RESEARCH ARTICLES

Healthcare workers' experiences of transitioning natalizumab infusions from hospital services to an in-home setting: a qualitative study

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ABSTRACT

Objective: This study explored healthcare workers' experiences of transitioning infusions of natalizumab from hospital to a patient-centred model of home care.

Background: Hospital in the home is one of the fastest growing healthcare delivery models. In Australia, intravenous infusions are rarely available at home for chronic disease patients, such as those with multiple sclerosis. A recent trial of natalizumab infusions at home for patients with multiple sclerosis required both the hospital and hospital in the home staff to consider the logistics of how this transition could be achieved safely.

Study design and methods: This was a qualitative study using an exploratory-descriptive approach. Twelve participants from two main groups of healthcare workers participated in delivering natalizumab infusions during the six-month trial period and were subsequently interviewed about their experience. Participants were recruited from a hospital ambulatory care day unit and a Home Infusion Team from a private provider of home nursing care located in South Australia. The data was analysed thematically.

Results: Three main themes were identified from the interviews: 'preparing for change', 'focussing on the patient', and 'enhancing professional support and relationships'. These findings demonstrated the importance of understanding healthcare workers' experiences of transitioning to a patient-centred model of care, from hospital to home infusion of natalizumab.

Discussion: Flexibility and good management of logistics is necessary to maintain the standards of the health services, which highlights the need for training and professional support to facilitate quality home care. This may enhance workers' sense of professional confidence and trust and reduce stress when delivering the home model of care.

Conclusion: Healthcare workers and patients worked to support one another, not only therapeutically but also logistically within collegial relationship and interdependent communications. Being flexible, communicating clearly and being willing to work together within the team, especially between the hospital in the home staff and the hospital staff, was demonstrated to be an important factor for the safe delivery of infusions at home. Managing the logistics

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of delivering a flexible and safe home therapy service was an important part of this model of care.

Implications for research, policy, and practice: The results of this study will be used to inform healthcare teams about the key logistical components that are important for healthcare services, when considering transitioning to a home-based model of care for treating people with relapsing-remitting multiple sclerosis.

What is already known about the topic?

- Although outpatient infusion programs are often hospital based, they may be run by regional health authorities or private organisations, such as a hospital in the home service.
- Healthcare workers delivering a hospital in the home service require advanced knowledge and skill in order to deliver quality care.

What this paper adds:

- The development of a comprehensive logistical process, which has the patient at the centre of the model of care, enabled natalizumab to be delivered safely in the community by healthcare workers.
- Being flexible, communicating clearly and being willing to work together within the team, especially between the hospital in the home staff and the hospital staff, was demonstrated to be an important factor for the safe delivery of infusions at home

Keywords: Model of care, healthcare worker, home infusion, multiple sclerosis, natalizumab.

INTRODUCTION

Over 25,000 people in Australia have multiple sclerosis (MS), an inflammatory disorder of the central nervous system that may result in neurological symptoms and increasing disability.[1,2] Multiple sclerosis is a chronic neurological disease that develops in young adults.[1] About three quarters of people with MS are female and the majority are diagnosed between the ages of 20 to 40 years.[2] Most people with MS start out with relapsing-remitting MS (RRMS), which is characterised by relapses or exacerbations when symptoms flare up, followed by a variable period of time when no symptoms are present, called 'remission'.[3] Currently, the US Food and Drug Administration, together with the European Medicines Agency, have approved 13 drugs for use as RRMS disease-modifying therapies, which help to control the disease and improve quality of life.[3] Gajofatto and Benedetti emphasised that these therapies modulate or suppress the different mechanisms of the autoimmune process that underlies the disease, thereby minimising the occurrence of relapse or preventing disease progression.[4] Natalizumab was one of the first disease-modifying therapies approved for the treatment of adults with RRMS in a hospital setting.[5,6]

