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Abstract

Background: Efforts to reduce inappropriate hospital stay, including alternatives such as homecare, are important to improve patient care and reduce health care costs.

Aims: This study evaluated inappropriate hospital stay in Shiraz, Islamic Republic of Iran and the extent to which these stays were due to lack of homecare services and others factors needed for homecare.

Methods: This cross-sectional study was conducted between January 2018 and September 2019 at two public hospitals in Shiraz. All adult patients hospitalized in these two hospitals in the study period were included, except patients in mental care wards. Appropriateness of patients' hospital stay was assessed on a daily basis using the Iranian version of the Appropriateness Evaluation Protocol. The chi-squared test was used to assess association between need for homecare and patient characteristics.

Results: Of 6458 hospitalization days assessed (for 1954 patients), 710 (11.0%) days were inappropriate. The greatest proportion of causes of inappropriate stay were physician-related (32.9%). Of the 710 inappropriate hospitalization days, 231 were due to lack of homecare

services. Most patients who were inappropriately hospitalized because of lack of homecare services were insured through Salamat insurance (64.0%). A statistically significant relationship was found between the need for homecare services and the type of health insurance (P = 0.01). Of the patients admitted to hospital because of lack of homecare services, 36.8% had endocrine diseases, especially diabetes, and 21.8% needed oxygen services.

Conclusion: Institutionalizing home health care in the Iranian health system could encourage more home health care referral and reduce inappropriate hospitalization, especially for diabetes.

Keywords: hospitalization, length of stay, homecare services, Iran

Citation: Siavashi E; Kavosi Z; Zand F; Amini M; Bordbar N. Inappropriate hospital stays and association with lack of homecare services. East Mediterr Health J. 2021;27(7):656–664. https://doi.org/10.26719/2021.27.7.656
Received: 30/04/20; accepted: 15/09/20

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Introduction

Hospitals are the main providers of health care services and play an important role in improving patients' physical and mental health. However, they account for the highest proportion of health care expenditure (1). As a result of demographic changes in recent years (ageing population), demand for hospital beds has increased (2,3). Data also show that 10–30% of hospital admissions are unnecessary (4). Unnecessary hospitalization increases patient and health system costs, reduces patient access to critically required resources and increases the risk of nosocomial infections in patients (5). In addition, unnecessary hospitalization leads to absence from work, which may have consequences on the society, and to negative emotional and psychological effects on families. Reducing inappropriate use of hospital services is a way to limit health care costs without compromising the quality of services (6).

Therefore, reducing inappropriate and unnecessary use of hospital resources and unnecessary hospital stay is important. Thus, many health systems have turned to alternative methods of providing services including home health care. Pressure from ageing populations coupled with the epidemiological transition in disease patterns to chronic illnesses in adults, economic changes and advances in technology have led to wiser provision of social and health care services at home (7,8). The World Health Organization (WHO) has also emphasized the importance of homecare services in response to the epidemiological, demographic and socioeconomic challenges the world is facing (9).

Moreover, the effectiveness of homecare programmes has been demonstrated in various studies. For example, a study in Switzerland concluded that providing home-based chemotherapy services was safe and cost-effective and was satisfactory for patients and their families (10). Furthermore, the involvement of patients with diabetes in homecare programmes has led to improved diabetes-related outcomes in these patients (11). A study in Austria showed that patients with depression who received homecare services had fewer depressive symptoms, higher quality of life and lower hospitalization costs (12). Homecare services and post-discharge support reduce hospital stay and costs (13). In order to cope with the ageing population and the increased demand for hospital beds, home health care may be an effective solution to help reduce costs and maintain the quality of service (8).

Studies in the Islamic Republic of Iran have reported that 6.3–22.8% of hospital stays were inappropriate (14,15). Efficient and cost-effective use of resources in countries such as the Islamic Republic of Iran, where funds allocated to the health care system are limited, is vital (16). However, home health care in the Islamic Republic of Iran is faced with various challenges including insurance, medical equipment, acculturalization, and the lack of an appropriate standard on the amount and the process of homecare payment (17).

Since home health care has many benefits for the patient and the health system, we aimed to evaluate the inappropriateness of patients' hospital stay and factors related to the inappropriate stay in Shiraz. We also determined whether the inappropriate hospital stay was because of the lack of homecare services and conditions, and if so, the condition these patients had and the type of services that they needed.

