International Journal of Advanced Community Medicine

E-ISSN: 2616-3594
P-ISSN: 2616-3586
www.comedjournal.com
IJACM 2021; 4(2): 07-13
Received: 06-02-2021
Accepted: 16-04-2021

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Risk factors for hospital readmission among home health care patients at PSMMC, Riyadh, Saudi Arabia, 2019

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DOI: https://doi.org/10.33545/comed.2021.v4.i2a.188

Abstract
Background: Worldwide the home health care (HHC) has many benefits. It improves countries health systems and clinical outcomes of patients, it is good solution for bed occupancy in hospitals.
Home Health care (HHC) provides nursing services supported with Medicare for patients with chronic medical issues that prevent them from leaving the home.
Objectives: This study aimed to describe frequency and rate of readmission to hospital by HHC patients according to diagnoses, and identify the factors associated with non-elective, readmission of HHC patients, at PSMMC, Riyadh, Kingdom of Saudi Arabia, 2019.
Methods: Cross-sectional study with a total number of participants 213 done by using self-administered chart review.
Result: A total of 213 Saudi health care patients participated, and most of them were in the age group of 75-85 years. The overall prevalence of readmission was 43.66%, and it was significantly higher among males at 55.81%. Poly-pharmacy and diabetes mellitus were the highest frequent causes of readmission at 75.27% and 65.59%, respectively. A significantly higher percentage of readmitted subjects have urinary tract infection and on NGT at 8.60% and 13.89% vs. 1.67% and 5% on the not readmitted group, respectively. On the other hand, the functional disability severity frequency and hypothyroidism were higher in the not readmitted groups compared to the readmitted one at 46.67%, and 27.5% vs. 32.26 and 12.9%, respectively. There was a significant difference between the two groups in the distance 25Km from central Riyadh. Male gender is associated with more than two folds risk of non-elective readmission of HHC compared to females, with OR =2.30, and a P-value of 0.004. Patients with urinary tract infections were more than five folds (OR= 5.55, P= 0.033) at risk of readmission, and those with surgical interventions have 6.91 folds increased risk of readmission. Besides, patients on NGT and those treated with a multidisciplinary team have OR of 3.09, and 3.41to be readmitted with a significant P-value (<0.05). HHC patients with a distance of 25 km^2 from the central region have more than 17 fold risk of readmission (P 17.31 and P 0.006). After multivariate adjustment, only male gender, multiple team treated patients and distance 25 km from central Riyadh were the factors that showed a significant (P< 0.05) increased risk of HHC patients readmission, with OR of 2.243, 3.206, and 15.336.

Keywords: Home care patients, home health care rehospitalization, home care readmission, home care risk factors

Introduction
Worldwide the home health care (HHC) has many benefits. It improves countries health systems and clinical outcomes of patients, it is good solution for bed occupancy in hospitals**.**
Home Health care (HHC) provides nursing services supported with Medicare for patients with chronic medical issues that prevent them from leaving the home.
"In Saudi Arabia, an HHC Program was developed at King Faisal Specialized Hospital and Research Center in 1991 for patients with terminal cancer (Gray & Ezzat, 1997)" [1]. at PSMMC the Program was established in May 1999, and accredited by JCI twice, the first time was in 2014 and the second in 2018. "In 2009, the program was established by the Saudi Ministry of Health, the main goal of this program is to "provide health services for all those who are in need of them, wherever they may be; in an endeavor to alleviate the suffering of waiting in hospitals or moving to get the service". HHC services are provided according to the international standards and within the framework of Islamic values and traditions of the society (Saudi Ministry of Health, 2011)" [1].

in our research we aim to reduce the rate of hospital admission through reduce the risk factors that lead to it among patients served by Home Health Care patients at PSMMC, Riyadh, Saudi Arabia.

Methods

This is a cross sectional study conducted on all patients, active file, who is listed in HHC program at PSMMC, re-admission within 30 days of discharge. a self-administered chart review were distributed to total number of the current study participants was 213 around (83%), we excluded the uncompleted chart and it was 238. chart developed depending on national rate of acute care hospitalization for HHC, consists items of: socio demographic characteristic, clinical data, environmental data, clinical risk factors and rate of readmission, chart was divided by using non probability convenient sampling technique on all patients file, who is listed in HHC program at PSMMC Data were analyzed by using Statistical Package for Social Studies (SPSS 22; IBM Corp., New York, NY, USA). Continuous variables were expressed as mean ± standard deviation and categorical variables were expressed as percentages. Chi square test and fisher exact test were used for categorical variables. Univariate and multivariate logistic regression were used to assess the association factors with non-elective readmission of HHC patients. A p-value <0.05 was considered statistically significant.