Hospital outpatient intravenous therapy services, also known as hospital-based infusion centres, are gaining recognition as a beneficial model of care for both health services and patients.[7] Patients diagnosed with RRMS may require natalizumab infusion treatments on an ongoing basis for at least a one-hour infusion every 28 days.[8,9] Natalizumab infusions can be delivered to people with RRMS as an outpatient rather than requiring admission to the hospital as an inpatient. While this outpatient appointment is a relatively short hospital visit, patients still have to allocate sufficient time to travel to and attend the hospital for the treatment and may miss work, study and other activities on that day. This is time consuming and inconvenient, not only for the patients but also for their family members.[10,11] Although outpatient infusion programs are often hospital based, they may be run by regional health authorities or private organisations. Several studies have recently supported the concept of delivering patient care, especially intravenous infusions, away from a hospital and in the patients' home or community environment. This places the patient at the centre of the delivery of the care rather than the hospital.[11,12]

BACKGROUND: 'HOSPITAL IN THE HOME' MODEL

Delivering healthcare for people with chronic health conditions at home is commonly known as 'hospital in the home services'.[2] 'Hospital in the home' involving infusion therapy has been an effective mode of management of some illnesses since the 1980s.[13] The use of home infusion therapy services has grown not only due to the development of advances in medical technology for infusion devices but also due to the development of new medicines. The development of home infusion treatment programs has been influenced by the need to stem the increasing demand for access to acute care hospital beds, to decrease the chance of infections and to reduce hospital costs.[14] Additionally, during the COVID-19 pandemic, the preference for people such as those receiving natalizumab for RRMS to avoid the hospital environment and self-isolate has increased the need for health managers to rapidly consider safer options for delivering ongoing medical treatment.

Disease-modifying therapies are part of a growing group of agents, which includes monoclonal antibodies, with the aim of offering more effective, suitable treatment for patients with chronic disease.[4] In some countries, such as Canada, certain disease-modifying therapies are provided to people in their own homes.[15] For example, infliximab therapy, a monoclonal antibody agent used for Crohn's disease patients has a safety profile approved for administration in the home setting. Three studies have reported that infliximab therapy for Crohn's disease is safe to administer in the home.[15,16] In the United Kingdom (UK), a recent pilot study by Brex et al. on natalizumab home infusion reported significantly higher levels of satisfaction (94 to 100%) after delivering 253 home infusions on 10 highly active MS patients.[8] Recent studies have piloted home infusions of natalizumab for people with RRMS.[9, 17] Despite the possibility of adverse events due to natalizumab infusion, these studies stated that the participants' safety was maintained and that participants reported a high level of satisfaction. While these three studies documented important findings about the patients' experience of home care, clinicians' experiences of transitioning to and supporting a different model of care have not been studied. Given that healthcare professionals are potentially operating in a new environment, and working with a new model of care, it is important to understand their perspectives, how they may inform practice and the process of managing change. A search of the literature has identified only one study conducted in the UK that used a qualitative methodology to investigate the experiences of district nurses caring for patients with home chemotherapy.[18] The authors concluded that the experiences of nurses with home chemotherapy highlighted the importance of shared care with patients and learning from colleagues.

This article presents the findings from research which aimed to understand healthcare workers' (HCWs) experience of transitioning to a patient-centred model of care, from in-hospital to at-home, for patients with MS requiring monthly infusions of natalizumab. Moreover, this study may inform the key logistics of the delivery of home infusion services.

METHOD

The study was conducted using a qualitative methodology. The study question was: 'What are HCWs' experiences of delivering natalizumab infusions in a home environment?' An exploratory descriptive study design is common among qualitative methodologies, also known as 'naturalistic inquiry'.[19(p479)] There were advantages to using this design for this research question. Firstly, it is an ideal design to gather individual experiences during the period of study. Secondly, the researchers sought to gain a deeper understanding of the HCWs' experiences of the model of care used in the home environment. The research was approved by the relevant health service Hospital Ethics Committee (HREC/16/RAH/192) and all participants provided written informed consent before commencing.

