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Original article

HOME HOSPITALIZATION: FIRST YEAR OF EXPERIENCE IN A PUBLIC HOSPITAL

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Abstract

Introduction: Home Hospitalization (HH) is a modality of home care with benefits for the health system, patients, families, and with few experiences in our country. In this paper, we present the results of the first year in a public hospital.

Materials and methods: Cross-sectional study. Patients older than 17 years with acute and clinically stable diseases were included. We analyzed their clinical characteristics, days of hospitalization, mortality, readmission, and patient and family satisfaction surveys. The cost analysis is general, per day/bed, and variable due to the progressive incorporation of human resources and increase of available beds.

Results: A total 276 patients were hospitalized, 51% women, median age 65 years, median number of days of hospitalization 4 and mean Charlson Index 4. The percentage of readmissions was 17.2% and mortality 6.7% at 30 days. Satisfaction surveys were completed by 28.6% of patients and 13.1% of family members: 96-100% reported that they considered all the points evaluated as very good/good. 90-95% stated that they would choose this modality again, that they would recommend this modality, and that they preferred it to hospitalization. The HH cost per bed day was 70% higher than the medical clinic cost per bed day..

Discussion: HH is feasible to implement and accepted in our setting. Its initial costs were higher than those in the medical clinic, but should be re-evaluated in the long term, if bed capacity and human resources remain constant.

Key words: home hospitalization, healthcare organization, satisfaction survey, healthcare costs

Resumen

Hospitalización a domicilio: primer año de experiencia en un hospital público

Introducción: La Hospitalización a Domicilio (HaD) es una modalidad de cuidados domiciliarios con beneficios para el sistema de salud, pacientes, familias, y con pocas experiencias en nuestro país. En este trabajo se presentan los resultados el primer año en un hospital público.

Materiales y métodos: Estudio de corte transversal. Se incluyeron pacientes mayores de 17 años, con enfermedades agudas y clínicamente estables. Se analizaron sus características clínicas, días de internación, mortalidad, reinternación y encuestas de satisfacción a pacientes y familiares. El análisis de costo es general, por día/cama y variable debido a la incorporación progresiva de recursos humanos y de aumento de camas disponibles.

Resultados: Se internaron 276 pacientes, 51% mujeres, mediana de edad de 65 años, mediana de días de internación 4 y una media de índice de Charlson 4.

El porcentaje de reinternaciones fue 17.2% y de mortalidad de 6.7%, a 30 días. Se realizaron encuestas de satisfacción a 28.6% de pacientes y 13.1% de familiares: 96-100% manifestaron como muy bueno/bueno todos los puntos evaluados. El 90-95% manifestó que volvería elegir esta modalidad, recomendaría esta modalidad y la prefiere a la internación en el hospital. El costo día cama de HaD fue superior en un 70% al costo día cama de clínica médica.

Discusión: La HaD es factible de implementar y aceptada en nuestro medio. Sus costos iniciales fueron mayores que en clínica médica, pero deben re-evaluarse a largo plazo donde la capacidad de camas y de recursos humanos se mantengan constantes.

Palabras clave: hospitalización a domicilio, organización para el cuidado de la salud, encuesta de satisfacción, costos en salud

KEY POINTS

Current knowledge

- Home hospitalization is a health strategy with benefits for the health system, patients, and family. This modality of home care is underdeveloped in the public health sector.

Contribution of the article to current knowledge

- Our data confirm that the home hospitalization model is feasible to implement and develop in the public health sector, with patient and family satisfaction and a positive impact on the health system.

In recent years, hospitals have seen their hospitalization capacity saturated due to a combination of factors: demographic growth, increased life expectancy, growth in the population segment of older adults with a greater number of comorbidities, and greater demand for care within the health care system[1].

In Argentina, there are experiences in public and private hospitals that provide hospital-at-home care services[2-7]. These studies highlight the implementation and benefits of home care, demonstrating its positive impact on reducing hospital readmissions and the feasibility of long-term home care programs. However, three different home care modalities can be identified: home care/assistance, home hospitalization, and hospital-at-home care. Each of them has different patient characteristics, care modalities, therapeutic goals, complexities, dependencies from the health system, and professionals responsible for care, as described in Table 1. Home Hospitalization (HH) is the modality that can replace hospitalization to optimize bed availability and reduce the burden of care. In contrast to hospital-at-home care for patients with chronic diseases, HH incorporates patients with acute diseases who meet the conditions to continue their treatment at home and allow a short-term discharge, with continuous rotation avoiding bed saturation within the HH.

