

Immediate outcome assessment of the rapid response team of home health care services at King Abdulaziz Medical City in Riyadh

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ABSTRACT

Background: Paediatrics rapid response team (RRT) is a newly developed service under paediatrics home health care (HHC) programme which is a standby visiting team that responds to non-critical emergency calls. The current study aimed to compare the total emergency visits and hospital admissions before and after implementation of RRT project. **Method:** A retrospective chart review was conducted from December 2018 to December 2020. Paediatric patients registered under the home health care (HHC) programme were the target population. The admission and hospitalization rates were assessed before and after the implantation of an RRT. The variables related to patient profile were assessed to explore the association between hospitalization and admission. **Result:** Data for 117 patients and a total of 114 calls attended under HHC covered by RRT were analysed. In the first year after the implementation of RRT, the mean number of ER visits per patient per year was reduced from 4.78 ± 6.10 to 3.93 ± 4.12 with (P value, 0.06). Also, a slight decrease in the mean number of admissions from 3.74 ± 4.43 to a mean of 3.46 ± 4.1 with (P value, 0.29). Follow-up after receiving an RRT call for an initial complaint was statistically significant in reducing both ER visits and hospital admissions within 7 days with a P value of 0.03 and 0.04, respectively. **Conclusion:** The RRT was effective in decreasing the ER visits and hospital admissions for a very special group of patients. Additionally, the emplacement of proper triaging code at the time of attending to patients helped in reducing unnecessary ER visit and hospital admission.

Keywords: ER visit, home health care, hospital admissions, paediatrics, programme

Introduction

Home health care (HHC) is a service provided by a group of health care professionals and paraprofessionals to patients in

their homes.^[1] It aims to provide follow-up and to improve patient's quality of life.^[2] In King Abdullah Specialist Children's Hospital (KASCH), paediatrics HHC was established in May 2016, starting with only nine patients, it now provides care for 122 patients (as of April 2020). The programme provides medical and nursing services and services related to respiratory and occupational therapy, clinical dietician and patient representatives, as well as social services. At home, services include but are not limited to: infusion therapy, respiratory therapy services and

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equipment, disease management services, and a family education initiative. It also provides a call centre to manage and resolve patients' complaints as needed.

HHC has many advantages for both the healthcare system and patients who can be cared for in their home. It helps in reducing the number of hospital admission, and emergency room (ER) visits.^[3] This will protect patients from acquiring unnecessary hospital infection, and in emptying hospital beds for acute cases.^[4] Also, it is cost-effective and patients can ensure receiving proper care at home.^[3] HHC has aided in spreading health awareness in the community, how to take care and attend to the needs of patients by teaching family members through delivered services at home.^[5]

HHC faces challenges and barriers that hinder offering the best care to patients. Variations in the skills and lack of knowledge of healthcare providers can affect the care delivered. This can lead to harmful outcomes for patients and will increase work on caregivers at home.^[6] Other challenges include not having standard protocols and guidelines for home health care services, lack of transportation methods, inadequate communication between home health care providers and health care centres and deficiency in the number of staff available.^[7]

Context of RRT

King Abdullah Specialist Children's Hospital (KASCH) is one of the tertiary care facilities specifically taking care of all the advanced care required for children under 15 years of age. The home health care (HCC) department provides services to children who have long-standing chronic conditions requiring frequent monitoring and hospital visits. The paediatrics rapid response team (RRT) was initiated in order to help the HHC department exclusively for these patients so they do not have to go through the routine ER visitation process. RRT is a standby visiting team that responds to non-critical emergency calls. The service is within regular working hours (08:00–17:00) from Sunday to Thursday. The aim of HHC in KASCH was to prevent unnecessary ER visits and admissions of HHC patients due to non-urgent health issues or issues related to patients' home medical equipment or medications refill. The RRT team included a team of physician, a registered nurse, a respiratory therapist (if needed), and an interpreter. All guardians/caregivers of patients enrolled in paediatrics HHC were provided a HHC hotline number. Calls from legal guardians/caregivers to the HHC call centre were referred to RRT for action and immediate response. The HHC physician reviewed the complaint and triage the patient based on the severity of the symptoms into three levels. The green level indicates mild symptoms with no change in oral intake or activity. Patients in the green category are instructed to observe the symptoms and call back if symptoms get worse. Yellow level indicates moderate symptoms with decreased oral intake or activity. Patients in the yellow category are visited by RRT within 2 hours from the call, while red level indicated severe symptoms and the family was instructed to go to the ER immediately.