SETTING AND PARTICIPANTS

This study is the qualitative part of a larger study that examined the safety, clinical effectiveness, acceptability and cost effectiveness of home infusions of natalizumab for people with MS.[9] Twelve participants from the two main groups of HCWs delivering natalizumab infusions during the six-month study period were interviewed: four from the Home Infusion Team (HIT) (a private provider of home nursing care located in South Australia) and eight from a tertiary hospital ambulatory care day unit. There was no relationship between the researchers and participants.

DATA COLLECTION/ANALYSIS

A total of 110 natalizumab infusions were provided to 36 RRMS patients during the six-month period April to September 2017, of which 55 infusions were delivered at patients' homes and another 55 at the ambulatory care day unit.[9,20] Semi-structured interviews were conducted with the HCWs after the completion of the period of delivering natalizumab home infusions. The participants were given a choice between participating in a telephone or a face-to-face interview, either individually or as a group. This combination of interview approaches was considered to be suitable because the questions were very specific (Table 1) and related to implementing the project's process. The interviews took between 30 and 60 minutes and were digitally recorded. The recordings were transcribed and participants were given the option to check the transcripts. None of the participants requested to review their transcript.

The transcripts were analysed using Braun and Clarke's method.[21] In this analysis, the researchers focussed on the content of the transcripts, then identified common themes. This approach involved grouping concepts, supported by quotations from the participants' interviews.

TABLE 1: HEALTHCARE WORKERS INTERVIEW QUESTIONS

1.	Could you please share how you started working on the Home Infusion project?
2.	What training did you receive in preparation for this project?
3.	How prepared did you feel for this project?
4.	What was your perception of the patients' preferences in receiving home infusion?
5.	Were there any family members present and if present, what sorts of interaction did they have (Home infusion team only)?
6.	In relation to the process of delivering home infusions what worked well and what did not work well?
7.	Were there any specific supports you required in the preparation or delivery of home infusions and if so what were they?
8.	What was your experience of any adverse events and the process of responding and reporting these (Home infusion team only)?
9.	How would you describe the experience working on the Home Infusion project?

ISSUES OF RELIABILITY AND VALIDITY

Reliability and validity are important components in conducting research. In qualitative research, validity and reliability are maintained by establishing trustworthiness. Trustworthiness can be demonstrated through the process of gathering data.[25] For this study the same semi-structured questions were used for all participants and two researchers independently analysed the transcribed recordings and then came together to discuss the findings. In addition, the research team met monthly throughout the data collection period. Finally, the researchers maintained an audit trail of the study, keeping a record of the materials used, and the process of data collection and analysis.

RESULTS

The framework that guided the analysis of the data was dictated by the study question. Three main themes were identified from the interviews: 'preparing for change', 'focussing on the patient', and 'professional support'. These are presented in Table 2. In the descriptions of each theme, participants are referred to by a letter and a number, such as H2, at the end of each comment. The HIT HCWs (nurses and courier) are identified with the letter H. The ambulatory care day unit HCWs (consultant neurologist, neurology nurse consultant, nurse unit managers and nurses) are identified with the letter R if they were individually interviewed or the letter F if they were interviewed in groups.

TABLE 2: OUTLINE OF THEMES AND SUBTHEMES FROM HCWS' EXPERIENCES

Theme	Subtheme
Preparing for change	Comprehensive process of preparation for change
	Extra work in facilitating the change
	Ensuring the cold chain is maintained
Focussing on the patient	Convenience for the patient
Enhancing professional support and relationships	Training
	Positive collegial relationships
	Nurse–patient relationships

THEME ONE: PREPARING FOR CHANGE

The importance of establishing a clear process that ensured safe patient care was a pervasive theme among the HCWs. This theme has three subthemes: 'comprehensive process of preparation for change', 'extra work in facilitating the change' and 'ensuring the cold chain is maintained'.

