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# Pharmacist-Led Medication Management Services: A Qualitative Exploration of Cardiovascular Disease Patient Experiences



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# *Pharmacist-Led Medication Management Services: A Qualitative Exploration of Cardiovascular Disease Patient Experiences*

Joshua Bennetts[1,2], Jennifer White[2,3], Hayley Croft[1], Joyce Cooper[1,4], Dawn McIvor[5,6], Nicholas Eadie[7], Marcelle Appay[1,7], Aaron Sverdlov[2,3,6], Doan Ngo[1,2]

1. School of Biomedical Science and Pharmacy, The University of Newcastle, Callaghan, NSW 2308, Australia
2. Hunter Medical Research Institute, New Lambton Heights, NSW 2305, Australia
3. School of Medicine and Public Health, The University of Newcastle, Callaghan, NSW 2308, Australia
4. College of Medicine and Dentistry, James Cook University, Townsville, QLD 4810, Australia
5. College of Health, Medicine, and Wellbeing, The University of Newcastle, Callaghan, NSW 2308, Australia
6. Cardiovascular Department, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia
7. Department of Pharmacy, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia

**Corresponding Author:**

Doan Ngo

Lot 1, Kookaburra Circuit, New Lambton Heights, New South Wales, 2305, Australia

doan.ngo@newcastle.edu.au

## Keywords

Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home Transition; Medication Review

## Abstract **Word Count: 256**

**Objective** Hospitalisation due to medication-related problems is a major health concern, particularly for those with pre-existing, or at high-risk of developing, cardiovascular disease (CVD). Post-discharge medication reviews (PDMRs) may form a core component of reducing hospital readmissions due to medication-related problems. This study aimed to explore CVD patients' perspective of, and experiences with, pharmacist-led medication management services. A secondary aim explored attitudes towards availability of PDMRs.

**Design** An interpretative qualitative study involving 16 semi-structured interviews. Data were analysed using an inductive thematic approach.

**Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an 820-bed tertiary referral hospital based in New South Wales, Australia.

**Participants** Patients with pre-existing or newly diagnosed CVD recently discharged from hospital.

**Results** A total of 16 interviews were conducted to reach thematic saturation. 9 Participants (56%) were male. Mean age of participants was 57.5 (±13.2) years. Three emergent themes were identified: (i) Poor medication understanding impacts transition from hospital to home; (ii) Factors influencing medication concordance following discharge, and (iii) Perceived benefits of routine post-discharge medication reviews.

**Conclusions** There is a clear need to further improve the quality use of medicines and health literacy of transition-of-care CVD patients. Pharmacists are suitable to provide essential and tailored medication review services to CVD patients as part of their multidisciplinary healthcare team. The implementation of routine, pharmacist led PDMRs may be a feasible means of providing patients with access to health education following their transition from hospital back to community, improving their health literacy and reducing re-hospitalisations due to medication-related issues.

## Article Summary: Strengths and Limitations of This Study

1. Hospitalisation due to medication-related problems is a global health concern. Post-discharge medication reviews may form a core component of reducing hospital readmissions due to medication-related problems. Limited research focussing on the perspectives of primary consumers has been conducted and thus this study aims to fill an existing knowledge gap.
2. The strength of this study lies in the exploration of a heterogenous sample of people with chronic cardiovascular disease across their transition-of-care.
3. The mean age of participants was relatively young and may therefore underestimate the need for post-discharge medication reviews in 'older' adults (adults over the age of 65 years).
4. There is a relative lack in representation from cultural and linguistically diverse patients.
5. Potential reporting bias: responding participants may have had different experiences to non-responders, including access to primary care where differing models of care exist.

