Cost assessment of home care for discharged patients with moderate to severe dependence

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Abstract

Objectives: To evaluate the cost of home care for patients with moderate-to-severe dependency.

Methods: This study retrospectively collected 123 cases of home nursing patients in Taizhou city, a city in southeast China, from January to November 2021 and compared the actual total cost and actual expenditure of home nursing with in-hospital nursing.

Results: The cost of home nursing was higher than that of hospital nursing (vs Yuan). Compared to home-based nursing and in-hospital nursing, the reimbursement amount of government-borne medical insurance reimbursement is higher (vs Yuan). The actual cost of the patient's expenses is less than that of home care (vs Yuan). There were significant differences between the two groups in the actual total cost and expense reimbursement (vs, $p < 0.05$; vs, $p < 0.05$). There was no significant difference between the two groups regarding total self-care expenses ($p = 0.327$).

Conclusion: The cost of home nursing is high, but the government and the hospital absorb the corresponding expenditure cost, so the actual expenditure of patients is low. Home care saves time and avoids the risk of accidents caused by moving. Home care reflects the medical policy to provide services and cost support through cost analysis. Further, the continuous care of moderate and severe living dependent discharged patients gets complete nursing care.

Introduction

As a country with the largest ageing population globally and a rapidly developing ageing population, China faces the great challenge of population ageing. With the change of disease spectrum in older adult patients, the incidence and prevalence of various chronic diseases continue to rise. Furthermore, more than 90% of patients with chronic diseases are repeatedly hospitalised, resulting in the final discharge of patients requiring continuity of treatment and care^[1]. From the analysis of the patient's care problems, the patient's self-care ability determines the required care ability. Patients' self-care ability was evaluated by the Barthel Index scale, the most widely used assessment tool^[2-3]. According to the total score of the index, the self-care ability was classified into four grades: severe dependence, moderate dependence, mild dependence, and no dependence. The demand for home care for patients with moderate or severe dependence is more prominent^[4].

Home care regards disabled and semi-disabled insured employees and their families who have a clear diagnosis and stable condition but still need medical care to provide medical rehabilitation and nursing services. This service form is where medical staff are sent to the home of the insured employee to carry out medical treatment, rehabilitation, and nursing after the agency's approval where the social security relationship of the insured employee is located. With the aggravation of global ageing, home nursing has become a new concept of healthy endowment^[5]. The research hotspots of home care for older adults at home and abroad differ. From the perspective of the research population, our country's research focuses

on older adults with chronic diseases. From the perspective of research content, the general direction of research in our country is still disease-centred. Focusing on general directions, such as home care, comprehensively analyses the multi-level influences and determinants of the needs of home care services for older adults. Further, it establishes relevant evaluation models, improves relevant service dimensions, and provides personalised nursing services to meet better the service requirements for home care of older adults^[6].

Economic globalisation and medical supply-side structural reform are constantly advancing^[7-9]. Cost accounting has become an important component of the management of medical and health institutions, and the breadth and depth of nursing cost research are also expanding and deepening^[10-11]. In the 1980s, research related to the nursing economy, mainly nursing cost accounting, nursing market development, and nursing economic management, emerged in developed countries.^[12] Research on the nursing economy in China is relatively weak, and the cost-accounting problem has gradually attracted attention with the extensive development and application of home nursing. Optimising the allocation of resources and obtaining the maximum benefit is an urgent problem to be solved. The purpose of this study was to evaluate the cost of home care for discharged patients with moderate to severe dependency.

Methods

Study patients

This research object refers to the bedridden due to illness, disability of reached or expected more than three months, inability to provide basic life necessities for oneself and not in a basic stable condition. Further, according to the daily life ability rating scale, rating below 60 points (including 60 points), conforming to one of the above conditions, according to Taizhou City Employee Basic Medical Insurance Measures, can apply for home care and receive basic medical insurance for employees. The flow chart of home care is shown in Figure 1. This study retrospectively collected 123 cases of home nursing home visits in Taizhou from 3 January to 15 November 2021 and 123 medical insurance cases. To calculate the cost of home nursing services and to receive nursing services in the hospital, there were 123 cases of home nursing patients confirmed to receive medical insurance, including 84 cases for men and 39 for women, aged from 50 to 92 years, with an average age of (77.92 ± 12.43) years.