Subtheme one: Comprehensive process of preparation for change

It was clear from the participants' experiences, across both the hospital and home care staff, that there was a lot of consideration during the planning and intervention phase of the project, which aimed for accurate documentation and patient safety. Participants mentioned that the process was well documented and comprehensive:

> *I think for the purpose of the trial, there was a lot more … tracking, and you could audit all of that. It was very comprehensive. Probably more comprehensive than we would normally do. (F3)*

With regards to the patient recruitment process, participants mentioned a key safety factor that only patients who had had more than 12 months of natalizumab treatment were recruited:

> *So the two safety issues we got around is, one was allergic reaction. That's why we said patients had to have a minimum number of doses before they went on the [home] treatment, because then that risk of allergic reactions were a lot, lot less. (R2)*

The main concern about transitioning treatment to the home was the management of an anaphylactic reaction in a home setting, as the following participant mentioned:

> *The only concern I had is that if a patient had a major anaphylactic reaction, what was the process that was involved? How was that going to be attended? That was my probably single most concern with the home infusions. (R1)*

The smoothness of the process of providing natalizumab treatment at home was an important part of the experiences of the HIT. The HIT clearly prioritised the patients' perspective, especially the benefits for them of well-organised care. Participants stated that they felt more confident and organised as the process developed smoothly:

> *But I think from the second time I sort [of] became a little bit more – I would get there a little bit early, I felt that my preparation was – making them feel comfortable and not being rushed or on a set timeline. I think I just became a little bit more organised and relaxed in the process. After that I think everything became quite – everything was very smooth sailing. (H1)*

> *As a nurse operating with what we, I have put in place, not any issues at all. It was … smooth … So I just thought no, it was good. (H3)*

Subtheme two: Extra work in facilitating the change

Workload management is an approach that is used to ensure a team functions efficiently and equitably. Some of the participants emphasised a concern that they had at the beginning of the trial process that the transition would generate extra work and may have a negative impact on the unit. However, this did not eventuate:

> *We had the paperwork … so we knew that those patients had come from home and now they were doing the hospital part. (F1)*

> *I was concerned about it because of the extra workload that it might have – you know, the impact that it might have had on our unit. (F2)*

All of the participants were required to do extra work and planning to ensure that the drugs were ordered, ready to be collected and arrived at the correct day and time in the patient's home:

> *I think from my point of view, for ordering and things like that, it was a lot of work from our side of things, to make sure that the drug was available at the times [required]. (F3)*

> *I was quite clear about when the couriers were coming. We knew when they were coming. We had the drug prepared. They came with containers that were temperature monitored. We signed for – we checked the patients, the dosage, the temperatures, all of that. It was really quite thoroughly done; it was very comprehensive. (F3)*

Subtheme three: Ensuring the cold chain is maintained

All of the HIT participants voiced the importance of maintaining the cold-chain process, mainly when handling the natalizumab between the hospital (where it was dispensed) and the home. The use of a 'cool pack' was critical (particularly in the Australian summer when the environment is very hot) in maintaining the appropriate temperature while the natalizumab was in transit:

> *Sometimes we did, now it may be that the nurse had scheduled an infusion for 7:00 in the morning, in which case the courier would pick up the drug from the hospital the afternoon before that, put it in the cold-chain data log and deliver it to the nurse's home [for appropriate ongoing storage]. (H4)*

> *I really liked the flexibility of it and the fact that I guess the cool pack maintained that process. There were a couple of times when the cool pack would be delivered to my house, so I would actually have the infusion maybe hours in advance, but again I knew that we could still check the temperature control and it was still within its manufacturing guidelines so I was happy to do that. (H1)*

Monitoring the temperature within the cool pack provided confidence that the cold chain had not been broken:

> *What did work really well was the cold-chain hardware and we were able to prove that by monitoring not only the in-chain stuff but also the longevity of the efficacy, of the cold-chain equipment, which worked really well even over two to three days in some cases. (H4)*

During the six-month home infusion trial, a participant reported that only one drug dosage was returned to the hospital, because of the patient's need to change an appointment for another week:

> *But if it was going to be like a reschedule of a week or more with once [only] I think we returned the drug to the hospital. So the beauty of that system is that we understood, if you like, the medication issues and the cold-chain physics well enough to make those decisions appropriately. (H4)*

This analysis highlights participants' high level of awareness of a key logistical part of the process, namely maintaining the cold chain when delivering this service in the community. This demonstrates that there can be flexibility while maintaining the relevant standard to ensure that the 'cold chain' is maintained for the medication.