To our knowledge, there is no similar national project of paediatrics HHC RRT aiming to decrease ER visits and admission in Saudi Arabia. Therefore, this study was a one-year pre-post assessment study to compare the total ER visits and admissions before (December 2018 to December 2019) and after (December 2019 to December 2020) implementation of the RRT project, in KASCH.

Methods

Study design and participants' inclusion

A pre-post operational study was conducted at the paediatrics department at KASCH Saudi Arabia. All paediatric patients registered and treated under HHC from December 2018 to December 2020 were included in the study. Electronic records for 117 patients registered under HHC were included in the study. All calls received from these patients during the first year of implementing RRT were retrieved and analysed. No specific exclusion criteria expect for the patients with more than two calls for the same complaint made in one week were excluded to avoid repetition of data. As all the calls registered and treated during the study period were assessed for the purpose of the study, non-probability consecutive sampling techniques were used for the inclusion of the study participants.

Data collection process

All information relevant to the call was retrieved via electronic chart review from RRT weekly report and the patient electronic medical records management system called BESTCare. The main variables for the data were related to the patient call which included patient demographic profile (age, gender, location of residence, type of primary disease), types of team members providing care at the patient's residence (nurses, respiratory therapist, physiotherapy, etc.), complaint, the nature of visit (virtual/physical), the mean response time after patient call received, number of referrals to ER and admissions. The main outcome variable was the total ER visits and hospital admissions before and after the implementation of the RRT project. Additionally, the response time to a patient's complaint, the number of patients treated, number of patients needed to be admitted, and monthly statistics were assessed to measure the immediate outcome indicators of RRT.

Statistical analysis

The data were collected using entry in Microsoft Excel, followed by data cleaning, and checking for correctness and completeness. The analysis was performed using Statistical Package for Social Sciences (version 22). Descriptive statistics were reported for all the demographic variables as numbers and percentages for qualitative variables, i.e., age categories, gender and primary disease. The numerical variables were reported as means and standard deviation. To assess the association of ER visits or hospital admission with the sociodemographic of the patients the Chi-square test/Fisher's exact test was applied as applicable.

Additionally, the effect of COVID-19 quarantine and the type of HHC visit, follow-up ER visit, and hospital admission within seven days was assessed using Chi-square test. To report the difference in the number of total ER visits and admission, before and after the implementation of RRT, Wilcoxon ranked test was used based on the positive ranks. The significance level was set at 0.05.

Ethical approval

The study was approved by the institutional ethical review board of King Abdullah International Medical Research Center (KAIMRC), Riyadh, Saudi Arabia. The study protocol number: RC20/495/R was approved on 26 October 2020. All the patient information was kept confidential, and anonymity was always maintained during the research. Only the research team had access to the patient data all information was safeguarded by password-protected devices and drives.

Results

Summary of the patient profile attended by RRT

A total of 117 paediatrics patients registered under HHC were covered by RRT during the study. School-aged children (6–18 years old) were the most prevalent age group 38 (33%) with a predominance of the male gender 69 (61%). The most common primary diseases were neurological disorders 49 (43%) followed by syndromes 32 (28%). Most calls were received in the month of March 2020, 19 (17%) during working hours and in the morning shift 68 (60%). The most common complaint reported was temperature instability 39 (34%) followed by respiratory symptoms 24 (21%). Calls received were categorized into green, yellow, and red as described previously, and most calls fell into the yellow category 47 (41%) followed by green 44 (39%). Paediatrics HHC RRT visits were mostly physical/home visits 71 (62%) and were doctor-based team visits 59 (52%). [Tables 1 and 2].

