Home palliative care reduces emergency room visits and deaths in health centers at a lower cost

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Abstract

Objectives: To compare the types of geriatric and palliative home care to determine which has better outcomes in patients with advanced dementia. Methods: This is a retrospective cohort study. Patients with advanced dementia admitted to the Geriatric Community Care program of a public geriatric hospital in Costa Rica in the period between January 2018 and June 2019 were included. They were divided into two groups depending on the specialized team that performed the home care, and their sociodemographic and clinical characteristics were analyzed. Subsequently, data generated from medical records on emergency consultations, hospitalization, place of death and cost of the visit generated by each patient between June 2018 and December 2019 were analyzed. A comparison was made between 192 patients with advanced Global Dementia Scale 7 dementia visited by the specialized geriatric home care team and 19 patients visited by the specialized palliative home care team of the National Geriatric Hospital. *Results:* We analyzed 226 data generated (192 by the geriatric program and 34 by the palliative program). Those receiving home care by a palliative team were less likely to go to the emergency room and die in a health center compared to those receiving home care by a geriatric team, at a lower cost. *Conclusions:* The specialized palliative home care program reduces emergency room visits, death at home, and costs of care in patients with advanced dementia compared with the geriatric program.

Keywords: Palliative Care; Geriatrics; Dementia; Home Care Services; Terminal Care; Cost-Benefit Analysis; Health Services.

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INTRODUCTION

Population changes related to aging will affect both the prevalence and incidence of age-related non-oncologic diseases such as dementia, mainly in Latin American countries[1,2].

Palliative care aims to alleviate the suffering of individuals and families facing a terminal illness. Dementias share certain aspects with other palliative diseases[3] but have their own characteristics[4,5] that make the approach to them different and extremely complex[6,7]. Although there is consensus on the need to provide dignified palliative care for these patients[8], it is widely recognized that the current structure of most health services is inadequate to meet the needs of this particular population[9].

It is unclear which model represents the best alternative care for this population group as it is highly dependent on the social context in which it is provided[10]. Patients generally do not receive the necessary support, which manifests itself in unsatisfactory care[11] with a poorer quality of death and an unfavorable cost/benefit ratio[12-14].

One area of palliative care is home-based palliative care, which has been previously defined in other publications[15]. Compared to usual care,[16] palliative home care has demonstrated favorable outcomes in symptom management, decreased emergency room visits or hospitalizations, and increased satisfaction with care; however, the evidence is inconclusive regarding home deaths, quality of life, caregiver burden, and functional impairment. Home palliative care may even be associated with more difficulty in caregiver bereavement management, especially in patients with dementia who are generally not included in these analyses[16-20].

Currently, information related to the costs of palliative care programs is insufficient. Generally, studies are small, use different methods of analysis and are directed at cancer patients[9,20-25]. In one review[16], lower costs were reported, with differences between 18 and 35%; however, only one of the studies analyzed reported statistically significant differences[9]. It is worth mentioning that none of the studies were conducted in Latin American countries, and therefore the scientific evidence of the impact of these programs in Latin America is minimal.

The Geriatric Community Care Unit (ACG) of the National Hospital of Geriatrics of Costa Rica offers care in the home setting by an interdisciplinary team to patients with terminal chronic degenerative diseases. Chart 1 summarizes the current status of the ACG unit and the services it offers, highlighting two visiting programs according to the model implemented, a geriatric and a palliative model[26]. Previous studies have shown that the palliative model offers good quality of death[27]; however, whether this is also accompanied by savings for the country's health system or other outcomes has not been investigated.

Chart 1. Modalities of care provided by the Geriatric Community Care service of the National Hospital of Geriatrics of Costa Rica (January 2018 to December 2019). San José, Costa Rica.

Modality of care	Patients visited	Description of program and services offered
Specialized geriatric home care	Non-oncologic terminal illness	**Visits by a multidisciplinary team a that includes** [a] **geriatric specialist** [b] **Visits every 2 to 3 months.** **Teleconsultation available during office hours.** Caregiver training group. Bereavement group.
Specialized palliative home care	Terminal oncologic and non-oncologic illness	**Visits by a multidisciplinary team including a specialist in geriatrics and palliative care.** **Visits every month or as needed.** **Teleconsultation available 24/7.** Caregiver training group. Bereavement group.