THEME TWO: FOCUSSING ON THE PATIENT

The focus on delivering a flexible, smooth process to achieve optimum patient-centred care was a pervasive theme amongst the participants. A focus on patient-centred care was the key philosophy that was adhered to by all of the participants. This theme has a sub-theme: 'convenience for the patient'.

Subtheme one: Convenience for the patient

Participants discussed how having natalizumab infusions at home provided convenience for the patients:

> *All of them want to know when it's going to happen permanently. I can't think of one person who didn't take part in the trial who would prefer to come into hospital. It is just so much more convenient for them. They all sort of said, look, I think this was fantastic. (R2)*

> *Everybody really liked it. I think the bulk of the people appreciated the opportunity to have it at home, certainly if you've got young children, all that sort of thing. (F3)*

In some case infusions at home improved patients' treatment compliance:

> *I could see the benefits, no problems at all. Having the infusion at home, I could see there would be better compliance. (R1)*

The participants emphasised that having natalizumab home infusions would free up spaces for other patients currently waiting for treatment in the hospital unit:

> *We would free up a lot of chairs that – when we try and get patients in, it can be very difficult. So you have temporarily given some capacity in the bookings. (R1)*

> *So, we're growing. We grow about 6% a year, is what I worked out some years ago. So, we're not going to get quieter. if there is a small population that we can move to community, and it's a move that's happening nationally as well as internationally. (F3)*

On the other hand, some participants noted that for some patients it was more convenient to have the infusion at the hospital:

> *The negatives tended to be that if that person worked in town, then it might be more convenient for them just to drop into the hospital than to have it in their work, or to go back home. (R1)*

All of the HIT interviewees described their approach as 'very flexible' in providing natalizumab treatment at the patient's home, as these participants highlighted:

> *Yeah, look, I was very flexible. I guess it was always about the – client centred and the fact that we had post-op care in the home, that we had the ability to really deliver the infusions on a much more flexible basis … I delivered infusions on public holidays, weekends, I did some infusions as late as seven o'clock, seven or eight o'clock at night. (H1)*

Flexible delivery of the nursing service was driven by the importance participants placed on their patients' ability to maintain their lifestyle while living with a chronic illness:

> *Just that it fits into their lifestyle and their – because people have busy lives these days so it's giving them that opportunity to have it done at night if they want to … So it was just – it just made it a lot less complicated for the patient. (H2)*

THEME THREE: ENHANCING PROFESSIONAL SUPPORT AND RELATIONSHIPS

The enhancing professional support and relationships theme included all participants' experiences across both the hospital and the HIT working together throughout the project. Professional support included training, establishing clear protocols, ensuring the availability of 'back-up' if needed and support from all colleagues. Three subthemes emerged: training, positive collegial relationships and nurse–patient relationships.

Subtheme one: Training

The HIT nurses were required to attend training to ensure that they had the knowledge and skill to carry out the treatment competently in a home setting. This included considering the context in which they would practise, as one participant stated:

> *I think at the initial orientation with … I think she talked a lot about risk assessment. She has done a lot of work with hospital at home and infusions in people's homes. I really asked a lot of questions and picked her brains on safety because I guess that is one of the things, we do have to be safe in a home when delivering care, another person's safety has to be paramount. (H1)*

The participants also appreciated the importance of observing how the nursing staff delivered the treatment in the hospital's outpatient department, which was a requirement for HIT nurses and helped to replicate hospital care in the home environment:

> *What you do here is done there. It's that reassurance. (F1)*

> *We had TAPP [Tysabri® Australasian Prescribing Program] training. So we were fully aware … to sort of see how the infusion went and what you could do when you're actually meeting the patients. So part of that meet and greet was also looking at how … to do the infusions. (H3)*

Subtheme two: Positive collegial relationships

For the HIT participants to deliver optimal care and maximise the advantages of home infusions, it was important for a collaborative relationship to be developed and maintained across both services. The participants appreciated the professional support from others, such as team members being flexible and working together:

> *That was all negotiable and because we were keen to get the process or the protocols working smoothly, we were always pleased to renegotiate timing and what have you. (H4)*

> *You just needed to be flexible and work with each other. Which we all did as nurses. (H3)*

Some participants mentioned having a 'back-up' if they were not able to meet the scheduled appointment time with the patient:

> *I wanted compliance to treatment to be seen as not driven by the nurse. More driven by the patient. Therefore, if there was a patient that needed cannulating and be given an infusion, because the other nurse couldn't get there, I stepped in. (H3)*

Senior hospital staff were also part of the collegial team and they were approached for support and advice, as this participant mentioned:

> *But yeah, so I would use … staff in [hospital] senior staff. We would talk things out. If there was some issues there, we would talk it out and we would get a resolution. (H3)*

An HIT participant acknowledged their responsibility as part of the team to ensure that the system worked:

> *From that schedule I would make it my duty, if you like, to collect the drug at an appropriate time so it could be delivered directly to the nurse in the field at the appropriate time. (H4)*

The ability to deliver a good outcome for the patient was at the heart of the willingness of all the participants to be flexible in when, where and how care was provided. As a team they worked together to ensure that the patients' needs were central to the service being delivered. The patients were also part of the team so the participants delivering care in the home were also adaptable to the varying home environments while ensuring that standards of care were maintained.

Subtheme three: Nurse–patient relationships

Some participants emphasised that establishing a therapeutic relationship with the patient is necessary not only to resolve any difficulties during the treatment but also to make the patients feel comfortable and safe in the care of

the visiting nurse. Meeting patients in the hospital setting before they transitioned to home care was important to promote this relationship:

> *It was really good to develop those personal therapeutic relationships. I think it was great for them because, they'd met me before, but then they'd also continue that follow-up care, so they felt quite safe as well. (H1)*

Participants identified that family support was particularly important, not only in their presence but also as a part of the patient's wellbeing, and it contributed to the therapeutic relationship:

> *Also a few of them had their families around while we were doing the infusion, so I'd include them in conversations. That I think helped the patients relax a bit more, knowing that we weren't sort of dismissive of the family. It was a very inclusive kind of process because the family are a big support to the patient, so they need to be, the family need the support as well. (H2)*

DISCUSSION

This exploratory descriptive study recognised the importance of understanding HCWs' experiences of transitioning to a patient-centred model of care, from hospital to home infusions of natalizumab. This included HCWs' perspectives on the logistics of the process and their need for training and support to ensure patient safety. A previous article explored the patients' perspective using the patient-centred model of care for home infusions of natalizumab.[20]

MANAGING THE LOGISTICS TO ENSURE A FLEXIBLE, SMOOTH PROCESS

The findings indicated that providing care at the patients' own home supported the principle of patient-centred care due to the flexibility and the convenience provided to patients. Offering infusion therapy within a non-hospital environment is common practice.[22] Organising and managing home infusions requires not only skill in delivering the treatment but also in the logistics of maintaining the cold chain, particularly when the outside environment may be very hot.[23] In this study, managing the logistics appropriately was critical to the success of the home-based infusion therapy and the administration of the medication. The importance of maintaining the safety of the medication and getting it to the patient at the right time and place was emphasised by all the participants during the interviews. This required everyone to step-up and be accountable for their part in the process and to communicate well with each other.