ER visits or hospital admissions within the next 7 days of call

Most of the calls received were during the morning shift and did not require ER visit 87 (60%) or hospital admission 68 (73%), *P* value of 0.19 and *P* value of 0.13, respectively. Almost half of the patients 20 (47%) seen via virtual calls ended up with ER visits with *P* value of 0.06. Patients who were triaged red 17 (74%) required ER visits and were more likely to be admitted compared to patients who were triaged yellow and green *P* value <0.001. Close HHC follow-up after receiving an RRT call for the initial complaint was statistically significant in reducing both ER visits and hospital admissions within 7 days, *P* value of 0.03 and 0.04, respectively. While those who had no close follow-up ended up with either 29 (45%) ER visit or hospital admission 21 (33%) within the next 7 days. Overall, no significant relationship was found between ER visits or hospital admission with age, gender, primary complaint of the patient, primary disease, time when the call was placed, month of the call or type of visit and team involved in the visit. [Table 3].

Table 1: Characteristics of the children registered under home health care (n=114)

Variables	Category	Frequency	Percentage
Age group	Infant (<1 year)	15	13
	Toddler (1-2 years)	26	23
	Preschool Age (3-5 years)	35	31
	School age (6-18 years)	38	33
Gender	Female	45	40
	Male	69	61
Primary disease	Syndromic	32	28
	Neurological disorder	49	43
	Prematurity	8	7
	Metabolic/endocrine diseases	17	15
	Renal/ESRD	4	4
	GI diseases	1	1
	Haematology/oncology	1	1
	Immunodeficiency	2	2

Impact of COVID-19 restrictions on the patient attended

Since the project was started a couple of months before the pandemic hit the world, we looked into the differences in terms of response by the RRT team before and after that specific period. The initial physical visits during the first 3 months of the implementation of COVID-19 restrictions were significantly reduced from 77 to 44%. This was paralleled by a significant increase in virtual calls from 23 to 56% *P* value <0.001. Additionally, there was a significant reduction observed in doctor-based team visits from 61 to 40% *P* value <0.001 as well as a reduction in physical follow-up visit from 32 to 14% *P* value of 0.016. Meanwhile, ER referrals reduced to zero during COVID-19 restrictions. However, there was no statistically significant difference between ER and hospital admissions within 7 days before and during implementation of COVID-19 restrictions [Table 4].

In the first year after the implementation of RRT, the mean number of ER visits per patient per year was reduced from 4.78 ± 6.1 to 3.93 ± 4.1 *P* value of 0.06, with a mean pre- and post-implementation difference of -1.82 . Also, a slight decrease in the mean number of admissions was noted from 3.74 ± 4.4 to a mean of 3.46 ± 4.1 with a mean difference of -1.065 . However, the results were statistically non-significant. The mean time to visit for those who required ER visits was 0.76 hours compared with 4.07 hours for those who did not need an ER visit *P* value <0.001. The mean time to visit for those who required hospital admission was 0.83 hours compared with 3.62 hours for those who did not require admission *P* value 0.01 [Figure 1].

Discussion

The current study investigated the immediate outcome assessment of paediatrics HHC RRT in a tertiary care setting. The results of this study showed a decrease in ER visits and hospital admissions after 1 year of implementing RRT project

Table 2: Characteristics of the RRT calls (n=114)

RRT related complaints	Category	Frequency (n)	Percentage
Month of the call	December 2019	15	13
	January 2020	15	13
	February 2020	17	15
	March 2020	19	17
	April 2020	11	10
	May 2020	2	2
	June 2020	5	4
	July 2020	0	0
	August 2020	3	3
	September 2020	4	4
	October 2020	11	10
Time of the call	November 2020	12	11
	Morning shift (08:00-12:00)	68	60
	Afternoon shift (12:01-16:00)	39	34
Complaints	After working hours (16:01-07:59)	7	6
	Temperature instability	39	34
	Respiratory symptoms	24	21
	GI symptoms	22	19
	Device-related complaints	15	13
	Change in level of activity	3	3
	Convulsion	2	2
Triage	Urinary symptoms	1	1
	Others (muscular pain, skin rash, ear discharge)	8	7
	Green	44	39
	Yellow	47	41
District	Red	23	20
	North	19	17
	South	4	4
	East	80	70
Type of RRT visit	West	11	10
	Physical visit	71	62
RRT involved team	Virtual visit	43	38
	Doctor-based team visit	59	52
	Non-doctor-based team visit	43	38
ER visit within the next 7 days	Virtual visit	12	11
	Yes	41	36
Admission within the next 7 days	No	73	64
	Yes	27	24
Reason for ER visit/admission (if any)	No	87	76
	No ER visit nor admission	72	63
	Respiratory disorders	22	20
	GI disorders	7	6
	Device-related issues	6	5
	UTI/urinary complaints	3	3
	Metabolic crisis	2	2
	Seizure	1	1
Death upon arrival	1	1	