In Argentina, Resolution 704/2000 of the National Ministry of Health regulates the norms for the Organization and Operation of Hospital-at-Home Care Services, which defines hospital-at-home care as "a modality of health care, through which assistance is provided to the patient-family at home, carried out by a multi-professional and interdisciplinary team whose mission is: to promote, prevent, recover, rehabilitate and/or accompany patients according to their diagnosis and evolution in the physical, psychological, social and spiritual aspects, maintaining quality, respect and human dignity"[8].

During late 2022 and early 2023, the HH[9] project was developed at the *Hospital Municipal de Agudos Dr Leónidas Lucero* in the city of Bahía Blanca. It began with a pilot test of 4 months[10], with a continuous and progressive growth of its inpatient capacity, and an increase in the number of beds and incorporation of professionals, throughout the first year of its implementation.

The objectives of this study were to describe the results of the first year of implementation of the HH project, analyze the satisfaction of patients and their families, evaluate the costs of implementation and compare them with the costs of the Medical Clinic Service (MCS), and evaluate the impact of this strategy within the hospital.

Materials and methods

Cross-sectional, descriptive study of the results of the first year of the HH project, between May 2023 and April

Table 1 | Comparative table of home care modalities

Characteristic	Home care/Assistance	Home hospitalization	Hospital at-home
Objetive	Prevent hospitalization	Replace hospitalization	Replace hospitalization
Dependence on professionals	Primary care	Hospital	Hospital
Dependence on patients	Primary care	Hospital	Hospital - Rehabilitation Center
Type of patients	Acute/Chronic	Acute	Chronic
Techniques	Low-intensity and complex	Low-intensity and complex or Intensity and complex	Intensity and complex
Treatments	Low-intensity and complex	Low-intensity and complex or Intensity and complex	Intensity and complex
Follow-up	Limited time	Limited time	Unlimited time
Prevention	Greater dedication	Less dedication	Less dedication
Education	Greater dedication	Less dedication	Greater dedication

2024. The *Hospital Municipal de Agudos Dr. Leónidas Lucero* (HMALL) is the reference hospital of the city of Bahía Blanca, handling the majority of emergency cases in the city. It has 120 inpatient beds, of which 40 are allocated for the MCS, with 100% occupancy throughout the year. Patients admitted to HH were referred from the MCS and had to meet the following criteria: 1) patients must be over 17 years of age with acute illnesses, with clinical stability and positive progress over the last 48 hours of hospitalization, requiring ongoing medical assistance that can be provided in a home setting without demanding hospital infrastructure to continue their treatment; 2) patients must have permanent accompaniment at home by a family member, friend, or caregiver, during the time in HH, 3) the patient must accept and sign an informed consent for this home care modality; and 4) the socio-habitational survey must ensure the minimum requirements for providing this care modality.

An Excel spreadsheet was designed that included the following variables: age, sex, diagnosis, days of hospitalization, Charlson Index, social security coverage, and treatment. Readmissions and mortality were evaluated at 30 days. A separate Likert-type patient and family satisfaction survey, taken from Resolution 704/2000 of the National Ministry of Health, was carried out by trained administrative personnel who had no direct contact during the HH assistance process. Three questions were added to this survey: 1- If you could choose, would you return to this service?; 2- Would you recommend this modality of care to others?; and 3- Would you prefer it before hospitalization? The answers to these questions were dichotomous yes or no. For the telephone surveys, a simple

random sample was used during the first 10 months of the project, 30 days after discharge from HH with 8 patients and 2 family members per month. For the cost analysis, the bed-day cost of hospitalization in HH was compared with the bed-day cost of the MCS. To evaluate the hospital results of the project implementation, indicators from the year before the project (May 2022 - April 2023) were compared with those of the implementation period: number of patients admitted to the MCS, 30-day mortality and readmissions, and number of admissions to the Intensive Care Unit. These data were retrieved from the hospital centralized computer system. A descriptive analysis was performed using measures of frequencies, proportions, medians, ranges, interquartile ranges, and Chi-square. SPSS 14 software was used for the statistical analysis.

Results

A total of 276 patients were admitted, 51% female (n=141) and 49% male (n=135), with a median age of 65 years, representing 15.5% of hospital admissions to the MCS. General patient characteristics are shown in Table 2. The average number of period readmissions from HH to the MCS was 17%. Figure 1 shows the comparison of readmissions of patients from HH and other sites to the MCS. Infectious diseases, such as pneumonia, urinary tract infections, and skin infections, were the most frequent diagnoses. Among respiratory diseases, exacerbated chronic obstructive pulmonary disease and asthmatic crisis were the main diagnoses; among cardiovascular diseases heart failure was the most common.