Methods

Study design and setting

This cross-sectional study was conducted between January 2018 and September 2019 at two public, teaching hospitals in Shiraz, Islamic Republic of Iran.

Study sample

The study population included all adult patients hospitalized in these two hospitals except for patients admitted to mental health wards. Thus, all surgical and internal wards, internal intensive care units, surgical intensive care units, cardiac care and neurological intensive care units of these two hospitals were included and followed for 252 days. Inclusion criteria were age > 18 years and at least 3 days of hospitalization.

Data collection

The appropriateness of the patient stay was assessed using the validated Iranian version of the Appropriateness Evaluation Protocol (18). The first part of this tool assesses the need for hospitalization and the second part evaluates the reasons for an inappropriate stay. The first part includes 31 criteria related to medical services, critical/nursing care services and patient's conditions that must be met for hospitalization to be appropriate. If these criteria are not met, the patient's hospitalization is unnecessary. The second part includes 34 questions on the reasons for inappropriate stay classified in four categories; factors related to: the physician, the hospital, the patient and the environment, society and other organizations.

Every day, all patients in the wards of the hospitals were entered in the study and the questionnaire was completed through review of the patients' medical records and interviews with nurses, patients' companions and the patients themselves. Interviewers worked independently and interviewed each patient individually to complete the questionnaire.

For patients found to have an inappropriate hospital stay, we also determined whether these patients needed special care or procedures at home after discharge and if so, what services they needed.

Data were collected by qualified interviewers who had: specialized knowledge in reading patient medical records and cards; at least a bachelor degree in nursing; at least 5 years' experience in nursing services; and the ability to communicate verbally in appropriate dialects with the patients and their companions. The interviewers were trained on how to complete the questionnaire, and were assessed and approved before joining the interviewer team. In case of any ambiguity on the completion of the questionnaire, interviewers could telephone the research team for guidance/clarification.

Statistical analysis

We used SPSS, version 18 for data analysis. We present data as frequency and percentage. We used the chi-squared test to determine the significance of associations between demographic characteristic of the patients and the need for homecare services. P **Ethical considerations**

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences (IR.SUMS.REC.1396.S738). After a full oral explanation of the study, we obtained written informed consent from all the patients or his/her companion. They were ensured of the confidentiality of the information by the interviewers and members of the research team.

Results

None of the patients declined to participate in the study. During the study period, 6458 questionnaires related to 1954 patients were completed and evaluated. Most patients were men (52.7%) and residents of Shiraz (57.6%). The greatest proportion (33.6%) were aged 61–80 years and almost half (49.9%) had Salamat insurance – one of the types of insurance in the Islamic Republic of Iran – (Table 1).

Of 6458 hospitalization days, 710 were considered inappropriate (11.0%). Because each day of hospitalization may have more than one reason for being inappropriate, the total reasons for inappropriate hospitalization in Table 2 are more than the 710 inappropriate days of hospitalization. The most common reasons for inappropriate stay were physician-related factors (32.9%). Lack of access to alternative care centres, failure to seek early consultation and postponement of surgery by the physician were the most common causes of inappropriate stay (Table 2).

Of the 710 inappropriate hospitalization days, 254 were due to lack of homecare services and conditions (unavailability of alternative service centres and/or social care centres, being without family at discharge and to provide homecare services, families' inability (financial or physical) to provide homecare services after discharge. After eliminating multi-causal hospitalization days, 231 of the 710 inappropriate hospitalization days were solely due to the lack of home care services. Patients who were inappropriately hospitalized because of lack of homecare services and conditions were mostly in the 61–80 year age range (37.6%), female (50.4%), from Shiraz (65.6%) and insured through Salamat insurance (64.0%). A statistically significant relationship was found between the need for homecare services and the type of insurance (P = 0.01) (Table 3).

The most common diseases of patients with inappropriate hospitalization due to the lack of

homecare services and conditions were endocrine (36.8%), neurological (19.5%) and pulmonary (18.2%) diseases (Table 4).

The most common services that patients received in hospital due to the lack of homecare services were oxygen (21.8%), cleaning of sores (13.4%) and suction (13.2%) (Table 5).As each patient may be hospitalized inappropriately because of the need for several types of services, the total need for services was 417.