[a] The multidisciplinary teams consist of a physician, nurse, and professionals in social work, psychology, nutrition, speech therapy, occupational therapy, pharmacy, mental health, dentistry and psychiatry; [b] The main differences between the programs are highlighted in bold.

Source: Prepared by the authors.

Thus, the objective of this research is to compare, in patients with advanced dementia, care in the home setting by specialized palliative care teams with home care by specialized geriatric teams to determine which model has better outcomes (fewer visits to the emergency room or hospitalizations and a higher number of deaths at home) and a lower cost ratio to provide a replicable option to meet the needs of this particular population in the Latin American context.

MATERIALS AND METHODS

To carry out the investigation, a retrospective cohort study was performed. The data used were taken from the medical records of the patients assessed by the weekly multidisciplinary sessions of the ACG, in which all admissions to the program are reviewed. In these sessions, a decision is also made as to which specialized team will follow up the patient (the geriatric or the palliative team). This decision is based on the criteria of the multidisciplinary team (which includes a geriatrician, a licensed nurse and a social worker with 10 years of experience in these cases) which considers the sociodemographic and clinical variables of each particular case.

In February 2020, clinical and sociodemographic data that were retrospectively obtained from the medical records of patients admitted to the ACG program between January 2018 and June 2019 were analyzed (see Figure 1). Data obtained included date of admission to the program, age, marital status, gender, caregiver, and the presence of pressure ulcers, use of an enteral nutrition device, presence of a bladder catheter. Of the total number of patients assessed, patients aged 60 years or older were included, with a diagnosis of dementia syndrome at program entry and with a Global Dementia Scale (GDS) classification adequately recorded, with dementia syndrome as the program entry diagnosis, and with a classification of GDS 7.

Subsequently, the population was divided into two groups according to the team that visited the patient during the study period (the specialized palliative care team and the specialized geriatric team). It should be noted that if, during the follow-up period, a patient moved from one program to the other, his or her data were analyzed again; that is, the patient was analyzed for the time spent in one program and then again for the time spent in the other program.

To contrast and compare certain criteria of interest according to program, exploratory descriptive analyses were performed. To determine if there were differences between the variables in each program, a more detailed study was performed, and 95% confidence intervals were determined using the Wald method for multinomial distribution. For the mean values, intervals were created so that the means approached a normal distribution and the unknown standard deviation for the population was estimated using the observed data. It should be noted that, for the variables of interest, length of stay included the duration a patient remained in one program before switching to another or dying.

To assess the risk of emergency department visits and/or hospitalizations and the costs per patient of emergency department visits and hospitalizations according to group, the Costa Rican national health system's Digital Record that records national information for the entire country was used to analyze emergency department visits and hospitalizations for each patient from June 2018 to December 2019 (see Figure 1).

To analyze whether there were significant differences in emergency department visits, hospitalizations, and place of death between the two groups of patients, a logistic regression model was developed. The data were analyzed using the binomial probability distribution. Finally, the statistical significance of the OR obtained was obtained at a 5% significance level.

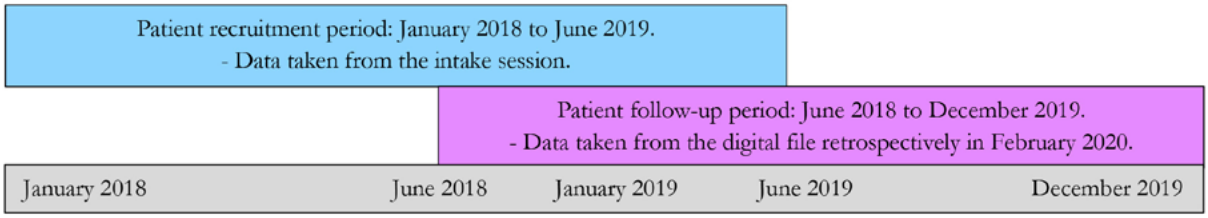

Figure 1. Time between recruitment and follow-up period (January 2018 to December 2019). San José, Costa Rica.