TRAINING AND PROFESSIONAL SUPPORT

Transitioning from hospital to home services requires highly skilled home care clinicians. The participants in this study recognised that training and professional support are essential when delivering infusions outside a hospital setting. The quality of the training and professional support of the HIT affected participants' experiences of delivering infusions in the home setting. In addition, this study revealed that the training and education allowed them to fulfil their role safely, efficiently and with confidence. Depledge and Gracie emphasised that skill-based training with continuing education is important to ensure safe treatment is delivered in a non-hospital setting such as a home infusion service.[24] Consistent with findings from their semi-structured study, interviews with nurses delivering home infusions in the United Kingdom found that most participants benefitted from the training and education provided, indicating that they felt confident and valued the professional support.[18]

Moving care from the hospital setting to the home setting requires consistent support, including enabling the HIT to access the required training and to receive ongoing advice from the hospital staff who have the experience and know the patients well. However, an international report argued that there is limited professional support for clinicians delivering home infusions due to a lack of resources.[22] Alexander et al. stressed the importance of professional support in ensuring quality of care when delivering a home-based model of care.[7] Throughout this study, professional and inter-organisation support were available to the HIT. This involvement provided very valuable support to the HIT and enhanced the sense of trust and confidence amongst the HIT team and between the HIT and hospital teams.

Managing the change from hospital to home care required good collaboration between the team. This effective collaboration was vital so that the team could determine the logistics of the process of transferring patients who were medically stable to home care, how information was communicated across both teams ensuring an audit trail of documentation, and then the process of delivering the medication to the patient at the time and venue that the patient requested. Even though there was some anxiety at the start of the transition, by working together through the concerns raised, all participants felt that the patients' safety was ensured, as much as possible. The participants recognised the value of the new service delivery model; though it was potentially disruptive to the daily routine in the hospital, it would provide a better quality of life for their patients with a long-term chronic disease. It was this central value, articulated by all participants that ensured the new model was about the patient and not about the hospital routine. If this value had not been shared across all service teams then there would have been many opportunities for the process to be sabotaged and the pilot project to fail. The results support the home model of care because of

the benefits to the patients, including convenience, and importantly improving patient compliance with their treatment.[11] In addition, the hospital was able to reduce the waiting list for those needing to commence treatment and to provide a more targeted service to those who were more acutely ill.

LIMITATIONS

One of the limitations of this study was the relatively small size of the HIT, which comprised only three nurses and two couriers. Another is that some of the participants were members of the main study's organising team. Although there is a positive perception of home infusions from this six-month study, a longer study period, such as a year of home infusions may present issues of sustainability, which indicates that further longitudinal studies are warranted.

CONCLUSION

This study provides an example of how two teams of health workers can come together to work through some difficult logistics of service delivery to establish a better way of delivering care that truly puts the patient at the centre. The new model focussed on more than the discharge of patients from one service to another, rather reflecting a model of care where patients with a chronic illness transition between home and hospital services depending on their wellbeing and the level of medical care required. Although HCWs had to accommodate extra work, especially with planning, patient assessment, nursing handovers, checking of natalizumab and documentation, they felt reassured that people with RRMS will receive a safe natalizumab infusion in an in-home setting.

IMPLICATIONS FOR RESEARCH, POLICY, AND PRACTICE

This study can inform healthcare teams about the key logistical components that are important for healthcare services, when considering transitioning to a home-based model of care for treating people with relapsing-remitting multiple sclerosis.