Discussion

To the best of our knowledge, this is the first study that shows the demand for home health care among hospitalized patients in the Islamic Republic of Iran. We hypothesized that inappropriate use of hospital may increase because of lack of home health care and that no hospital refers patients to home health care in the Islamic Republic of Iran. We found that 11.0% of hospital patient days were inappropriate, of which 32.5% (231/710) were due to lack of home health care services. Our results concur with a study in Belgium which showed that a large proportion of patients who could be discharged (31%) were not discharged because their families were unable to provide homecare services and there were difficulties in finding rehabilitation centres and nursing homes (19). A study in the United States of America (USA) showed that 29.2% of patients discharged from hospital were referred to home health care (1). Another American study also found that 88 of 194 (45.4%) elderly patients admitted in emergency departments could have benefited from a homecare referral (20).

Home health care is still in its infancy in the Islamic Republic of Iran and is not yet well established in the health system. This shortcoming is also mentioned in the Lebanese health system (21). There is no comprehensive information system of a registered home health care in the country (22) so hospitals do not have any discharge plan for referral to home health care. Moreover, lack of standardized criteria that can be used to assess the need for home health care at discharge in Iranian hospitals might be another reason for not referring patients to home health care. As reported in a study on discharge referral decision-making, clinicians have no standardized and valid guidelines for home health care referral decisions, and use of such guidelines can support them for evidence-based decision-making (23).

Another reason for hospital stays is that home health care is not covered by Iranian health insurance plans. As our findings showed, there was a significant relationship between the insurance type and the need for homecare services. Patients who had Salamat insurance stayed in hospital although they needed homecare services because this insurance scheme covers a large percentage of patient hospital costs, but home health care is not included in the health package. In the USA, where home health care is covered by Medicare, about 30% of

hospitalized patients insured through Medicare were referred to homecare centres after discharge in 2012 (1). Research shows that increasing the reimbursement of Medicare insurance for homecare services has led to an increase in the use of homecare services by the insured (24).

Our findings showed the most of the patients hospitalized because of lack of home health care had endocrine diseases, especially diabetes, and neurological diseases. Research in the USA also showed that most patients receiving homecare services from 2000 to 2007 had diabetes mellitus (10.1%) (25). A study on non-English-speaking patients in the USA found that homecare interventions were an effective way to control diabetes; after 24 months of receiving homecare services, patients had improved stability of their blood glucose, blood pressure and lipids and their outpatient visits decreased (11). As a start, Iranian health policy-makers should recommend referral of patients with diabetes and neurological diseases to home health care to encourage the use home health care which can result in reduced use of hospital beds and associated care costs. An Iranian study also reported that providing home health care for stroke patients was more cost-effective than hospital care (26). In addition, modern technologies used to treat and reduce diabetes complications (both outpatient or at home) can easily replace hospital care services.

We found that patients whose stay in hospital was inappropriate were there to receive services such oxygen (21.8%), cleaning of sores (13.4%) and suction therapy (13.2%) which they could receive at home. Similarly, research showed that the greatest care needs of patients after discharge in the Islamic Republic of Iran were administration of a catheter and the care of wounds and dressings (27). A systematic review of home mechanical ventilation showed that such home care improved the quality of life of patients and reduced the number of hospitalizations (28). Even so, the rate of use of home mechanical ventilation varies considerable by country: 2.9 users of home mechanical ventilation/100 000 population in Hong Kong, 3.9/100 000 in Hungary, 9.9/100 000 in Australia, 10.5/100 000 in Sweden, 1/100 000 in New Zealand and 12.9/100 000 in Canada (29–33).

The most important limitation of our study was its focus on patients with inappropriate hospital stay to estimate home health care demand at discharge. We did not include patients with appropriate stay who may also need home health care after discharge. Therefore the demand may be higher that our results suggest.

Institutionalizing home health care in the Iranians health system could improve the appropriate use of hospital beds, reduce health system costs, decrease readmission rates and prevent hospital complications such as falling out of bed and nosocomial infections (34,35). Covering

home health care under the Iranian health insurance plan will encourage more home health care referral and reduce inappropriate hospitalization, especially for diabetes and neurological diseases. Registries of home health care centres that can provide care to patients referred by hospitals and family physicians would enhance a home health care system.

Acknowledgement

We thank the research department of Shiraz University of Medical Sciences for administrative support.

Funding: None.

Competing interests: None declared.