## Introduction

**Word Count: 4655**

Cardiovascular disease (CVD) is a leading cause of death and disability in Australia. In 2021 alone, CVD was the underlying cause of death in 42,700 individuals, representing 25% of all deaths. During this same year, coronary heart disease was the leading single cause of death in Australia, accounting for 17,300 deaths, being 10% of all deaths and 41% of CVD deaths.[1] Internationally, medication-related issues are a common contributor to hospitalisations and mortality for CVD patients who often have a high drug burden consisting of multiple medications and complex dosing regimens.[2] This is compounded in patients with poor health literacy: the inability to understand and act on medical information.[3]

Rehospitalisation due to poor medication management presents as a significant issue for cardiology patients, who have been shown to have an increased likelihood of hospital readmission by 28% in the following month.[4] Poor medication concordance is closely associated with adverse outcomes in CVD patients of whom many are elderly and take 5 or more medications.[5] Poor medication concordance, use of harmful medications and withdrawal of beneficial medications have been identified as precipitating factors for 20% of heart failure (HF) hospitalisations.[6] Patients with poor medication concordance also have 36% higher mortality from ischemic heart disease, and a 2-fold increased risk of mortality from cerebral haemorrhage and cerebral infarction than those with good concordance.[7]

Internationally, the provision of pharmacist-led medication reconciliation programs during hospital transitions have been established as a means for improving post-hospital healthcare utilisation.[8-11] Growing evidence highlights that comprehensive medication reviews improve health literacy, and reduce the number of medication-related errors and inappropriate use of

medicines.[12-17] In Australia, medication review services were first introduced for residents of aged care facilities in 1997, expanded to include those living in a community setting in 2001,[18, 19] and further revised in 2020, to include referrals from hospital-based medical practitioners. The latest amendment enables the initiation of comprehensive medication reviews through hospital networks along with the allowance for pharmacist-initiated follow-up reviews; promoting a patient-centred cycle-of-care whereby pharmacists are directly involved in the follow-up of medication-specific problems.

To date, previous research has explored pharmacist and general practitioner (GP) perspectives of comprehensive medication reviews, including more recently pharmacist perspectives on the implementation of post-discharge medication reviews (PDMRs).[20-25] There remains a lack of evidence relating to patient perspectives on PDMRs, particularly those with existing CVD or those who are at high-risk of CVD complications. Patient perspectives are invaluable in assessing the effectiveness of healthcare service implementations aimed at improving health literacy and self-management. Some research exploring pharmacist-led medication reconciliation reviews suggesting there is improved health literacy and sustained self-management upon returning to a community setting in CVD patients who receive pharmacist intervention.[26, 27] To our knowledge, this is the first study exploring these perspectives of transition-of-care CVD patients and their experiences with pharmacist-led medication management services. We aimed to explore the experiences of patients during their transition-of-care (ToC) from hospital to home probing their understanding of medication-related changes and subsequent medicine review referral.

## Method

*Study Design, Participant Selection and Recruitment*

An interpretive qualitative approach was deemed appropriate to explore our research question. Patient and public involvement was not deemed necessary for the design and implementation of this study. Participants were recruited from the John Hunter Hospital (JHH): a major referral hospital for the Hunter New England Local Health District (HNELHD) servicing over 920,000 people. Patients meeting our inclusion criteria (see Figure 1) being discharged from the JHH with either newly diagnosed or pre-existing CVD were identified by and invited to participate by cardiology nurses and pharmacists from the cardiology ward and cardiac rehabilitation clinic (CRC) at the JHH. Potential participants were provided with detailed study information and had the opportunity to ask questions about the research. All participants provided informed consent. Interviews were conducted between Dec 2022 and July 2023. This study employed the use of semi-structured interviews and was informed by the COnsolidated criteria for REporting Qualitative research (COREQ) checklist.[28] Approval for this project was obtained from the Hunter New England Health Human Research Ethics Committee (Reference Number: 2022/ETH00872).