To compare the costs of each home program, the following formula was used:

- **Total cost per patient of the geriatric home program=** Cost of home care per patient in the geriatric program + cost of emergency room visits per patient in the geriatric program + cost per day of hospitalization per patient in the geriatric program + cost per day of hospitalization per patient in the geriatric program.

- **Total cost per patient of the palliative home program=** Cost of home care per patient in the palliative programs + cost of emergency visits per patient in the palliative program + cost per day of hospitalizations per patient in the palliative program + cost of teleconsultation.

The cost of visits per patient for each program, is derived from the ACG service cost study of the Hospital General Management, 2018. The aforementioned study used the variables of salaries, per diem, mileage used by each vehicle, and the costs of nursing and medical procedures performed. To estimate these costs, the salary category for each work team (geriatric versus palliative) was determined. To identify the actual cost of salaries, overtime, vacation, and other salary categories, the study used information from the 2018 Hospital Staff Salary Update prepared by the Department of Human Resource Management. Data regarding the distance traveled by the ACG for visits during 2018 were obtained from the Monthly Report of the Surveillance and Transportation Service. The cost per kilometer traveled was obtained from the Institutional Tariff Model. Data on the different procedures performed, both medical and nursing, were obtained from the ACG Annual Report, 2018. Once the annual costs of geriatric and palliative care were determined, the ratio of cost per patient, as mentioned above, was used to allow an appropriate comparison between programs.

For emergency department visits and hospitalizations, the duration of each visit (in hours) and the duration of hospitalization (in days) were quantified retrospectively using information from the institutional digital record for each patient, as described above. Subsequently, the costs per hour in the emergency room and per day of hospitalization were calculated for each group and finally per patient. The costs per hour in the emergency room and per day of hospitalization were obtained from the information provided by the Cost Accounting Area, 2019. Finally, once the variables necessary for the final calculation were obtained, the total costs per patient for the two programs were determined to allow comparisons between the programs.

Both the geriatric and palliative care programs offer the possibility of teleconsultation during office hours; however, only the palliative program offers the possibility of after-hours care (24 hours a day, 7 days a week). Although the cost of this teleconsultation is free, since it is donated by the Partir con Dignidad Foundation, this research calculated the cost of this care in order to determine the total cost of the palliative model in the context that this donation does not exist. Considering data from the 2018 and 2019 ACG Final Report, it is estimated that each patient in the palliative program makes an average of 5.3 calls. Each call has an approximate cost for the study year at $22.7. Of these calls, an estimated 42.5% were made outside of office hours. Taking these variables into account, the total cost in the study period for palliative care patients was $51.13 per patient.

The protocol for this study was approved by the Ethics Bioethics Committee of the Hospital Nacional de Geriatría y Gerontología Doctor Raúl Blanco Cervantes. Ordinary Session Number 12, November 5, 2019. Agreement No. 3. (protocol number CEC 14-2019).

RESULTS

Of the 443 patients seen in the Admission Session, 211 had the diagnosis of advanced dementia GDS 7 who were followed up. 192 were admitted to the geriatric program and 19 to the palliative program. The mean age of all participants was 85.3 years (SD= 8.6 years). At a general level it can be said that the ages of both groups have very similar distributions in their mean and standard deviation. The general characteristics of these patients are shown in Table 1. A total of 15 of these patients started follow-up in the specialized geriatric program and were subsequently transferred to the palliative care program. The data for these 15 patients were analyzed separately, first at the time they belonged to the geriatric program and then upon transfer to the palliative program. This generated a total of 226 cases that were followed up. A more detailed description of the study population can be found in other publications[28]. No significant differences were found in the demographic and clinical characteristics of the two groups.

As shown in Table 2 patients in the palliative care program had a lower risk of hospitalization, emergency department visits and death in the health center compared to those in the geriatric care program. This difference was statistically significant only for emergency visits and death in the health center.

It is important to note that the cost of home care per patient is higher for palliative care when considering the visit itself. However, considering the results over time, this becomes less expensive when considering that it leads to fewer emergency visits and hospitalizations, as shown in Table 3.