Results

We set out this cross-sectional survey study to assess the risk factors for hospital readmission among home health care (HCC) patients at PSMMC, Riyadh, Saudi Arabia, 2019. The socio-demographic data of the participants are shown in table (1). A total of 213 Saudi health care patients participated in the current study, most of them were in the age group of 75-85 years old, and more than half of them were females at 59.6% and married at 51.6%.

The frequency and rate of readmission to hospital by HHC patients are shown in table (2). The results showed that the overall prevalence of readmission was 43.66%, and it was significantly higher among males at 55.81% compared to females at 35.43%, with a P-value of 0.003. The readmission frequency did not differ significantly by age or marital status. The readmission was the highest among the age group of 35-44 years old at 60%, and absent among those aged 26.34, with a P-value of 0.938. For marital status, married participants showed the highest readmission frequency at 49.09%, while it was the lowest among divorced at 33.33%, with a P-value of 0.416.

The mean of times and duration of admission is shown in table (3). The mean (±SD) of times of readmission in the current study was 2.12(±2.40), and the mean (±SD) duration of admission was 7.80(±22.27) days.

Poly-pharmacy and diabetes mellitus were the highest frequent causes of readmission at 75.27% and 65.59%, respectively. There were statistically significant differences (all P values <0.05) between readmission and not readmitted patients in the current study in terms of urinary tract infection, patients on NGT, and functional disability severity. Since a significantly higher percentage of readmitted subjects have urinary tract infection and on NGT at 8.60% and 13.89% vs. 1.67% and 5% on the not readmitted group, respectively. On the other hand, the functional disability severity frequency and hypothyroidism were higher in the not readmitted groups compared to the readmitted one at 46.67%, and 27.5% vs. 32.26 and 12.9%, respectively. There was a significant difference between the two groups in terms of the number of home care days, surgical interventions being the highest in the readmitted group, multidisciplinary treatment team, and the distance 25Km from central Riyadh, where all P values were <0.05. For the remaining clinical characteristic, the differences between the two groups were statistically non-significant. Data is shown in table (4)

Table 1: Demographic characteristics of the patients

		Number (n=213)	%
Marital Status	Single	12	5.6
	Married	110	51.6
	Divorced	6	2.8
	Widowed	85	39.9
Age	18-25	6	2.8
	26-34	2	.9
	35-44	5	2.3
	45-55	6	2.8
	56-64	16	7.5
	65-74	31	14.6
	75-85	147	69.0
Gender	Male	86	40.4
	Female	127	59.6
Nationality	Saudi	213	100.0

Table 2: Frequency and rate of readmission to hospital by HHC patients

		Number	%	P value
Overall		93	43.66	
Gender	Male	48	55.81	0.003*
	Female	45	35.43	
Age	18-25	3	50.00	0.938
	26-34	0	0.00	
	35-44	3	60.00	
	45-55	2	33.33	
	56-64	8	50.00	
	65-74	13	41.94	
	75-85	64	43.54	
Marital Status	Single	5	41.67	0.416
	Married	54	49.09	
	Divorced	2	33.33	
	Widowed	32	37.65	

* Significant p value

Table 3: Mean of times and duration of admission

	Mean	SD
How many times	2.12	2.40
Duration of admission	7.80	22.27

Table 4: Clinical and Environmental Characteristics of the patients

		ALL (n=213)		Readmission (n=93)		Not readmission (n=120)		P value
		Number	%	Number	%	Number	%	
Congestive heart failure	Yes	36	16.90	18	19.35	18	15.00	0.400
	No	177	83.10	75	80.65	102	85.00	
Peripheral vascular disease	Yes	4	1.88	1	1.08	3	2.50	0.447