*Data Collection and Analysis*

Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted by a member of the research team (JB) at a mutually convenient time between 1st September 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview schedule, questions aimed to probe participant experiences of their recent hospitalisation experiences and subsequent implementation and management of medications, as well as

attitudes towards pharmacist-led medication management services including availability of PDMR services. Identified themes informed continuing data collection and sampling continued until thematic saturation (two co-coders agreeing that no new themes were emerging) was achieved. Coding was performed independently by two authors (JB, JW), following an inductive thematic approach.[29] Analysis followed a three-phase approach: (i) initial familiarisation of the data following a systematic identification of salient themes within each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked to sections of the written transcript; (iii) collation of codes into larger themes by examining relationships between each code. Transcripts were coded line-by-line, describing, and interpreting emerging categories and searching for differences and similarities. The next step involved examining the relationship between categories in the context of the research question to form themes. Consistency of findings was upheld through immersion within the data and peer debriefing with data coding reflexivity and discussion with the research team.[30, 31] Coders captured exemplar quotes supporting each theme.

## Results

A total of 18 participants provided written informed consent to be interviewed, with 16 completing the interview process. One participant declined the interview and another participant passed away prior to being interviewed. Demographics for the 16 participants (mean age 57.5 (13.2) years, 9 (56%) male) are shown in Figure 2.

Three emergent themes were identified:

(i) *Poor medication understanding impacts transition from hospital to home;*

(ii) *Factors influencing medication concordance following discharge, and*

(iii) *Perceived benefits of routine PDMRs*

1. *Poor medication understanding impacts transition from hospital to home*

Many participants reported difficulty comprehending health-related information during their hospital admission including understanding the cause of their cardiovascular event, subsequent medication changes, and the lifestyle changes recommended following their discharge. Participants reflected on their feelings of anxiety and being overwhelmed in response to the experience of a life-threatening cardiovascular event. Participants reportedly attributed anxiety with difficulties in comprehending the initiation of, or changes to, medications during their acute hospital admission.

> "[It's] obviously a very stressful situation I was in, being so young and having a cardiac thing go on. So, I didn't take everything in those first couple of days." (P1)

> "Because when you're in hospital and they're telling you what tablets to take, you're going 'okay, there's just so much going on in hospital'. Yeah, it's not until you get home that you think 'okay, what was that all about?'. It was just a whirlwind I went through". (P4)

Participants reported that understanding copious amounts of new medication-related information was more difficult to comprehend whilst trying to grasp the extensiveness of medications now required.

> "…so, they gave me a week's medication from the pharmacy at the hospital and this big, two A4 sheets of all the tablets that you get. I go 'oh s**t' because you don't know this. I'm going to check-out, and they go 'oh, here are all your tablets' and I go 'oh s**t, look at all this'!". (P5)

Participants' understanding of their medication regime were experienced on a spectrum where some readily grasped changes with new information while other struggled. Difficulty understanding was compounded among participants who had no prior experience with taking regular medications.

> "My big problem—like, I've never had anything before—is knowing what all these tablets do…you know nothing, you're learning it all". (P5)

Participants recounted varying experiences with education during their hospital admission. Most participants reported they received a combination of verbal and/or written medication instructions during their hospitalisation or at discharge. Participants valued staff who took the time to explain their medication regime and "were nice enough to write down" (P4) or provide written information. Information sources included physicians, nurses, and pharmacists; although some participants reported they were unsure as to who provided the information.

> "Hang on, well I know when I was [in hospital], the last doctor I'd seen there, he explained to me all the way through me tablets: 'when you leave hospital, take so and so and so, then take another tablet', and it was all written out for me". (P17)

> "I mean, …there was a person, or some nurse, or doctor came around and explained the situation". (P5)

However, other participants commented on the lack of information provision during their admission and the limited reinforcement of what medication to take and why, especially during medication rounds. Participants' reports suggested they were passive during medication rounds and only a few pressed staff for information. Many participants perceived

limited education was due to staff time constraints and being unable to take time to engage and deliver education in an impactful manner.