This study was exempt from informed consent and was approved by the Ethics Committee of Taizhou Hospital of Zhejiang Province (approval number: K20211227) in China. All the procedures were performed per the guidelines of our institutional ethics and the Declaration of Helsinki. All participant information was maintained anonymously.

Data collection

The services provided by home medical care should be based on safety, effectiveness, and strict standardisation of disinfection and isolation measures. Therefore, medical safety should be guaranteed in the family. Further, the treatment effect should be accurate, disinfection and isolation should meet the requirements, and medical rehabilitation equipment should be used in the family. Furthermore, it should be non-invasive, avoid easily causing blood loss, and not easily causing serious allergies. The subjects included in this study were long-term indwelling gastric and urinary catheters that need to be replaced regularly, pressure ulcer care, venous blood testing, replacement of drainage bags, subcutaneous injection of drugs, and maintenance of intravenous catheters.

The grade of patients' self-care ability was determined by the "Rating Scale", which was divided into four grades: severe dependence, moderate dependence, mild dependence, and no dependence; grade classification standard score ≤ 40 points, total score 41–60, total score 61–99, total score 100; the degree of care need can be divided into four categories: all need others' care, most need others' care, little need for others' care, and no need for others' care. The total participants' score eligible for home care must be below or equal to 60. Furthermore, most or all of them need to be cared for by others. The 123 patients were moderately or severely dependent, and their self-care ability was graded using the "rating scale" to determine the activities of daily living; the patients were divided into four grades: severe dependence (total score ≤ 40 points), moderate dependence (total score 41–60), mild dependence (total score 61–99), and no dependence (total score 100). The degree of care needed is divided into four categories: all need the care of others, most need the care of others, a few need the care of others, and some do not need to be cared for by others. The total score of the objects that meet the home care requirements must be 60 points or below; most or all of them need the care of others.

Medical, rehabilitation, and nursing personnel engaged in home-based nursing services should obtain legal qualifications and have more than 3 years of work experience in relevant clinical work in medical institutions. Additionally, the qualifications of the medical personnel who make house calls in a hospital must be intermediate or senior.

Cost definition

The fees for home care services include outpatient fees, treatment, material, and transportation. Those who come to the hospital to receive care include consultation fees, treatment fees, materials fees, transportation fees, and transportation fees.

The government cost is the medical rehabilitation and nursing expenses incurred during the home care period, in line with the provisions of the basic medical insurance for employees (including the medical staff's visit fees and the medical staff's visit fees of different levels of medical institutions are implemented according to the relevant standards for community health service fees approved by the price department), included in the maximum reportable cost of hospitalisation in the current year. Each nursing cycle will be settled as one hospitalisation, and there is no threshold for payment, which will be shared by the general planning fund and the individual. The proportion of the coordination fund is

determined according to the corresponding level of the medical institutions providing home care services: 80% for first-level and lower medical institutions, 75% for second-level medical institutions, and 70% for third-level medical institutions. Medical staff's medical expenses are uniformly implemented at 50%. This study refers to government costs as reimbursement expenses divided into tangible and intangible categories. Tangible cost is the actual cost paid by the patient. The cost of visiting the clinic was determined according to the patient's condition and nursing items. When visiting the hospital to receive nursing services, the registration fee is the diagnosis and treatment. The treatment fee and the material fee are charged according to the medical charging standard of Zhejiang Province and the requirements of the local price bureau and are in line with the charging standard in the hospital. This study investigates the packaged charging of the transportation fee for home care services. The transportation cost of patients coming to the hospital for treatment and receiving nursing services is calculated from the distance from the patient's home to the hospital, based on the local taxi fare standard. Calculate the actual cost of transportation according to the degree of dependence. Intangible costs include visiting medical personnel and the patients' families' cost. The cost of medical personnel is calculated by the annual salary of the professional title position of the hospital where the visiting personnel belong. It takes half a day to calculate the cost of home nursing service from the time of receiving the notice to prepare materials. The labour cost of family members is calculated according to the per capita GDP of Linhai City, Zhejiang Province, China and the degree of moderate or severe dependence of patients accompanied by two people for half a day.