Satisfaction surveys were completed by 28.6% (n=79) of the patients and 13% (n=36) of the family members. Answers to the survey questions are shown in Tables 3 and 4. For the survey questions regarding "decision to treat you at home", "presence of the staff", "efficiency of the task assigned to the staff", "treatment received", "compliance with the schedule", "staff support", "resolution of problem", "explanation of the care", "explanation of the medication" and "interest shown by the team", more than 95% of patients' and family members' answers were between very good and good. Only on the question of "the number of hospitalization days", 7.8% of the patients and 11% of the family members answered fair/poor. In response to the questions added to the questionnaire, 90-95% of the respondents stated that they would "choose this type of care again", "recommend it" and "prefer it to hospital admission", both patients and family members (Table 5).

In relation to the general evaluation of HH costs, 90% corresponded to salaries and 10% to transportation of professionals, supplies, and medication. In the comparative analysis with the cost per bed day of the MCS, the cost per bed day in HH was 70% higher: MCS cost per bed day 102 thousand Argentinean pesos vs. HH cost per bed day 172 thousand Argentinean pesos; values analyzed as of July 2024.

Table 6 shows comparative data for the period under study vs. the immediately preceding period without the implementation of the project in the Medical Clinic Services and Intensive Care Unit. No significant differences were observed in mortality and readmissions, but there was an increase in the number of hospitalizations in Intensive Care Unit.

Table 2 | Characteristics of patients admitted to Home Hospitalization

Variable	Result
Age	65 (IQR 60-74)
Sex, n (%)	
Female	141 (51)
Male	135 (49)
Charlson Index	4 (range 1-8)
Days of hospitalization	4 (IQR 3-7)
Diseases, n (%)	
Infection	95 (34.4)
Cardiovascular	42 (15.2)
Respiratory	38 (13.8)
Hematologic	26 (9.4)
Digestive	15 (5.4)
Neurologic	14 (5.1)
Urinary	10 (3.6)
Others	36 (13)
Mortality (30 days)	6.7%

IQR: interquartile range

Figure 1 | Comparison of monthly readmission percentages in the Medical Clinic Service from Home Hospitalization in contrast to other locations

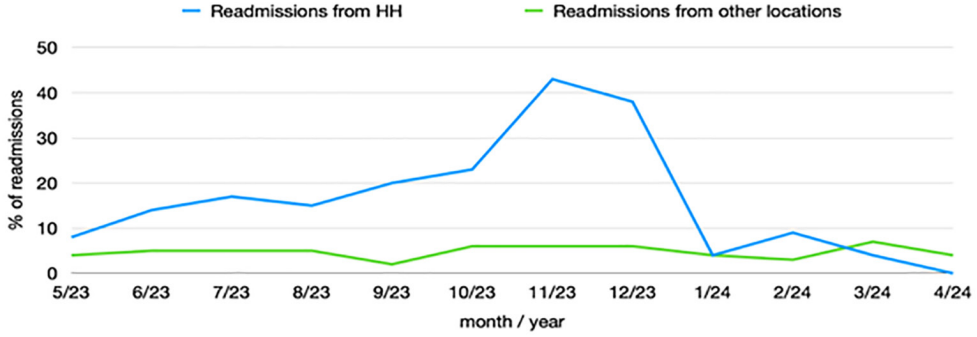

Table 3 | Results of the patient satisfaction survey - n=79 (Resolution 704/2000 survey of the National Ministry of Health)

Question	Very good % (n)	Good % (n)	Regular % (n)	Poor % (n)
Decision to treat it at home	73.4 (58)	22.8 (18)		3.8 (3)
Staff presence	86 (68)	10.2 (9)		3.8 (3)
Personal assigned task (efficiency)	87.3 (69)	8.9 (7)		3.8 (3)
Treatment received	87.3 (69)	8.9 (7)		3.8 (3)
Compliance with the schedule	89.8 (62)	17.8 (14)		3.8 (3)
Professional support	88.6 (70)	8.9 (7)		3.8 (3)
Resolution of problems	83.5 (66)	12.7 (10)		3.8 (3)
Explanation of care	81 (64)	15.2 (12)		3.8 (3)
Explanation of medication	82.3 (65)	13.9 (11)		3.8 (3)
Interest shown by the team	90 (71)	6.2 (5)		3.8 (3)
Number of days of hospitalization	67 (53)	25.4 (20)	3.8 (3)	3.8 (3)