"None really. It was just, I guess, the nurses coming and saying either 'this is due' or 'how are you feeling? Do you need pain relief?'". (P9)

"…you know, when you're in hospital, it's so busy, full-on. The doctors and nurses are running from patient-to-patient. So, there's not a lot of time to actually sit and really talk about medications and sort of similar things like that". (P6)

Participants' reports suggested the negative impact of receiving differing information from multiple sources. Some participants reported a lack of consistency between staff members which accentuated anxiety and confusion.

"So, I guess it's probably a little bit of anxiousness where you get little snippets of information…you've got no idea…like when you're in hospital, because you have all different doctors at different particular times, I think it's because the message isn't coming from the one person all the time. Like it's coming from various different people". (P7)

Many participants described the difficulties engaging with self-management education when they felt unwell, distracted by an unfamiliar environment, or were focussed on "wanting to get home". (P5)

"The thing is, you've been sick in hospital, you don't think. So, your mind's all muddled up or you go 'whatever, I don't want to listen to you'". (P17)

Being a passive recipient of medications in hospital alongside struggling to understand a new medication regime reportedly impacted participants confidence to manage their medications on discharge. Participants reported that they were most unsure during the first few weeks post-discharge as they attempted to establish routines with either taking medications for the first time or implementing a new medication regimen.

> "But at the time it's a bit like, I'm a bit confused about what is what, going though boxes and reading my list. So yeah, the first few weeks was a bit confusing with what I was taking". (P4)

While some participants reported ongoing feelings of anxiety and being overwhelmed by a lack of familiarity with medication terminology and understanding the purpose of their medication, others took on the role of educating themselves. For many this involved online searching or talking to family member who were health professionals, especially when experiencing side effects.

> "I came home without too much insight into what they [medications] are and that sort of thing. It's been kind of left up to my own accord to basically prepare myself". (P9)

> "I asked my sister – she's a cardiothoracic nurse – so I asked her, you know, side effects I was having that I got on the weekend". (P2)

2. *Factors influencing medication concordance following discharge*

*Discharge home*

For many participants the reality of needing to take life-saving medication became apparent on return home when they were confronted with the seriousness of the situation and the need

to develop new daily medication routines. Many were grateful they were on sick leave or had time post-discharge to establish a routine including being mindful of when medications needed to be taken and if they needed to be taken with meals or not.

> "And generally, I get up at the same time each day. Having said that, I am on sick leave at the moment. So that will take time and breakfast will change when I go back to work. But that's down the track management". (P1)

For participants, especially those without prior experience with taking medication, remembering to administer doses, manage prescriptions and medication supply, and follow-up appointments with GPs whilst balancing prior commitments with family or work was an additional burden.

> "I'm just a really busy person. I work full-time and then I've got two kids. So, by having to throw medication in on that…I guess it's like when you're a new person to start taking medication…you've got to take the medication seriously. And I'm the sort of person who, like, I know I've got to take it but I'm just, like, busy. Like it's not the first thing that's on my mind which is not good. I need to change that". (P7)

*Cardiac Rehabilitation*

Several participants reported they continued to lack understanding of their medication regime, which was apparent when engaging with other health professionals such as dentists or rehabilitation therapists.

> "I even went to the dentist, and they said: 'what are you on, we need to update your records', and I didn't even know". (P9)

> "I was just at Cardio Rehab [CRC]…and they asked me if I was on a beta-blocker, and I actually didn't know what a beta-blocker was. I was, like, not sure!". (P7)

Nine participants were recruited through the CRC at the JHH and reported increased accessibility and reinforcement of medication information through the clinic. Participation in the CRC provided participants with an opportunity for further engagement with specialists in cardiology and ask questions or raise concerns related to medications or management of their CVD.