Statistical analysis

We converted the discrete data of various home care charging data into classified data. Microsoft Office Excel was used to analyse each patient's charging data. Bar charts were used to analyse patients' self-care ability classification, nursing project classification, and home care satisfaction evaluation. IBM SPSS Statistics²⁶ software was used in the cost analysis. The actual total cost analysis and actual cost analysis of home care and in-hospital care are presented using descriptive analysis ($\bar{x} \pm s$, yuan). The t-test was used to compare accounting data between the two groups, and statistical significance was set at $p < 0.05$.

Results

In this study, 82.11% of 123 patients who received medical insurance home care were rated as severely dependent, 17.89% as moderately dependent, and 0 as mildly dependent or not dependent. The results showed that 100% of the patients in the study were moderately or severely dependent, as shown in Figure 2.

For 123 cases of home nursing service items, 37.21% were gastric tube replacement, 20.16% were pressure ulcer care, 19.38% were urinary tube replacement, and 9.30% were blood drawing. Further, 6.98%

were drainage bag replacement, 3.88% were subcutaneous injection, and 3.10% were dressing changes in PICC, as shown in Figure 3.

When the full cost accounting was carried out in this study, the full cost accounting of home nursing was as follows: total cost = outpatient fee + treatment fee + material fee + transportation fee + medical staff cost, and the result is 784.51 ± 248.57 Yuan. Conversely, when patients come to the hospital themselves to receive nursing services, the full cost accounting is as follows: Total cost = consultation fee + treatment fee + material fee + transportation fee + transportation fee + family labour cost; the result is 448.91 ± 96.34 Yuan, the comparison of the total cost of the two nursing service modes is statistically significant, and the statistical results show that the cost of nursing services in hospitals is less than that of home care ($t=13.96$, $P < 0.001$) (Table 1).

Actual cost accounting: from the perspective of patients, the actual expenses of patients applying for home care services are calculated as follows: Total reimbursement cost = reimbursement of medical expenses + reimbursement of treatment expenses + reimbursement of materials, accounting result is 203.43 ± 67.45 Yuan, total self-care cost = self-care medical expenses + self-care materials + self-care transportation, accounting result is 98.94 ± 52.00 Yuan.

The actual expenses of patients who come to the hospital to receive nursing services are calculated as follows: total reimbursement = reimbursement of medical treatment fee + reimbursement of treatment fee + reimbursement of materials fee, accounting result is 23.20 ± 4.57 Yuan; total self-care cost = self-care treatment fee + self-care material fee + self-care transportation fee, accounting result is 105.25 ± 48.84 Yuan. Therefore, the statistical results show that the actual cost of applying for home nursing service after reimbursement by medical insurance is less than that of receiving nursing service by oneself (Table 2).

The statistical results in Table 3 show that the total cost accounting of home nursing is higher than that of hospital nursing; the difference is as high as 335.60 ± 241.31 Yuan. By comparing home-based nursing and in-hospital nursing, the reimbursement amount of government-borne medical insurance reimbursement is high, and the difference is 180.22 ± 64.31 Yuan. Therefore, the actual cost of the patient's expenses is less than home care's. Nevertheless, the difference is not -6.32 ± 36.91 Yuan. T-test was performed on the data of the three groups, and the results of the actual total cost and total expense reimbursement were $p=0.000 < 0.05$, showing significant statistical significance. Conversely, the comparison of total self-care expenses between the two groups showed that t value $= -0.982$, $P = 0.327 > 0.05$, showing no statistical significance.

Evaluation of Satisfaction

The family members who apply for home care score the satisfaction of the nursing service process. Satisfaction includes service attitude of medical personnel and the on-site service timeliness, nursing operation technology, operation safety, explain health promotion knowledge, seven home care models,

overall satisfaction, each per the “basic satisfaction, satisfaction, not satisfied” three grades are evaluated, single satisfaction is over 97%, as shown in Figure 4, 98.37% from overall satisfaction as shown in Figure 5. The participants in this study had high overall satisfaction with home care. However, based on the analysis of the satisfaction of each project, it was concluded that the timeliness of home visits and health education of home nursing staff was relatively insufficient, which is also the direction of improvement in the future.

