interruption of the diet for the practice other procedures and inadequate staff sizing.

It is observed that the findings of this research, as well as of the studies cited, show the need for improvement in the interdisciplinary work process in health institutions. In addition, the difficulty in articulating the lactation sector with the professionals of the NICU and UCINca is clear, a fact that reveals the need for a flow of diets in the researched institution,

which guarantees the sustainability of the service without significant losses. It is believed that promoting interdisciplinary dialogue between professionals can collaborate to reduce waste.

## CONCLUSION

The waste of breast milk and infant formula occurs in both sectors studied, being of greater significance in the Neonatal Intensive Care Unit sector, with the main reason for performing the procedure in the neonate. Considering the importance of adequate nutritional support for newborns, as well as the need to optimize institutional financial resources, we warn that it is necessary to better control the distribution of diets through the establishment of an institutional flow that results in the reduction of the evidenced waste. ■

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