	No	209	98.12	92	98.92	117	97.50	
Dementia	Yes	54	25.35	21	22.58	33	27.50	0.413
	No	159	74.65	72	77.42	87	72.50	
Alzheimer's disease	Yes	16	7.51	6	6.45	10	8.33	0.605
	No	197	92.49	87	93.55	110	91.67	
Parkinsonism	Yes	10	4.69	5	5.38	5	4.17	0.679
	No	203	95.31	88	94.62	115	95.83	
Psychiatric diagnosis	Yes	24	11.27	11	11.83	13	10.83	0.820
	No	189	88.73	82	88.17	107	89.17	
Cancer diagnosis	Yes	20	9.39	9	9.68	11	9.17	0.899
	No	193	90.61	84	90.32	109	90.83	
Stroke	Yes	70	32.9	37	39.8	33	27.5	0.059
	No	143	67.1	56	60.2	87	72.5	
Diabetes Mellitus	Yes	137	64.32	61	65.59	76	63.33	0.733
	No	76	35.68	32	34.41	44	36.67	
(COPD)	Yes	5	2.35	1	1.08	4	3.33	0.280
	No	208	97.65	92	98.92	116	96.67	
Asthma	Yes	21	9.86	6	6.45	15	12.50	0.142
	No	192	90.14	87	93.55	105	87.50	
Renal failure	Yes	27	12.68	16	17.20	11	9.17	0.080
	No	186	87.32	77	82.80	109	90.83	
Urinary trac infection	Yes	10	4.69	8	8.60	2	1.67	0.018*
	No	203	95.31	85	91.40	118	98.33	
Skin ulcer or wound	Yes	32	15.02	18	19.35	14	11.67	0.199
	No	181	84.98	75	80.65	106	88.33	
Functional disability severity	Yes	86	40.38	30	32.26	56	46.67	0.034*
	No	127	59.62	63	67.74	64	53.33	
Cognitive function severity	Yes	57	26.76	24	25.81	33	27.50	0.782
	No	156	73.24	69	74.19	87	72.50	
Polypharmacy	Yes	157	73.71	70	75.27	87	72.50	0.649
	No	56	26.29	23	24.73	33	27.50	
On NGT	Yes	19	8.92	13	13.98	6	5.00	0.023*
	No	194	91.08	80	86.02	114	95.00	

*Significant p value

Table 4: Cont…..

		ALL (n=213)		Readmission (n=93)		Not readmission (n=120)		P value
		Number	%	Number	%	Number	%	
On o2	Yes	5	2.35	4	4.30	1	0.83	0.079
	No	208	97.65	89	95.70	119	99.17	
Others	Yes	213	100.00	93	100.00	120	100.00	
HTN	Yes	164	77.0	75	80.6	89	74.2	0.265
	No	49	23.0	18	19.4	31	25.8	
Dyslipidemia	Yes	69	32.4	25	26.9	44	36.7	0.13
	No	144	67.6	68	73.1	76	63.3	
Hypothyroidism	Yes	45	21.1	12	12.9	33	27.5	0.010*
	No	168	78.9	81	87.1	87	72.5	
IHD	Yes	24	11.3	14	15.1	10	8.3	0.127
	No	189	88.7	79	84.9	110	91.7	
Lives alone	No	213	100.00	93	100.00	120	100.00	
Availability of Care giver	Yes	212	99.53	92	98.92	120	100.00	0.255
	No	1	0.47	1	1.08	0	0.00	
Unsafe housing	Yes	2	0.94	1	1.08	1	0.83	0.684
	No	211	99.06	92	98.92	119	99.17	
Distance 25Km from central Riyadh	Yes	193	90.61	92	98.92	101	84.17	<0.001*
	No	20	9.39	1	1.08	19	15.83	
Home care days	1 week	18	8.5	9	9.7	9	7.5	0.016*
	2 week	16	7.5	5	5.4	11	9.2	
	2-4 week	54	25.4	32	34.4	22	18.3	
	4-6 week	48	22.5	19	20.4	29	24.2	
	1 month	56	26.3	19	20.4	37	30.8	
	3 month	17	8.0	5	5.4	12	10.0	
	6 month	4	1.9	4	4.3	0	0.00	
Hospital acquired infection	Yes	2	0.94	2	2.15	0	0.00	0.107
	No	211	99.06	91	97.85	120	100.00	
Surgical intervention	Yes	17	7.98	14	15.05	3	2.50	0.001*
	No	196	92.02	79	84.95	117	97.50	