In this study, the overall satisfaction of family members of patients with home care was 98.37%, and individual satisfaction was above 97%. Moreover, the medical staff’s service attitude, on-site service timeliness, nursing operation safety, health knowledge education, and service mode are recognised by family members with high trust, which further stimulates their sense of responsibility.

Discussion

Of 123 patients, 100% were assessed as moderately or severely dependent, and the analysis showed that the demand for home care reached 100%. This result is similar to Hao Xiaoning et al.’s^[13]. The research conclusion is relatively uniform: the object of home nursing service is that individuals who cannot take care of themselves completely need help in life. It is a new nursing model and the most suitable way of home health care under medical and nursing integration in China. Ren anji et al. and Li Yao et al. also believe that home care services will become the mainstream of home care services^[14-15]. In particular, home nursing services are provided to patients who meet the requirements of self-care ability assessment after discharge.

According to the current development status of China, home nursing services belong to the special professional medical nursing services of hospitals^[13]. However, the nursing project analysis of this study shows that only professional nursing staff in medical institutions, not family members or caregivers, can complete the replacement of gastric tubes, pressure ulcer care, replacement of urinary tubes, and blood drawing, which shows the importance of home nursing.

Under the current promotion of home care, more attention is paid to the cost for patients. However, research shows that the current nursing fees are lower than the actual cost of care. The actual high cost mainly lies in the human cost of medical personnel. Home care home visiting standards require nursing personnel with intermediate and senior professional titles or specialised nurses to visit homes. Medical personnel with intermediate and senior professional titles and specialised nurses in medical institutions are high-income groups, resulting in a very high cost for visiting personnel.

Analysis of home care patients after discharge (especially those located far from hospital patients and older adults who live alone) in nursing needs, through online booking, at home can enjoy professional care services, effectively reduce the number of travels back and forth across the patient or family hospital, reduce the waste of workforce, material resources, financial resources, and promote patients recover^[17]. However, when going to a hospital for nursing care, patients’ families need to make an

appointment ahead of time, look for personnel handling patients to the truck, and then send them to the hospital. Home care can save a lot of time and human resources and avoid the way to handle various diseases such as pipe, tube drawing, mutation, and other adverse events. Jessie and other research have shown that occupying the home rehabilitation of patients at home to go to a doctor, eliminating the journey cost, clinic waiting time, receiving home care patients with an average of 2.5 h treatment time is shortened to court. Additionally, the average medical cost decreased by 34.03% to provide quality, convenient patient care while reducing economic and family care pressure^[18]. In August 2019, the National Healthcare Security Administration pointed out that online services provided by designated institutions have the same coverage of medical insurance payment as offline services^[19]. The local government has already covered fees for patients eligible for home care. Our results showed no difference between the amount paid for home care services and hospital care services after reimbursement because of the government's home care medical insurance policy.

This study shows that home care costs are higher than the cost of visiting a doctor to receive nursing services; however, the actual amount paid by patients after medical insurance reimbursement is similar. The personnel cost is relatively high in proportion to the payment amount. In this study, all participants who visited the clinic were professional nurses with intermediate and senior professional titles. The cost accounting analysis results show that the cost of home care has greatly increased. Whether it is possible to choose an experienced nurse with a primary professional title to reduce the cost of home care requires further study.

Limitation

The limitations of this study are as follows: 1) Transportation costs may not be accurately calculated because of the inconsistency of home care programs (e.g. distance assessment). 2) Due to cultural factors, if a patient chooses to go to a hospital, friends, relatives, and neighbours may help each other, causing difficulties in estimating cartilage costs. 3) Home care exists in a team way, including the hidden cost of platform design, construction, maintenance, and management, which was not calculated in this study. Finally, 4) this study failed to effectively compare the causal relationship between the relevant factors and expenditure costs, which prospective studies will further prove.

Conclusions

The cost of home care is high, but the government and hospitals absorb the related expenditure costs, so the actual cost to the patient is low. Additionally, family members can apply for home care through a mobile app, saving time and avoiding the risk of accidents caused by moving. Cost analysis, including reflecting the medical policy to provide services and cost support, also enables the continuous care of discharged patients with moderate and severe dependence to obtain more nursing care.