Séjours hospitaliers inappropriés et association avec le manque de services de soins à domicile

Résumé

Contexte : Les efforts qui visent à réduire les séjours hospitaliers inappropriés, notamment des alternatives telles que les soins à domicile, sont importants pour améliorer les soins prodigués aux patients et réduire les coûts des soins de santé.

Objectifs : La présente étude a évalué les séjours hospitaliers inappropriés à Chiraz (République islamique d'Iran) pour examiner dans quelle mesure ces séjours étaient dus au manque des services des soins à domicile et à d'autres facteurs nécessaires à la mise en place de ces services.

Méthodes : La présente étude transversale a été menée entre janvier 2018 et septembre 2019 dans deux hôpitaux publics à Chiraz. Tous les patients adultes admis dans ces deux hôpitaux pendant la période d'étude ont été inclus, sauf les patients des services de soins psychiatriques. La pertinence des séjours hospitaliers des patients a été évaluée sur une base quotidienne à l'aide de la version iranienne de l'outil Appropriate Evaluation Protocol (Protocole d'évaluation de la pertinence). Le test du khi carré a été utilisé pour évaluer l'association entre les besoins en matière de soins à domicile et les caractéristiques du patient.

Résultats : Sur 6458 journées d'hospitalisation évaluées (pour 1954 patients), 710 journées (11,0 %) étaient inappropriées. La plus grande proportion des causes des séjours inappropriés était liée aux médecins (32,9 %). Sur 710 journées d'hospitalisation inappropriée, 231 étaient dues au manque de services de soins à domicile. La plupart des patients hospitalisés d'une façon inappropriée à cause de l'absence de services de soins à domicile bénéficiaient de l'assurance Salamat (64,0 %). Une relation statistiquement significative a été constatée entre le besoin en matière de soins à domicile et le type d'assurance-maladie (p = 0,01) ; 36,8 % des patients admis à l'hôpital en raison du manque des services de soins à domicile étaient atteints de maladies endocriniennes, notamment de diabète, et 21,8 % avaient besoin de services d'oxygène.

Conclusion : L'institutionnalisation des soins de santé à domicile dans le système de santé iranien pourrait encourager davantage l'orientation vers les soins à domicile et réduire les hospitalisations inappropriées, notamment pour les patients diabétiques.

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WHO EMRO | Inappropriate hospital stays and association with lack of homecare services

: من بين 6458 يومًا لفترة الإدخال إلى المستشفى التي تم تقييمها (بما يشمل 1954النتائ ج
مريضًا) ، اتسمت الإقامة بعدم الملاءمة في 710 أيام (11.0%). وكانت النسبة الأكبر من
أسباب الإقامة غير الملائمة متعلقة بالطبيب (32.9%). ومن بين 710 أيام غير ملائمة
للإقامة في المستشفى، كان 231 يومًا منها يعود إلى نقص خدمات الرعاية المنزلية . وكان
معظم المرضى الذين أُدخلوا إلى المستشفى بشكل غير ملائم بسبب نقص خدمات الرعاية
المنزلية مُؤمَّناً عليهم من خلال تأمين " سلامات " (64.0%). ووُجد أن هناك علاقة ذات
دلالة إحصائية بين الحاجة إلى خدمات الرعاية المنزلية ونوع التأمين الصحي (0.01=p). ومن
بين المرضى الذين أُدخلوا إلى المستشفى بسبب نقص خدمات الرعاية المنزلية، كان 36.8%
يعانون من أمراض الغدد الصماء، لا سيَّما السكري، وكان 21.8% يحتاجون إلى خدمات
الأكسجين .

: إن إضفاء الطابع المؤسسي على الرعاية الصحية المنزلية في النظام الصحيالاستنتا ج
الإيراني يمكن أن يشجع المزيد من خدمات الإحالة إلى الرعاية الصحية المنزلية، ويحدّ
من الإدخال غير الملائم إلى المستشفيات، لا سيَّما بالنسبة لمرضى السكري .