with drop in ER referrals down to zero during COVID-19 restrictions. The patients triage level was the main indicator determining the admission or referral for hospitalization for the patients treated under RRT. Since it was one-year pre- and post-comparison, focus was laid on the effect of reducing the total ER visits. Although no statistically significant results were noted in our study, still the overall reduction in the pre- and post-implementation was noted for the same patient.

Rapid response teams have been created and proved functional in different parts of the world for reducing the burden of care and improving patient outcomes.^[8-10] In our study, no significant relationship or statistical significance was found between ER visit or hospital admission within seven days of receiving a complaint by RRT and variables such as age, gender, complaints, primary disease, time of call, the month of the call or type of visit and team involved. As many studies have reported a reduction in

Table 3: Factors associated with of ER visits or hospital admissions within the next 7 days of call

Variables	ER visit ≤7 days of call			Hospital admission >7 days of call		
	Yes (n=41) n (%)	No (n=73) n (%)	P	Yes (n=27) n (%)	No (n=87) n (%)	P
Gender						
Female	17 (38%)	28 (62%)	0.74	9 (20%)	36 (80%)	0.52
Male	24 (35%)	45 (65%)		18 (26%)	51 (74%)	
Age group						
Infant (<1 year)	6 (40%)	9 (60%)	0.93	5 (33%)	10 (67%)	0.74
Toddler (1-2 years)	8 (31%)	18 (69%)		5 (19%)	21 (81%)	
Preschool age (3-5 years)	13 (37%)	22 (62%)		9 (26%)	26 (74%)	
School age (6-18 Years)	14 (37%)	24 (63%)		8 (21%)	30 (79%)	
Shift						
Morning shift (08:00-11:59)	27 (40%)	41 (60%)	0.19	18 (27%)	50 (74%)	0.13
Afternoon shift (12:00-15:59)	13 (33%)	26 (76%)		9 (23%)	30 (77%)	
After working hours (16:00-07:59)	1 (14%)	6 (86%)		0 (0%)	7 (100%)	
Chief complaint						
Temperature instability	14 (36%)	24 (63%)	0.18	11 (28%)	27 (72%)	0.34
Respiratory symptoms	9 (38%)	15 (62%)		5 (21%)	19 (79%)	
Others	18 (44%)	34 (65%)		11 (41%)	41 (59%)	
Team response						
Physical visit	21 (30%)	50 (70%)	0.06	14 (20%)	57 (80%)	0.25
Virtual visit	20 (47%)	23 (54%)		13 (30%)	30 (70%)	
Plan of care						
HHC Visit	21 (30%)	48 (70%)	0.02*	14 (20%)	55 (80%)	0.09
ER referral	12 (63%)	7 (37%)		8 (42%)	11 (58%)	
Phone follow-up/virtual	6 (27%)	16 (73%)		3 (14%)	19 (86%)	
Type of HHC follow-up						
HHC visit	6 (22%)	21 (78%)	0.003*	3 (11%)	24 (89%)	0.04*
ER referral	3 (100%)	0 (0%)		1 (33%)	2 (67%)	
Phone follow-up/virtual	3 (15%)	17 (85%)		2 (10%)	18 (90%)	
No follow-up	29 (45%)	35 (55%)		21 (33%)	43 (67%)	
Triage						
Green	2 (5%)	42 (96%)	<0.001*	2 (5%)	42 (96%)	<0.001*
Yellow	22 (47%)	25 (53%)		13 (28%)	34 (72%)	
Red	17 (74%)	6 (26%)		12 (52%)	11 (48%)	
Time from call to patient visit (hours)						
Mean (SD)	0.76	4.07	<0.001**	0.83	3.62	0.01**
Median (IQR)	0.67	1.5		0.79	1.4	