Table 1. Percentage distribution, mean age, and sociodemographic and health variables of patients by program, San José, Costa Rica (January 2018 to December 2019).

Variable	Geriatric Program n=192 (100%)	CI	Palliative program n=34 (100%)	CI
Average length of stay (days)	407.4	377.5; 436.5	426.1	286.9; 565.1
Average age	85.2 (SD=7,9)	84.1; 86.3	86.9 (SD=7,8)	82.7; 91.2
Marital status				
Widowed	93 (48.2%)	41.1; 55.3	16 (47.4%)	24.9; 64.8
Married	60 (30.9%)	24.3; 37.4	14 (42.1%)	19.9; 64.3
Single	26 (13.6%)	8.7; 18.5	2 (5.3%)	0.0; 15.3
Other	14 (7.3%)	3.6; 11.0	2 (5.3%)	0.0; 15.3
Gender				
Female	141 (73.4%)	67.2; 79.7	25 (73.7%)	53.9; 93.5
Male	51 (26.6%)	20.3; 32.8	9 (26.3%)	6.5; 46.1
Primary Caregiver				
Family	154 (80.2%)	74.5; 85.9	28 (83.3%)	66.1; 100.0
Hired personnel	38 (19.8%)	14.1; 25.5	6 (16.7%)	0.0; 33.9
Pressure ulcers grade 3 or 4				
Yes	27 (14.2%)	9.2; 19.2	2 (5.3%)	0.0; 15.3
Nasogastric tube or PEG[a]				
Yes	42 (22.1%)	16.2; 28.0	14 (42.1%)	19.9; 64.3
Bladder catheter				
Yes	11 (5.8%)	2.5; 9.1	5 (15.8%)	0.0; 32.2

[a] PEG: Percutaneous endoscopic gastrostomy.

Table 2. Risk model results for emergency department visits, hospitalization, and place of death by program. palliative care, San José, Costa Rica (January 2018 to December 2019).

Variable	Palliative program	
	OR1/	CI
Consultations to the emergency service		
Yes	0,18	0,09; 0,35 *.
Hospitalization		
Yes	0,46	0,07; 1,56
Place of death		
Health center	0,16	0,01; 0,93 *

CI: 95% confidence interval. OR: Odds ratio;

*: p<0.05. 1/Reference category: Geriatric.

Source: Prepared by the authors.

Table 3. Comparison of geriatric and specialized palliative program costs in the home setting. San José, Costa Rica (January 2018 to December 2019).

Variables	Program	
	Geriatric	Palliative
General variables		
Total patients at the beginning of the study	192	19
Total patients at the end of the study	192	34
Data evaluated	419	46
Cost of home care per patient	$ 368,4[a]	$ 680
Variables of emergency department visits		
Patients who visited the emergency department	106	4
Total number of emergency department visits	295	14
Time (in hours) of emergency department visits	1630	153,4
Total cost of care in the emergency department	$ 76858,4	$ 5607,7
Cost of emergency care per patient	$ 400	$ 165
Hospitalization variables		
Hospitalized patients	32	2
Total hospitalizations	38	2
Total days of hospitalization	574	26
Cost of one day of hospitalization (average)[a]	$ 802	$ 802
Cost per hospitalized patient	$ 1759	$ 485
Other variables		
Cost of 24/7 teleconsultation	n/a[b]	$ 51,13
Total cost per patient [c]	$ 2527,4	$ 1381,1

[a] Cost depends on the hospital where the patient was hospitalized; [b] Not applicable; [c] Total cost per patient in the geriatric home program= Cost of home care per patient in the geriatric program + cost of emergency room visits per patient in the geriatric program + cost per day of hospitalization per patient in the geriatric program; Total cost per patient of palliative home program= Cost of home care per patient in palliative program + cost of ER visits per patient in palliative program + cost per day of hospitalizations per patient in palliative program + cost of 24/7 teleconsultation.

Source: Prepared by the authors.