Table 4 | Results of the family satisfaction survey - n=36 (Resolution 704/2000 survey of the National Ministry of Health)

Question	Very good % (n)	Good % (n)	Regular % (n)	Poor % (n)
Decision to treat it at home	94.4 (34)	5.6 (2)		
Staff presence	94.4 (34)	5.6 (2)		
Personal assigned task (efficiency)	97.2 (35)	2.8 (1)		
Treatment received	97.2 (35)	2.8 (1)		
Compliance with the schedule	86 (31)	14 (5)		
Professional support	97.2 (35)	2.8 (1)		
Resolution of problems	91.6 (33)	8.4 (3)		
Explanation of care	97.2 (35)	2.8 (1)		
Explanation of medication	97.2 (35)	2.8 (1)		
Interest shown by the team	97.2 (35)	2.8 (1)		
Number of days of hospitalization	72.2 (26)	16.8 (6)	11 (4)	

Discussion

HH is a model of home care for patients who meet the characteristics and needs required given the saturation of hospital beds. The project proposal was visualized as an option in response of this reality. The different hospital areas that were fundamental to the implementation agreed on the objectives and the progressive development of the project[9,10].

The HH population was characterized by being older adults with multiple comorbidities and with a higher frequency of acute diseases of infectious, respiratory, and cardiovascular etiology. The results of the surveys conducted revealed that patients and family members accepted this modality of care. The number of patients admitted to the HH population constitutes 15.5% of the annual admissions to the MCS, indicating a decline in the total number of patients receiving care in this service when comparing the 2022-2023 and 2023-2024 annual seasons. This also impacts on a decrease in the work overload of healthcare professionals. The increase in the number of hospitalizations in the Intensive Care Unit is also positive, as a greater number of patients can be admitted to the MCS. However, a high percentage of readmissions and a higher cost were observed in HH compared to those in the MCS.

A negative point was the percentage of readmissions with 17%. This situation was observed during the fifth to sixth month of project implementation, with a peak of 40% readmissions. An analysis of the causes of this situation was conducted, and the results indicated that older adults with multiple comorbidities contributed to the observed readmission rate, added to the necessary learning curve of the project, which despite having professionals with nearly 20 years of experience in HH, it is still a new modality of assistance. During the final months of the first year of the project, a decrease in the percentage of readmissions was observed, similar to the readmissions of other locations within the MCS. Cunha Ferré MF et al. identified low functionality, pressure ulcers, and age over 83 years as predictors of hospital readmission to the emergency department within 72 hours from home care services in Argentina[6]. Another study by Schapira et al. evaluated geriatric co-management and interdisciplinary transitional care intervention in frail elderly patients hospitalized in a tertiary hospital in Argentina. This study demonstrated that the intervention led to a significant reduction in 30-day hospital readmissions and emergency room visits in the initial six months following discharge[2]. Perman G et al. evaluated the efficacy of integrated care initiatives for frail el-

Table 5 | Results of questions to patients (n=79) and family members (n=36) about "choice, preference and recommendation of Home Hospitalization"

Question	Patients % (n)	Family % (n)
If you could choose, would you use this service again?		
Yes	97.5 (77)	100 (36)
No	2.5 (2)	-
Do you prefer it before hospitalization?		
Yes	83.5 (66)	88.9 (32)
No	16.5 (13)	11.1 (4)
Would you recommend this type of care to other people?		
Yes	97.5 (77)	100 (36)
No	2.5 (2)	-

Table 6 | Comparison of two consecutive annual periods, with and without Home Hospitalization in the Medical Clinical Services and Intensive Care Unit

Variable	Período 05/22-04/23 (without HH)	Período 05/23-04/24 (with HH))	Result	p-value
MCS total admissions (n)	1955	1785	-170 (- 8.7%)	-
ICU total admissions (n)	403	454	51 (11.2%)	-
MCS mortality n (%)	255 (13)	224 (12.5)	-32 (-0.5)	0.65
MCS readmissions within 30 days n (%)	101 (5.15)	80 (4.46)	-21 (-0.69)	0.33

HH: home hospitalization; MCS: medical clinical services; ICU: intensive care unit

derly living at home, implementing a structured process, assessing functionality, nutrition, mobility, pain, cognition, medication reconciliation and adherence, need for care, quality of care, and environmental safety. The program resulted in a reduction of hospital admissions and an improvement in quality of life compared to usual care, with no significant differences in mortality rates[5]. However, it is important to note that patients in these studies are older adults with chronic diseases, whereas those included in HH were also older adults but with acute diseases.