HHC=home health care, ER=emergency room. *Chi-square/Fisher's exact test applied as applicable and significant at <0.05. **Wilcoxon rank test (2-tailed) applied and significant at <0.05

the total admission rate, some have reported the contrary. The study by Siclovan *et al.* reported higher rate of readmission among HHC patients compared to patients without HHC.^[11] They also defined three confounding factors relating HHC to readmissions (HHC eligibility criteria, variation in practice referral and some characteristics of patients that may cause the likelihood to be admitted again). There was no such difference seen in our patient sample. Since the hospital services in Saudi Arabia are provided by the government free of cost to all nationals. Also, we specifically looked into the immediate output in terms of a seven-day reduction in hospital admission, this could be one of the reasons why the significant difference could not be noted. However, the total number of admissions for the same patient at two points in time was reduced.

During the first three months from implementing of COVID-19 restrictions, physical visits were significantly reduced compared to before restrictions were applied, and this was statistically

significant. This was the first time tele-visits were fully introduced in the Saudi health system.^[12] Due to the restrictions of the curfew, many patients could not come in person to the hospital for visits. In other parts of the world, the pandemic encouraged the use of telehealth services and changed the way patient care was delivered.^[13] It was paralleled by a significant increase in virtual calls, a reduction in doctor-based team visits and overall physical follow-up visits, which were all statistically significant, and ER referrals were reduced to zero. This might be due to the rise of virtual medical care. There was no statistically significant difference between ER and hospital admissions within 7 days before and during the implementations of COVID-19 restrictions. Which draws attention to the point that although the in-person visits were reduced, still the 7 days of admission were not affected by the fact that restrictions were emplaced and if a patient needed admission, he was referred to the hospital. However, other studies have reported an overall reduction in hospital admission because of pandemic.^[14]

Table 4: Effect of COVID-19 quarantine on the type of HHC visit, follow-up, ER visit and hospital admission within 7 days

Variables	Visits				P
	Before quarantine n=62		After quarantine n=52		
	n	%	n	%	
Physical Vs virtual					
Physical	48	77%	23	44%	<0.001*
Virtual	14	23%	29	56%	
Doctor visit Vs none					
Doctor visit	38	61%	21	40%	<0.001*
Virtual visit	14	23%	29	56%	
None doctor visit	10	16%	2	4%	
Type of HHC follow-up (visit or phone)					
HHC Visit	20	32%	7	14%	0.02*
ER referral	3	5%	0	0%	
Phone follow-up/virtual	7	11%	13	25%	
No follow-up needed	32	52%	32	62%	
ER visit within the next 7 days					
Yes	24	39%	17	33%	0.50
No	38	61%	35	67%	
Admission within the next 7 days					
Yes	13	21%	14	27%	0.45
No	49	79%	38	73%	

*Chi-square test applied as applicable and significant at <0.05. Abbreviations: HHC=home health care, ER=emergency room

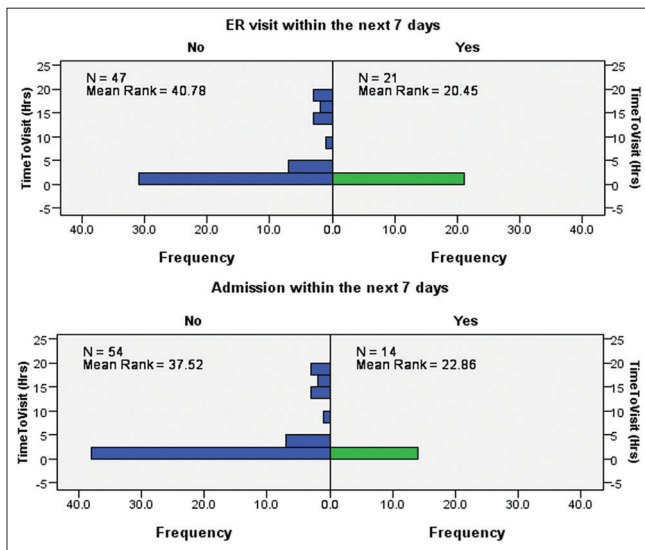


Figure 1: Time to visit in hours in association to ER visit or hospital admissions within 7 days from receiving RRT complaint

The current study did not show a statistical significance in reduction in both ER visits and hospital admissions after implementation of RRT programme by HHC. These results were similar to Birmingham and Oglesby study, after implementing the hospital readmission reduction programme showed little reduction in hospital readmission without statistical significance.^[15] However, other studies showed a more noticeable reduction in hospital readmissions in patients enrolled in HHC services.^[16] Overall data showed a trend in decrease, whether it was major or minimal, in hospital readmissions when HHC services were implemented.