References

1. Jones CD, Wald HL, Boxer RS, Masoudi FA, Burke RE, Capp R, et al. Characteristics associated with home health care referrals at hospital discharge: results from the 2012 national inpatient sample. Health Serv Res. 2017;52(2):879–94. https://doi.org/10.1111/1475-6773.12504

2. Schmidt R, Geisler S, Spreckelsen C. Decision support for hospital bed management using adaptable individual length of stay estimations and shared resources. BMC Med Inform Decis Mak. 2013;13:3. https://doi.org/10.1186/1472-6947-13-3

3. Barisonzo R, Wiedermann W, Unterhuber M, Wiedermann CJ. Length of stay as risk factor for inappropriate hospital days: interaction with patient age and co-morbidity. J Eval Clin Pract. 2013;19(1):80–5. https://doi.org/10.1111/j.1365-2753.2011.01775.x

4. Shafik MH, Seoudi TM, Raway TS, Al Harbash NZ, Ahmad MM, Al Mutairi HF.

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Appropriateness of pediatric hospitalization in a general hospital in Kuwait. Med Princ Pract. 2012;21(6):516–21. https://doi.org/10.1159/000339084

5. Masoompour SM, Askarian M, Najibi M, Hatam N. The financial burden of inappropriate admissions to intensive care units of Shahid Faghihi and Nemazee hospitals of Shiraz, Iran, 2014. Shiraz E-Med J. 2016;17(11):e38677. https://doi.org/10.17795/semj38677

6. Barouni M, Amini S, Khosravi S. [Appropriateness of delivered services in educational hospitals: a case study in Kerman University of Medical Sciences.] Sadra Med J. 2016;4(3):185–94 (in Farsi).

7. Genet N, Boerma WG, Kringos DS, Bouman A, Francke AL, Fagerström C, et al. Home care in Europe: a systematic literature review. BMC Health Serv Res. 2011;11(1):207. https://doi.org/10.1186/1472-6963-11-207

8. Keeling DI. Homecare user needs from the perspective of the patient and carers: a review. Smart Homecare Technol Telehealth. 2014;2014(2):63–76. https://doi.org/10.2147/SHTT.S42673

9. Comprehensive community-and home-based health care model. New Delhi: World Health Organization, Regional Office for South-East Asia; 2004 (https://apps.who.int/iris/bitstream/handle/10665/204893/B0021.pdf?sequence=1&isAllowed=y, accessed 9 February 2021).

10. Lüthi F, Fucina N, Divorne N, Santos-Eggimann B, Currat-Zweifel C, Rollier P, et al. Home care—a safe and attractive alternative to inpatient administration of intensive chemotherapies. Support Care Cancer. 2012;20(3):575–81. https://doi.org/10.1007/s00520-011-1125-9

11. Nguyen DL, DeJesus RS. Home health care may improve diabetic outcomes among non-English speaking patients in primary care practice: a pilot study. J Immigr Minor Health. 2011;13(5):967–9. https://doi.org/10.1007/s10903-011-9446-9

12. Klug G, Hermann G, Fuchs-Nieder B, Panzer M, Haider-Stipacek A, Zapotoczky HG, et al. Effectiveness of home treatment for elderly people with depression: randomised controlled trial. Br J Psychiatry. 2010;197(6):463–7. https://doi.org/10.1192/bjp.bp.110.083121

13. Lin F, Luk J, Chan T, Mok W, Chan F. Effectiveness of a discharge planning and community support programme in preventing readmission of high-risk older patients. Hong Kong Med J. 2015;21(3):208–16. https://doi.org/10.12809/hkmj144304

14. Meidani Z, Farzandipour M, Hosseinpour M, Kheirkhah D, Shekarchi M, Rafiei S. Evaluating inappropriate patient stay and its reasons based on the appropriateness evaluation protocol. Nurs Midwifery Stud. 2017;6(3):121–4. https://doi.org/10.4103/nms.nms_16_17

15. Pourreza A, Kavosi Z, Khabiri R, Salimzadeh H. Inappropriate admission and hospitalization in teaching hospitals of Tehran University of Medical Sciences, Iran. Pak J Med Sci. 2008;24(2):301–5.

16. Esmaili A, Seyedin H, Faraji O, Arabloo J, Bamdady YQ, Shojaee S, et al. A pediatric appropriateness evaluation protocol for Iran children hospitals. Iranian Red Crescent Med J. 2014;16(7). https://doi.org/10.5812/ircmj.16602

17. Safdari R, Alizadeh M, Mohamadiazar M, Sharifi F, Fakhrzadeh H. [Comparative study of home care program in Iran with other developed countries.] Iran J Diabetes Metab. 2014;13(6):439–46 (in Farsi).