Multiple team treated	Yes	32	15.02	22	23.66	10	8.33	0.002*
	No	181	84.98	71	76.34	110	91.67	
Complication	Yes	1	0.47	1	1.08	0	0.00	0.437
	No	212	99.53	92	98.92	120	100.00	
Comorbidity	Yes	13	6.10	9	9.68	4	3.33	0.052
	No	200	93.90	84	90.32	116	96.67	

*Significant p value

Table 5: Univariate logistic regression for the associated factors with non-elective, readmission of HHC patients

		Odds ratio	95% CI		P value
			Lower	Upper	
Gender	Male	2.30	1.32	4.03	0.004*
	Female**	1.00			
Stroke	Yes	1.742	.978	3.102	0.059
	No**	1.00			
Urinary trac infection	Yes	5.55	1.15	26.81	0.033*
	No**	1.00			
Functional disability severity	Yes	1.84	1.05	3.23	0.034*
	No**	1.00			
On NGT	Yes	3.09	1.13	8.47	0.028*
	No**	1.00			
Hypothyroidism	Yes	0.39	0.19	0.81	0.011*
	No**	1.00			
Distance 25Km from central Riyadh	Yes	17.31	2.27	131.86	0.006*
	No**	1.00			
Surgical intervention	Yes	6.91	1.92	24.84	0.001*
	No**	1.00			
Multiple team treated	Yes	3.41	1.52	7.62	0.002*
	No**	1.00			
Home care days	1 week**	1.00			
	2 week	2.20	0.54	8.96	0.271
	2-4 week	0.69	0.24	2.01	0.493
	4-6 week	1.53	0.51	4.54	0.447
	1 month	1.95	0.66	5.72	0.225
	3 month	1.33	0.38	4.72	0.656

* Significant P value
** Used as a reference

Table 6: Multivariate logistic regression for the associated factors with non-elective, readmission of HHC patients

		Odds ratio	95% CI		P value
			Lower	Upper	
Gender	Male	2.243	1.195	4.213	0.012*
	Female**	1.00			
Urinary Trac infection	Yes	3.224	.624	16.667	0.163
	No**	1.00			
Functional disability severity	Yes	.627	.330	1.191	0.154
	No**	1.00			
On NGT	Yes	2.959	.972	9.010	0.056
	No**	1.00			
Hypothyroidism	Yes	.493	.220	1.104	0.086
	No**	1.00			
Distance 25Km from central Riyadh	Yes	15.330	1.856	126.648	0.011*
	No**	1.00			
Surgical intervention	Yes	4.305	.999	18.545	0.050
	No**	1.00			
Multiple team treated	Yes	3.206	1.258	8.166	0.015*
	No**	1.00			