One of the limitations of the study is the high costs during this year of the HH project implementation It was observed that the HH cost per bed day is 70% higher when compared to medical clinic costs. It should be taken into account that this cost has been variable throughout the period analyzed and not only due to inflationary variations in our country. During the initial 4 months of the project (the pilot stage), the human resources comprised 4 professionals and 4 available beds. In the second stage of the project, 2 additional professionals were incorporated, with 8 beds available for the subsequent 5 months. For the final 3 months, 8 professionals were allocated to the project with 12 potential inpatient beds. This situation indicates that the initial months of the project were associated with higher expenses, which subsequently decreases in the final months. To estimate the annual number of patients requiring hospitalization, ensuring that the bed-day cost of the project approximates that of the MCS, a minimum of 350 patients per year is required. It is observed that as the number of patients increases, the bed-day cost in HH decreases. A cost-effectiveness analysis carried out by Lamfre et al. on home palliative care for cancer patients in the province of Río Negro showed that this care increased the probability of dying at home by 10.32% compared to usual care, with significant annual savings both from a social and financial perspective. However, these patients had chronic diseases, in contrast to HH patients. Another study published by Roubicek J. et al. examines the hospitalization experience of patients with acute diseases in a private health center in Argentina, where the overall cost per day/bed, also compared to a day of hospitalization in a medical clinic, was lower[7]. So far, this modality implies a higher cost. These results and estimates should be validated during the second year of the HH project, when human resources, installed bed capacity, and occupancy rate remain constant. On the other hand, potential in-hospital complications preventable by the referral of patients to HH have not been taken into account in the evaluation of costs, nor have referrals without delay from Intensive Care Unit to the MCS, when beds are available in the MCS due to the implementation of HH. Another tool that can be incorpo-

rated into the project is telemedicine. The hospital has a recently created Telehealth and Special Projects Directorate, but this type of strategy has not yet been implemented in HH. Telemedicine can be a tool to support the growth of the project and potentially improve the costs of the model[11]. The results for all the survey questions, which exceeded 90%, indicated that patients and their families accepted this modality of home care. This reality cannot be measured in terms of costs, but it represents an added value that favors HH development. Roubicek J. satisfaction survey of patients or family members who had access to the service revealed that 95% of them had their expectations met and rated the service with the highest score. It should be noted that the sample size of the survey may not be representative of all the patients due to the low number of responses.

The results obtained during the first year of the project implementation are encouraging, and this model of home care can be extended to other services and specialties within a hospital with similar realities. However, the characteristics of the model would need to be adapted to a HH model. The literature contains descriptions of HH in traumatology[12], surgery[13,14], hepatology[15], oncology[16], cardiology[17], and geriatrics[18], among other medical specialties and specific groups of acute diseases[19]. Significant progress has been made in this new delivery model within a public hospital, leaving fertile ground for other services and/or units to approach this modality.

This model of home care has proven to be beneficial to patients and their families, including enhanced commitment and responsibility, improved quality of life, intimacy and well-being, personalized care, and reduced risk of iatrogenesis hospitalization and social disintegration. At the hospital level, the benefits included improved bed availability and rotation, decreased unnecessary stays, enhanced resource availability with potential budget reductions and optimized services. At the health system level, the benefits are evident in increased efficiency and effectiveness, characterized by optimal resource utilization, despite their scarcity, and the possibility of fostering a multifaceted, integrated and continuous relationship among the different health care levels[1].

This project originated as a Home Hospitalization Area under the Medical Clinic Service of HMALL as a pilot test. During the evolution of the project and with the analysis of the results obtained as of March 11, 2024, the hospital General Directorate decided to create the HMALL Home Hospitalization Service by Resolution 554/2024.

In conclusion, the HH model is feasible to implement and develop in our environment, accepted by patients and family members, and has a positive impact on the medical clinic service, optimizing bed availability and reducing the health care burden on health professionals. The costs in this period are substantial; however, they should be re-analyzed later, when the variables are more constant in relation to the capacity and use of available beds, stable human resources, and its impact on other hospital services such as intensive care.

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Conflict of interest: None to declare

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