> "I actually had a chat with one of the nurses at rehab today, and I was going to have a chat with one of the guys at the pharmacy but I though I'm at rehab today, I'll chat with them about the cholesterol medication I'm on". (P6)

*External support*

Many participants relied on others to help manage their medications and adhere to them, be that family members, carers, or community pharmacists. While this was most evident in the weeks following discharge, others reported an ongoing reliance on family members or carers. As such, some participants acknowledged they had less opportunity to engage with community pharmacists for ongoing education, information, or intervention if necessary.

> "Just take them when I'm supposed to take them. My son sort of gets them out and gives them to me, and I just take them as I'm supposed to. I'm a bit foggy at the moment, but he's looking after it. I'll have to get more involved very shortly". (P15)

> "Because say I say to my wife "I'm too sick to get my tablets today, can you pick them up for me"? So, if someone else goes and picks up your tablets for you, you don't have any interaction with the pharmacist." (P5)

*Community care*

Participants readily identified the importance of community pharmacies managing their prescriptions and medications, including use dose administration aids.

> "So obviously looking at things of whether Webster-paks® or blister packs — pre-made medications — that sort of thing as well I think is really important." (P1)

However, some participants acknowledge that by relying on an external source there was the potential for error or oversight if they weren't familiar with changes to their medications.

> "I gave my prescriptions actually to the pharmacist. They know what they're doing, and I don't have to worry about it. You don't have to think about sitting at the table and dividing them all up and hoping that they're not all wrong…which has happened a couple of times. I've gone a couple of weeks without realising I wasn't taking one particular [medication]". (P18)

Participants who followed through with an appointment to see their GP on discharge indicated the benefit in gaining further understanding of their recent hospitalisation and medication changes, including accessing new prescriptions.

"I was told to go to my GP a week after which I did yesterday…she reinforced what [medications] they had sent me home with". (P11)

Overall, participants reported a wide range of challenges attempting to implement a medication regime on discharge. Many participants were not supplied with sufficient medication quantities on discharge to seen them through to their follow-up GP appointment, who were often required to wait several weeks.

"…because my GP is booked out that far ahead, I'm looking at two to three weeks. When I rang up to say that I need an appointment to arrange some medications after I had a heart attack, they had to put me on an emergency waiting list, and even then, it took them seven days to get me in." (P3)

Younger participants were reportedly confronted with the concept of taking multiple medications and some were reluctant to use dose administration aids which they associated with 'older people'.

"And for me, personally, I still consider myself still fairly young, and I think this [dose administration aids] is an old person's thing. So, getting your head around it all, you know, it's a little new". (P2)

Many participants commented on the benefit of accessing a community pharmacist for medication-related information and health advice prior to escalating any concerns to their GP.

"I'm wary about that. I wouldn't go and pick up a multivitamin or something without talking to the Chemist: 'this is what I take. Could there be any interactions?'" (P12)

"Because sometimes it's hard to get into see your GP. And sometimes it's not necessary to see your GP. I feel that [the community pharmacist] is the 'first port-of-call'; unless you're really, really sick." (P6)

Conversations with a community pharmacist on discharge home provided many participants with the reassurance they needed to better manage their medications. However, some participants reported they were reticent to speak to their community pharmacist due to privacy concerns associated with discussing personal medical information in public or being a burden when the pharmacist was perceived to be "busy". (P11)

"But what I really hate when I go to the chemist is when you first give them the script and it's the first time you're getting it back, they want to talk to you — and there are so many people around…and I actually feel uncomfortable talking about that in front of other people…it's probably not actually sinking in because I'm like 'who's standing behind me, is there someone here that I know' you know? And I think that's probably why I didn't know a lot about my medications. I was just like 'yep, yep'; do you know what I mean?". (P7)

For some participants, accessing a community pharmacist and pharmacy services centred around medication cost whereby participants would seek multiple pharmacies to obtain the best price for their medications. Participants acknowledged this had potential to impact continuity of care facilitated by seeing the same pharmacist.