* Significant P value
** Used as a reference

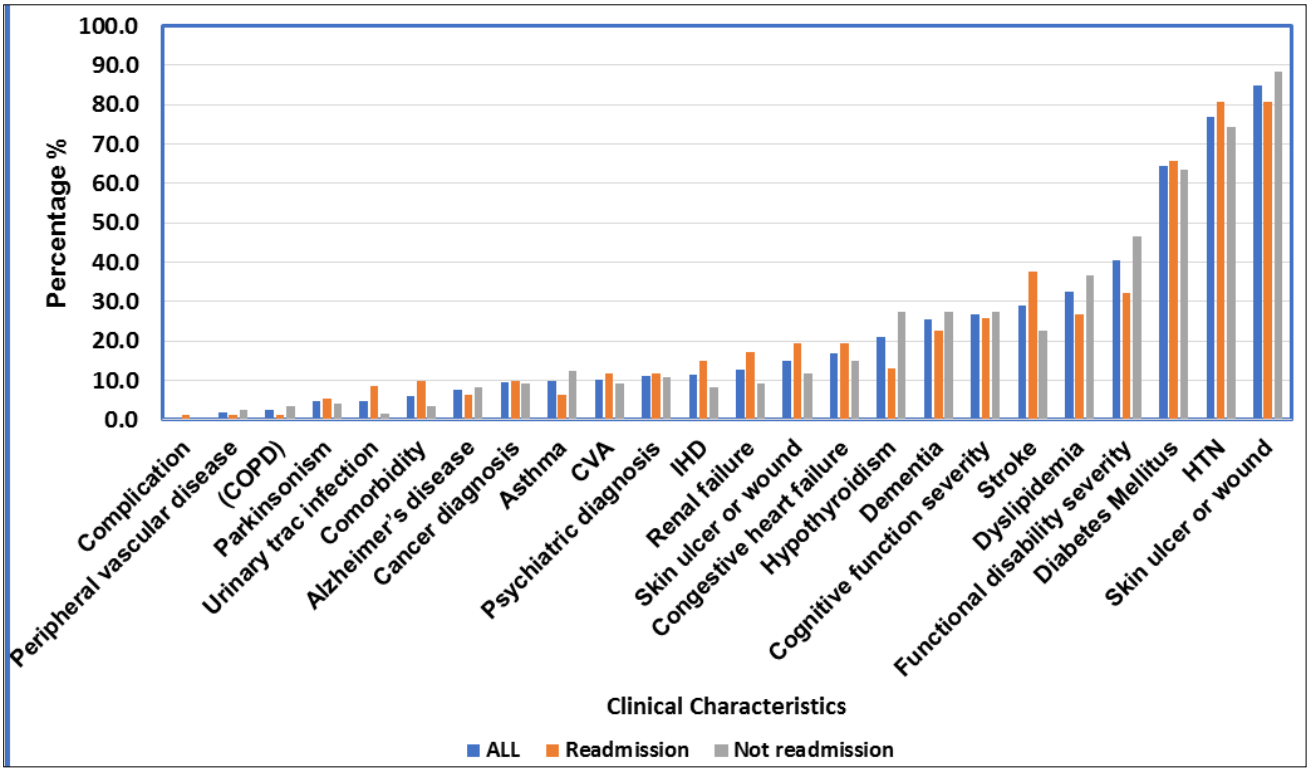

Fig 1: Clinical Characteristics of the patients

The univariate logistic regression for the associated factors with non-elective, readmission of HHC patients is shown in table (5). The results showed that the male gender is associated with more than two folds risk of non-elective readmission of HHC compared to females, with OR =2.30, and a P-value of 0.004. Patients with urinary tract infections were more than five folds (OR= 5.55, P= 0.033) at risk of readmission, and those with surgical interventions have 6.91 folds increased risk of readmission. Besides, patients on NGT and those treated with a multidisciplinary team have OR of 3.09, and 3.41to be readmitted with a significant P-value (<0.05). Functional disability severity was also significantly associated with increased risk of readmission (OR= 1.84, and P-value of 0.034). HHC patients with a distance of 25 km^2 from the central region have more than 17 fold risk of readmission (P 17.31 and P 0.006). The results also showed that the risk of readmission increased by increasing the number of home care days to one month, at three months of home care the risk started to decrease. The only factor that did not show a significant association with the risk of readmission in the current study was the history of stroke, where the OR was 1.742, but the P-value was 0.059.

When multivariate logistic regression analysis was done, only male gender, multiple team treated patients and distance 25 km from central Riyadh were the factors that showed a significant (P< 0.05) increased risk of HHC patients readmission, with OR of 2.243, 3.206, and 15.336, respectively, as shown in table (6).

Discussion

Identifying the prevalence, reason, and risk of hospital readmissions in patients receiving HHC is important as it is the first critical step in developing effective readmission reduction interventions specific to HHC. The current study revealed a high rate of all-cause readmission that exceeded 43% and was significantly associated with male gender, patients with UTI, patients on NGT, functional disability patients, hypothyroidism, a far distance from the central region, and the number of home care days.

Compared to a recently published local study [2], the estimated readmission rate is considered far higher at 43.66% vs. 14.3%. However, it should be noted that the other study populations were with the major three chronic diseases (DM, HTN & Dementia), and the readmission was within the first 30 days from discharge [2], but the current study ones have different comorbid chronic conditions, and the assessed readmission was within 6 months, which could make the difference in the readmission rate. Similarly, a far lower readmission rate was reported by Ness and William Kramer, 2013 at 17.8% in the fourth quarter of 2012 [3]. Another study published in 2018 reported a readmission rate of 16.16% that was decreased to 15.29% after the implementation of the reduction program including home visits [4]. In addition, Madigan EA *et al*. reported a readmission rate of 24% in 2001, which is nearly half of what we reported in our study [5]. Based on these results, the current study finding shed the light on the urgent need for hospital readmission-reducing programs.