The use of triaging systems for the patient has long been used since years and has shown one of the effective ways to facilitate early intervention and improve overall patient outcome.^[17,18] In our study, we found that people who had a more serious complaint based on the triaging system were most likely to visit ER or to be admitted in the next 7 days. Multiple factors play a role in affecting the length of time to visit such as staffing issues, living in a remote district from the hospital, or receiving an initial RRT call over the weekend. However, this did not impact patient safety or care, as all patients who required ER visits or hospitalization were assessed in a timely manner (within 5 hours). This highlights the importance of having a clear triage system, so as not to delay urgent care to those who required it.

The current study demonstrated a significant reduction in ER visits and hospital admission if patients were followed up either physically or virtually within 7 days from receiving the RRT complaint. A systematic review conducted by Jayakody *et al.* concluded that telephonic follow-up is an effective method in reducing readmissions within 30 days, most of these patients with heart failure and other chronic diseases.^[19] Close follow-up (1–7 days) was observed to improve the clinical effectiveness and reduce hospital visits in comparison with late follow-up (8–30 days). This was recommended by other studies where early outpatient visit within 7 days from the discharge resulted in a lower rate of readmission, while late outpatient visit 8–30 days post-discharge was not statistically significant in reducing readmission.^[20]

The current study was conducted to assess some of the immediate outcomes of the new intervention introduced by the

hospital to deal with chronically ill patients requiring continued medical care in an effective way without creating an additional burden on the existing team. The results were not statistically significant and there are limitations to the overall generalisability of the results to other settings. Contextual factors must be taken into consideration when implementing such interventions. The out-of-pocket cost for chronic patients in Saudi Health system is negligible and patients are provided free of cost medical care by the government. The new team created to take care of the HHC patients was a separate team and was dedicated to this specific task. The idea of creating an RRT is good, but the financial implications must be taken into consideration if the government takes the decision to scale up the project to other tertiary care centres inside the kingdom. A cost-effective comparison with other existing interventions must be done to see if the project is sustainable in the long run. Nevertheless, the idea of creating a dedicated RRT is helpful in overall improving the quality of care for the patients under HHC and reducing the burden of admission in tertiary care centres. The strengths of the study included the same patient followed and admission reported before and after the intervention. Thus, the patient factors which can be a confounder for the overall admission rate were controlled in our study. The future multicentre studies for accessing the long-term impact of intervention like RRT in reducing the burden of hospitalization must be conducted across different centres.

Conclusion

The current study demonstrated the immediate one-year impact of the implementation of RRT for paediatric patients registered under HHC. The level of triage was significantly associated with reducing the unnecessary ER visits and admissions within 7 days from the call. Apart from that, we recommend a follow-up visit or phone call for the next 5–7 days after receiving a paediatric HHC RRT complaint, which had a significant association with ultimately reducing the ER visits and hospital admissions.

Key messages

The inclusion of a dedicated team for home health care patients can help in the reduction of overload on the main ER teams. However, many patients with chronic illnesses need constant medical support for their long-standing conditions. The composition of the rapid response team also plays a vital role in terms of making decisions for patient referral for hospitalization. The routine indicator like response time in minutes is not good indicator for looking into the outcome of the RRT. Virtual visits can be one of low-cost interventions that can help in reducing patient turnover at tertiary care hospitals.

Ethical approval

This paper was ethically approved by King Abdullah International Medical Research Center (KAIMRC), Riyadh, Saudi Arabia. Protocol number: RC20/495/R approved on October 26, 2020.

Patient consent

No patients were directly contacted during this study; therefore, no informed consent was applicable.

Data availability

Data used to support the findings of this study are available from the corresponding author upon request.