18. Esmaili A, Ravaghi H, Seyedin H, Delgoshaei B, Salehi M. Developing of the appropriateness evaluation protocol for public hospitals in Iran. Iranian Red Crescent Med J. 2015;17(3). https://doi.org/10.5812/ircmj.1903

19. Fontaine P, Jacques J, Gillain D, Sermeus W, Kolh P, Gillet P. Assessing the causes inducing lengthening of hospital stays by means of the Appropriateness Evaluation Protocol.

Health Policy. 2011;99(1):66–71. https://doi.org/10.1016/j.healthpol.2010.06.011

20. Castro JM, Anderson MA, Hanson KS, Helms LB. Home care referral after emergency department discharge. J Emerg Nurs. 1998;24(2):127–32. https://doi.org/10.1016/S0099-1767(98)90014-9

21. Chemali Z, Chahine LM, Sibai AM. Older adult care in Lebanon: towards stronger and sustainable reforms. East Mediterr Health J. 2008;14(□6)□:1466–76. https://apps.who.int/iris/handle/10665/117579

22. Nikbakht-Nasrabadi A, Shabany-Hamedan M. Providing healthcare services at home – a necessity in Iran: a narrative review article. Iran J Public Health. 2016;45(7):867–74.

23. Bowles KH, Foust JB, Naylor MD. Hospital discharge referral decision making: a multidisciplinary perspective. Appl Nurs Res. 2003;16(3):134–43. https://doi.org/10.1016/S0897-1897(03)00048-X

24. Wang Y, Leifheit-Limson EC, Fine J, Pandolfi MM, Gao Y, Liu F, et al. National trends and geographic variation in availability of home health care: 2002–2015. J Am Geriatr Soc. 2017;65(7):1434–40. https://doi.org/10.1111/jgs.14811

25. Caffrey C, Harris-Kojetin LD, Moss AJ, Sengupta M, Valverde R. Home health care and discharged hospice care patients; United States, 2000 and 2007. Natl Health Stat Report. 2011;38:1250–75.

26. Ghaderi H, Shafiee H, Amery H, Vafaeenasab M. [The cost-effectiveness of home care and hospital care for stroke patients.] J Healthcare Manage. 2012;4(3):7–15 (in Farsi).

27. Alaviani M, Khosravan S. [Caring needs of discharged patients from medical-surgical wards of Gonabad hospitals.] Nurs J Vulnerable. 2015;2(3):25–35 (in Farsi).

28. MacIntyre EJ, Asadi L, Mckim DA, Bagshaw SM. Clinical outcomes associated with home mechanical ventilation: a systematic review. Can Respir J. 2016;2016:6547180. https://doi.org/10.1155/2016/6547180

29. Chu C, Yu W, Tam C, Lam C, Hui D, Lai C. Home mechanical ventilation in Hong Kong. Eur Respir J. 2004;23(1):136–41. 10.1183/09031936.03.00017803

30. Valko L, Baglyas S, Gal J, Lorx A. National survey: current prevalence and characteristics of home mechanical ventilation in Hungary. BMC Pulm Med. 2018;18(1):190. https://doi.org/10.1186/s12890-018-0754-x

31. Garner DJ, Berlowitz DJ, Douglas J, Harkness N, Howard M, McArdle N, et al. Home mechanical ventilation in Australia and New Zealand. Eur Respir J. 2013;41(1):39–45. 10.1183/09031936.00206311

32. Laub M, Berg S, Midgren B. Home mechanical ventilation in Sweden—inequalities within a homogenous health care system. Respir Med. 2004;98(1):38–42. https://doi.org/10.1016/j.rmed.2003.08.005

33. Rose L, McKim DA, Katz SL, Leasa D, Nonoyama M, Pedersen C, et al. Home mechanical ventilation in Canada: a national survey. Respir Care. 2015;60(5):695–704. https://doi.org/10.4187/respcare.03609

34. Caplan GA, Ward JA, Brennan NJ, Coconis J, Board N, Brown A. Hospital in the home: a randomised controlled trial. Med J Aust. 1999;170(4):156–60. https://doi.org/10.5694/j.1326-5377.1999.tb127711.x

35. Wilson A, Parker H, Wynn A, Jagger C, Spiers N, Jones J, et al. Randomised controlled trial of effectiveness of Leicester hospital at home scheme compared with hospital care. BMJ. 1999;319(7224):1542–6. https://doi.org/10.1136/bmj.319.7224.1542

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