In accordance with previously published studies [6-9], the current study showed that male gender is a risk factor for hospital readmission. On the other hand, there was no significant association between age and readmission rate, a finding which is in contrast to what has been reported in the literature [5, 9, 10].

Generally, our results are consistent with previous research identifying urinary tract infection as a significantly greater hazard of readmission [11, 12]. Therefore, targeting care and support to HHC patients with UTI is essential to reduce the readmission rate. In our study, 30% of UTI patients have a urinary catheter, a percentage that is higher than what is in the literature at approximately 20%, with the risk of catheter-UTI increasing by 3–7% per day [13, 14]. Therefore, it is recommended that a specialized person go to the

patient's home, insert the catheter, checkup on it, and prescribe the suitable treatment if needed to reduce the readmission rate. Similar findings were reported for patients on NGT, where the highest percentage of them were readmitted, which necessitate the need for a program for follow up and education for HHC patients on NGT to decrease their rate of readmission.

In their study, Greysen SR *et al*. reported that functional impairments are associated with higher readmission rates, and the risk of readmission increased in a dose-response fashion as the severity of impairment increased [15]. In addition, small and single-site studies showed a consistent relationship between functional impairment and readmission [16-18]. The current study findings were different from these findings, since, for those with functional disability, the percentage of readmitted was lower than those who were not admitted. Such finding could be explained by the ""good post-discharge environment" for patients with functional disability severity, that they might receive more interest, follow up, and care compared to mild cases. Also, there was no enough data for the researcher to assess the severity, therefore, it is recommended to use a functional disability assessment tool for HHC patients.

Previous studies focusing on heart failure (HF) patients reported that cardiac-related diagnosis and respiratory problems were the most common reasons for hospital readmissions [19-21]. Kang Y et 2017 found that out of 526 HF patients receiving telehomecare, 80% of the hospital readmission was because of HF, other heart diseases, respiratory infection, cardiac dysrhythmia, and other respiratory problems [21]. In the current study, polypharmacy and diabetes mellitus were the most common reasons for readmission. Polypharmacy itself isn't a direct cause of readmission, but it is well known that most of the HHC patients have different chronic diseases, and therefore, they are taking many drugs. Similarly, for diabetic patients, the readmission might be attributed mainly to the diabetes complications, not diabetes itself. Unfortunately, there was no enough data about diabetes complications in the current study. It is recommended that a detailed assessment about diabetes and its complication should be added and if they have a direct relationship with patients' readmission. This might help in developing futures plans to decrease the readmission rates due to diabetes complications. Moreover, in contrast to these findings, our results showed no significant association between CHD, peripheral vascular disease, CHF, asthma, or COPD and the risk of readmission.

A previous study assessed the Risk factors for 30-day hospital readmission in patients ≥65 years of age showed that patients who lived 50 miles or more from the first hospital were less likely to be readmitted, which could be due to under ascertainment of readmission [22]. This is in contrast to ur finding which showed that patients with a distance 25Km^2 from central Riyadh have a significantly increased rate of readmission.

The current study has its limitations that include, the retrospective design that did not allow collecting detailed data, and the small sample size that was taken from HHC following one health care institution in the kingdom, therefore, the results cannot be generalized.

Conclusion

The current study revealed that hospital readmissions are prevalent among home care patients (HHC), and warrant more effort to prevent them**.** The risk factors for readmissions according to the current study findings are male gender, urinary tract infection, functional disability, on NGT, hypothyroidism, surgical interventions,