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REFERENCES

1. Miller C, Karpinski M, Jezewski M. Relapsing-remitting multiple sclerosis patients' experience with natalizumab: a phenomenological investigation. *Int J MS Care*. 2012;14(1):39-44.
2. Menzies Health Economics Research Group. Health Economic Impact of Multiple Sclerosis in Australia. Hobart: University of Tasmania; 2017.
3. Kornek B. An update on the use of natalizumab in the treatment of multiple sclerosis: Appropriate patient selection and special considerations. *Patient Prefer Adherence*. 2015;9:675-84.
4. Gajofatto A, Benedetti M. Treatment strategies for multiple sclerosis: When to start, when to change, when to stop? *World J Clin Cases*. 2015;3(7):545-55.
5. McCormack PL. Natalizumab: a review of its use in the management of relapsing-remitting multiple sclerosis. *Drugs*. 2013;73(13):1463-81.
6. Nicholas J, Racke M, Imitola J, Boster A. First-line natalizumab in multiple sclerosis: rationale, patient selection, benefits and risks. *Ther Adv Chronic Dis*. 2014;5(2):62-8.
7. Alexander M, Corrigan A, Gorski L, Hankins J, Perucca R, editors. Infusion nursing: an evidence-based approach. 3rd ed. London: Elsevier Health Sciences; 2011.
8. Brex P, Ford H, Silber E, Thomas F. MS patients' satisfaction with a home infusion service: a pilot study. *J Neurol Neurosurg Psychiatry*. 2017;88:A41.
9. Schultz TJ, Thomas A, Georgiou P, Mahasen J, Simon L, Cusack L, et al. Piloting home infusions of natalizumab: a randomised crossover trial. *J Neurol Neurosurg Psychiatry Res*. 2018;89(6):A10.
10. Cousins A, Lee P, Rorman D, Raas-Rothschild A, Banikazemi M, Waldek L, et al. Home-based infusion therapy for patients with Fabry disease. *Br J Nurs*. 2008;17(10):653-7.
11. Juaton M, Cusack L, Schulz T. Patients' experiences of natalizumab treatment in a home environment: a qualitative study. *Aust J Adv Nurs*. 2020;37(1):14-20.
12. Chataway J, Porter B, Riazi A, et al. Home versus outpatient administration of intravenous steroids for multiple-sclerosis relapses: a randomised controlled trial. *Lancet Neurol*. 2006;5(7):565-71.
13. Stephens B. Patients' experiences of community IV therapy. *Br J Nurs*. 2013;22(19):S24-7, S9.
14. Snelling M. Home intravenous therapy. *Hospital Pharmacist*. 2008;15(1):16-18.
15. Ducharme J, Pelletier C, Zacharias R. The safety of infliximab infusions in the community setting. *Can J Gastroenterol*. 2010;24(5):307-11.
16. Kuin S, Stolte SB, van den Brink GR, Ponsioen CY, Fockens P, D'Haens GR, et al. Remicade infusions at home: an alternative setting of infliximab therapy for patients with Crohn's disease. *Eur J Gastroenterol Hepatol*. 2016;28(2):222-5.
17. Vijayan S, Adams J, Cook L, Haskins Z, Kermode A. Establishment of the first at-home natalizumab infusion service for the treatment of relapsing remitting multiple sclerosis (RMMS). *J Neurol Neurosurg Psychiatry*. 2017;88(5):e1.
18. Turner C, Pateman B. A study of district nurses' experiences of continuous ambulatory chemotherapy. *Br J Community Nurs*. 2000;5(8):396-400.

19. Polit D, Beck C. Nursing research: generating and assessing evidence for nursing practice. 10th ed. Hong Kong: Lippincott Williams & Wilkins; 2016.
20. Schultz TJ, Thomas A, Georgiou P, Cusack L, Juaton M, Simon L, et al. Developing a Model of Care for Home Infusions of Natalizumab for People With Multiple Sclerosis. *J Infus Nurs*. 2019;42(6):289-96.
21. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol*. 2006;3(2):77-101.
22. Royal College of Nursing. Moving care to the community: an international perspective. London: Royal College of Nursing; 2014.
23. Gardner G, Gardner A, Morley G, Watson DA. Managing intravenous medications in the non-hospital setting: an ethnographic investigation. *J Infus Nurs*. 2003;26(4):227-33.
24. Depledge J, Gracie F. Developing a strategic approach for IV therapy in the community. *Br J Community Nurs*. 2006;11(11):462-8.
25. Lincoln YS, Guba EG. Naturalistic inquiry. Beverly Hills, Calif: Sage Publications; 1985.