Declarations

Ethics approval and consent to participate

This study was exempted from informed consent and was approved by the Ethics Committee of Taizhou Hospital of Zhejiang Province (approval number: K20211227) in China. All procedures were performed in accordance with the guidelines of our institutional ethics committee and adhered to the tenets of the Declaration of Helsinki. All participants' information was maintained anonymously.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Competing interests

The authors declare that there is no conflict of interest.

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Authors' contributions

WYQ and DJB conceived the study. JF, JLZ, RYX, LMJ collected the data. WYQ, DJB analysed and interpreted the data and wrote the first draft of the paper. THT, FMC, SJP searched, sorted, and interpreted the relevant literature. All authors edited and approved the final manuscript.

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Not available.

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Tables

Table 1 Total cost accounting analysis of home-based nursing and in-hospital nursing in 2021 ($\bar{x} \pm s$, yuan)

Charging projects	Full cost accounting for home care	Full cost accounting of hospital treatment and nursing	
	mean $\pm$ SD	mean $\pm$ SD	
Medical fees or Fees for medical treatment	149.35 $\pm$ 52.94	15.00	
Treatment	30.98 $\pm$ 27.88	30.98 $\pm$ 27.89	
Cost of raw materials	54.16 $\pm$ 47.78	54.16 $\pm$ 47.78	
Transportation	78.04 $\pm$ 38.73	28.32 $\pm$ 23.67	
Handling fee	---	128.46 $\pm$ 79.20	
Medical personnel costs or Family labor costs	482.15 $\pm$ 184.82	192.00	
The total cost	784.51 $\pm$ 248.57	448.91 $\pm$ 96.34	P<0.001

Note: The total cost accounting of the two nursing service modes was compared, $t=13.961$, $P=0.000$, showing significant statistical significance.

Table 2 Actual cost analysis of home-based nursing and in-hospital nursing in 2021 ($\bar{x} \pm s$, yuan)

Charging projects	Full cost accounting for home care	Full cost accounting of hospital treatment and nursing	
	mean $\pm$ SD	mean $\pm$ SD	
Reimbursement of medical expenses or Reimbursement of medical expenses	121.39 $\pm$ 47.98	15.00	
Pay for the consultation yourself	17.79 $\pm$ 24.31	---	
Reimbursement of medical expenses	30.98 $\pm$ 27.88	3.10 $\pm$ 2.79	
Self-care treatment	---	27.88 $\pm$ 25.09	
Reimbursement of material costs	51.06 $\pm$ 48.84	5.11 $\pm$ 4.88	
Pay for your own materials	3.10 $\pm$ 6.76	49.06 $\pm$ 42.95	
Self-pay transportation	78.04 $\pm$ 38.73	28.32 $\pm$ 23.67	
Reimbursement of total expenses	203.43 $\pm$ 67.45	23.20 $\pm$ 4.57	P<0.001
Total expenses	98.94 $\pm$ 52.00	105.25 $\pm$ 48.84	P<0.001

Table 3 Analysis of the difference between home-based nursing and in-hospital nursing expenses in 2021 ($\bar{x} \pm s$, yuan)

Charging projects	Home care	hospital treatment and nursing	Balance (Yuan)	T value	P values
	mean $\pm$ SD	mean $\pm$ SD			
Actual total cost	784. 51 $\pm$ 248. 57	448. 91 $\pm$ 96. 34	335. 60 $\pm$ 241. 31	13. 961	P<0. 001
Reimbursement of total expenses	203. 43 $\pm$ 67. 45	23. 20 $\pm$ 4. 57	180. 22 $\pm$ 64. 31	29. 567	P<0. 001
Total expenses	98. 94 $\pm$ 52. 00	105. 25 $\pm$ 48. 84	-6. 32 $\pm$ 36. 91	-0. 982	0. 327
The difference	482. 15 $\pm$ 184. 82	320. 46 $\pm$ 79. 21			

Figures

Figure 1

Home care process

Figure 2

Analysis of grade of self-care ability of home nursing patients

Figure 3

Type analysis of home nursing out-call nursing items

Note: Overall satisfaction = number of satisfied cases/total number of investigated cases *100%.

Figure 4

Individual satisfaction with home care services

Figure 5

Overall satisfaction with home care

Supplementary Files

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