References

1. https://www.researchgate.net/publication/319644780_THE_QUALITY_OF_HOME_HEALTHCARE_SERVICE_IN_RIYADHSAUDI_ARABIA
2. Mohamed Medhat, Al-Tehewy Mahi, Hakim, Sally Mansour, Abdulaziz Rasheed, Bin Abood *et al*. Studying impact of home health care on hospital readmission rate in prince sultan military medical city, Riyadh, Saudi Arabia 2020.
3. Reducing Hospital Readmissions: It's About Improving Patient Care | Health Affairs Blog [Internet]. [cited 2020 Nov 22]. Available from: /do/10.1377/hblog20130816.033808/full
4. Birmingham LE, Oglesby WH. Readmission rates in not-for-profit vs. proprietary hospitals before and after the hospital readmission reduction program implementation. BMC Health Serv Res 2018;18(1):31.
5. Madigan EA, Schott D, Matthews CR. Rehospitalization among Home Healthcare Patients: Results of a Prospective Study. Home Healthcare Now. 2001;19(5):298–305.
6. Madigan EA, Gordon NH, Fortinsky RH, Koroukian SM, Piña I, Riggs JS. Rehospitalization in a national population of home health care patients with heart failure. Health Serv Res 2012;47(6):2316-2338. doi:10.1111/j.1475-6773.2012.01416.x
7. Olson CH, Dey S, Kumar V, Monsen KA, Westra BL. Clustering of elderly patient subgroups to identify medication-related readmission risks. Int. J Med Inform 2016;85(1):43-52. doi:10.1016/j.ijmedinf.2015.10.004.
8. Tao H, Ellenbecker CH. Is OASIS effective in predicting rehospitalization for home health care elderly patients? Home Health Care Manag Pract. 2013;25(6):250-255. doi:10.1177/1084822313495046.
9. Wang J, Jia H, Shang J, Kearney JA. Critical association between mental health disorders and medical status: depression intervention use indicates a two-fold risk for subsequent medical events in older American home health care patients. J Gerontol Nurs 2016;42:42-55.
10. Chen HF, Popoola T, Radhakrishnan K, Suzuki S, Homan S. Improving diabetic patient transition to home healthcare: leading risk factors for 30-day readmission Am J Manag Care 2015;21(6):440-450.
11. Osakwe ZT, Larson E, Shang J. Urinary tract infection-related hospitalization among older adults receiving home health care. Am J Infect Control 2019;47(7):786-792.e1.
12. Castle N, Engberg JB, Wagner LM, Handler S. Resident and facility factors associated with the incidence of urinary tract infections identified in the nursing home minimum data set. J Appl Gerontol 2017;36:173–94.
13. Saint S, Trautner BW, Fowler KE, Colozzi J, Ratz D, Lescinskas E *et al*. A multicenter study of patient-reported infectious and noninfectious complications associated with indwelling urethral catheters. JAMA Intern Med 2018;178:1078.
14. Tominaga GT, Dhupa A, McAllister SM, Calara R,

Peters SA, Stuck A. Eliminating catheter-associated urinary tract infections in the intensive care unit: is it an attainable goal? Am J Surg 2014;208:1065–70.
15. Greysen SR, Cenzer IS, Auerbach AD, Covinsky KE. Functional Impairment and Hospital Readmission in Medicare Seniors. JAMA Intern Med 2015;175(4):559–65.
16. Depalma G, Xu H, Covinsky KE, Craig BA, Stallard E, Thomas J *et al*. Hospital readmission among older adults who return home with unmet need for ADL disability. Gerontologist 2013;53(3):454–61.
17. Hoyer EH, Needham DM, Miller J, Deutschendorf A, Friedman M, Brotman DJ. Functional status impairment is associated with unplanned readmissions. Arch Phys Med Rehabil 2013;94(10):1951–8.
18. Hoyer EH, Needham DM, Atanelov L, Knox B, Friedman M, Brotman DJ. Association of impaired functional status at hospital discharge and subsequent rehospitalization. J Hosp Med 2014. Epub ahead of print. 10.1002/jhm.2152
19. Madigan EA. People with heart failure and home health care resource use and outcomes. J Clin Nurs 2008;17(7B):253-259. doi:10.1111/j.1365-2702.2008.02334.x.
20. Madigan EA, Schott D, Matthews CR. Rehospitalization among home healthcare patients: results of a prospective study. Home Healthc Nurse 2001;19(5):298-305.
21. Kang Y, McHugh MD, Chittams J, Bowles KH. Risk factors for all-cause rehospitalization among Medicare recipients with heart failure receiving telehomecare. Telemed J E Health 2017;23(4):305-312. doi:10.1089/tmj.2016.0048.
22. Silverstein MD, Qin H, Mercer SQ, Fong J, Haydar Z. Risk factors for 30-day hospital readmission in patients ≥65 years of age. Proc (Bayl Univ Med Cent) 2008;21(4):363–72.