DISCUSSION

The results of this publication demonstrate the positive impact of the specialized palliative home care program on emergency visits, place of death and cost, even when compared to the geriatric program. The impact of palliative care on emergency visits, hospitalizations, and home deaths is greater than presented in previous publications [9,16,29].

Chiang J-K et al conducted a study with a similar population and methodological approach. The investigators sought to compare the impact of palliative care in the home setting on quality of life. They compared 164 patients from two different programs (one with a palliative approach and one without a palliative approach). This research showed only a significant difference in the variable related to death in hospitals and failed to document differences in emergency room visits or hospitalizations. It is worth mentioning that the research did not focus specifically on patients with dementia, nor did it perform any economic analysis[9].

Seow H et al. calculated relative risks by comparing two types of home interventions in two groups of 3109 patients each in Ontario Canada. This research demonstrated a decrease in emergency department visits and deaths in the hospital setting in patients visited by a palliative care team. However, the research did not specifically include patients with dementia nor was an economic analysis performed[15]. Similar findings were obtained from a systematized review of 4 studies analyzing interventions in the home setting of patients at the end of life, which only demonstrated a lower probability of dying in the hospital in the interventional groups[29].

Having control over the place of death is considered central to achieving an adequate quality of death. Evidence suggests that most terminally ill patients want to die at home[30]. Deaths in the hospital setting are accompanied by costly hospitalizations and aggressive treatment at the end of life, compromising the quality of death of patients and increasing the costs of care[30,31]. This explains why a death in the home setting is considered an important indicator of the quality of end-of-life care[31] , especially if the patient is cared for during this process by a home palliative care team with the characteristics presented in this study, as it ensures continuous and timely monitoring.

The cost/benefit ratio of home programs is not clear[29]; this is especially true in the Latin American context, where there is inadequate scientific evidence to guide health systems, which differ in each country and have little coverage of care in the home setting, especially for patients with dementia.

Although the frequency of care by the palliative team generates higher costs (see Table 2), this care provides high quality care[27] that allows the patient to die at home at a lower cost by avoiding emergency department visits and hospitalizations; therefore, when the total impact of this care is evaluated, the final result is a lower cost of care. This reduction is even greater than that reported in international publications[9, 16].

As shown in Table 1, the palliative care program differs from the geriatric program in three aspects. The most relevant difference is the availability of 24/7 teleconsultation and the frequency of visits 27. Virtual teleconsultation in palliative care has shown some positive results in oncology[32] and pediatric populations[33]. In addition, the increased frequency of visits allows greater contact between the team and families, thus providing more opportunities for education and awareness. These two distinctive elements of the model sensitize and empower family members, favoring decision making aimed at more conservative care[21].

The main limitation of this study refers to the unbalanced data, specifically in the target variable analyzed (program). Within the category "Geriatric Program" the great majority of the weight of the data is found, which means that it becomes complex to make inferences due to unequal counts. This explains the range of confidence intervals evidenced in the variables related to the palliative program. Another limitation of this study is that it is a nonrandomized study. Therefore, there may be a risk of selection risk in the population of each group. However, as evidenced in Table 1, the two groups did not differ significantly in their characteristics at the beginning of the study.

The study has some strengths. The control group (geriatric program) represents a highly specialized model of care, and because of the characteristics of the patients included and the similarity of the two models, conclusions can be drawn about the aspects that make the palliative model successful. This allows us to justify the investment needed to reproduce the model and offer a successful alternative in the Latin American context. Finally, the patients who were followed had a diagnosis of dementia, and the findings of this study generate scientific evidence that, to the authors' knowledge, did not previously exist for the Latin American setting in this particular population.

It is clear that more research is needed regarding home care models that can respond to the complex needs of patients with different non-oncologic diseases. Ideally, this research should use similar methods so that its results are comparable since needs vary greatly according to the social and cultural setting[33]. However, the results of the present study are sufficient to support home palliative care programs for patients with advanced dementia that are similar to those analyzed in this study.

CONCLUSION

Palliative home care has a positive impact on emergency visits, home death, and care costs for patients with advanced dementia, even when compared with similar geriatric care programs. This model of care represents an attractive alternative to the few care options currently available for this particular population.

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