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Conflicts of interest

There are no conflicts of interest.

References

1. Fratantoni K, Raisanen JC, Boss RD, Miller J, Detwiler K, Huff SM, *et al.* The paediatrics home health care process: Perspectives of prescribers, providers, and recipients. *Paediatrics* 2019;144:e20190897.
2. Ellenbecker CH, Samia L, Cushman MJ, Alster K. Patient safety and quality in home health care. In: Hughes RG, editor. *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. Rockville (MD): Agency for Healthcare Research and Quality (US); 2008. Chapter 13.
3. Olsen S. The Role of Human Factors in Home Health Care: Workshop Summary. Washington, DC: National Academies Press; 2010.
4. Alhelali RA. Principles of home health care in Saudi Arabia. *J Nurs Care* 2016;5:90.
5. Almoajel A, Al-Salem A, Al-Ghunaim L, Al-Amri S. The quality of home healthcare service in Riyadh Saudi Arabia. *AJSC* 2016;5:72-81.
6. Nageswaran S, Golden SL. Improving the quality of home health care for children with medical complexity. *Acad Paediatr* 2017;17:665-71.
7. Valizadeh L, Zamanzadeh V, Saber S, Kianian T. Challenges and barriers faced by home care centers: An integrative review. *Med Surg Nurs J* 2018;7:e83486.
8. Ko BS, Lim TH, Oh J, Lee Y, Yun I, Yang MS, *et al.* The effectiveness of a focused rapid response team on reducing the incidence of cardiac arrest in the general ward. *Medicine (Baltimore)* 2020;99:e19032.
9. Hermanson S, Osborn S, Gordanier C, Coates E, Williams B, Blackmore C. Reduction of early inpatient transfers and rapid response team calls after implementation of an emergency department intake huddle process. *BMJ Open Qual* 2020;9:e000862.
10. Cheng A, Mikrogianakis A. Rapid response systems for paediatrics: Suggestions for optimal organization and training. *Paediatr Child Health* 2018;23:51-7.
11. Siclován DM. The effectiveness of home health care for reducing readmissions: An integrative review. *Home Health Care Serv Q* 2018;37:187-210.
12. Alakeely M, Almutari A, Masud N, Altulaihi B. Preparedness

- of primary health care leaders during COVID-19 outbreak, Riyadh, Saudi Arabia: A qualitative study. *Risk Manag Healthc Policy* 2021;14:4339-51.
13. Wosik J, Fudim M, Cameron B, Gellad ZF, Cho A, Phinney D, *et al.* Telehealth transformation: COVID-19 and the rise of virtual care. *J Am Med Inform Assoc* 2020;27:957-62.
 14. Kalanj K, Marshall R, Karol K, Tiljak MK, Orešković S. The impact of COVID-19 on hospital admissions in Croatia. *Front Public Health* 2021;9:720948.
 15. 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;18:31.
 16. Mohamed MM, Al-Tehewy M, Hakim SA, Rasheed AMB, Abood AA, Kofi MA. Studying impact of home health care on hospital readmission rate in prince sultan military medical city, Riyadh, Saudi Arabia. *Int J Med Health Res* 2020;6:16-21.
 17. Cremonesi P, di Bella E, Montefiori M, Persico L. The robustness and effectiveness of the triage system at times of overcrowding and the extra costs due to inappropriate use of emergency departments. *Appl Health Econ Health Policy* 2015;13:507-14.
 18. Dhiliwal S, Salins N, Deodhar J, Rao R, Muckaden MA. Pilot testing of triage coding system in home-based palliative care using Edmonton Symptom Assessment Scale. *Indian J Palliat Care* 2016;22:19-24.
 19. Jayakody A, Bryant J, Carey M, Hobden B, Dodd N, Sanson-Fisher R. Effectiveness of interventions utilising telephone follow up in reducing hospital readmission within 30 days for individuals with chronic disease: A systematic review. *BMC Health Serv Res* 2016;16:403.
 20. Lee KK, Yang J, Hernandez AF, Steimle AE, Go AS. Post-discharge follow-up characteristics associated with 30-day readmission after heart failure hospitalization. *Med Care* 2016;54:365-72.