"So, we try to keep costs down where we can…at least by going to that [discount pharmacy] kind of thing, we are trying to keep costs down. But in a way of a relationship, I wouldn't know any of the people in there". (P9)

### 3. *Perceived benefits of routine PDMRs*

Most participants acknowledged the importance of taking responsibility for their medications. However, all participants could foresee circumstances where the availability of PDMRs would prove beneficial.

> "I think it [post-discharge medicines reviews] would be really valuable. For me who's never really taken any medication, you know, it's all a bit daunting all of a sudden having to take medication". (P2)

> "As a nurse, there a lot of people out there who have no clue what their medication are or how they should be working, or when they should be taking them. So, I can see the benefits of it — even for myself". (P16)

Participants reported that PDMR would provide the opportunity for a tailored provision of information. Some participants suggested incorporating a 'triage' system to account for each patient's individual social situation and educational needs, along with assessing those who may be at high-risk for medication misadventure.

> "There could be benefits from them [post-discharge medication reviews] that you don't see until you actually have someone come to have a look. I think that you would probably ideally… make contact with a person in hospital, so you understand what they're circumstances are. And then you could make the decision from there. It's very person-orientated". (P12)

"…then maybe from that phone call going "okay you sound really stressed about your medication we'll try and squeeze you in tomorrow" …I guess maybe, like, a phone call to kinda like 'triage' how urgently they need it". (P1)

The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety experienced during and after discharge home. Participants reported that PDMR would benefit transition back into a community setting to monitor, reinforce information and provide reassurance and support. Similarly, participants perceived that receiving a PDMR at home gave them time to process their hospitalisation and any changes implemented, which might raise issues to be discussed.

"And also, when you're in the hospital, you might not be thinking of these things to ask either because it's all new and stuff. So, by the time you get home you can all of a sudden sit down and sort of absorb the information." (P2)

"I would say within the week of coming home. I wouldn't leave it much later. Because in that week, you're still feeling…like you feel quite safe while in hospital. But when you come home, it's a little bit daunting." (P6)

Home visitation for a PDMR was also perceived to be more conducive for medication-related education, away from the time pressures experienced of other settings.

"You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get out of the way'. And even you're not sitting in the doctor's surgery thinking 'I'm getting charged for every 5 minutes I'm sitting here'". (P9)

"And when you go to the GP, it's very transactional. Like it's just like you're in, out, they're really busy to the point that you don't feel confident that they really listen". (P7)

## Discussion

*Summary of main findings*

Our study explored perspectives of CVD patients on their experiences with medication management and pharmacist-led medication review services during their ToC, including attitudes towards having access to PDRMs. Cardiology patients' ToC following a hospital admission is often associated with a period of vulnerability that may be ameliorated through pharmacist medication reconciliation, especially in patients with CVD.[32] Our findings identified that the hospital environment presented several challenges which impacted the effective delivery of education for inpatients. Participants detailed difficulties understanding and retaining medication-related information during admission for a significant health event. Feelings of anxiety and being overwhelmed contributed to poor information retention and meant participants returning home lacking confidence in managing their medications. Overall, while participants took time to establish a routine back home, many gradually became confidant and expressed value in a medication review to monitor and provide support.

*Comparison with existing literature*

Existing literature highlights the impact of time pressures on the quality and efficacy of hospital-delivered education for inpatients has been extensively covered in the available

evidence base.[33-36] In response patients may be less equipped to manage their medications on discharge to a community setting, thus affecting their quality use of medicines (QUM) — the safe, effective, and appropriate use of medicines — and increasing the risks of future hospitalisations.

Obtaining the patient perspective is a critically important phase of implementing new health services. Our results provide the perspectives of CVD patients thus building on existing literature.[37] For example, White et al (2012)[38] conducted a qualitative study that identified four key benefits of medication reviews as perceived by patients eligible for these reviews: (i) acquisition of personalised medication information and advice; (ii) reassurance regarding medications and coordination of their care; (iii) feeling valued and cared for by a health care provider; (iv) enhancing the patient-provider and pharmacist-GP relationships. Our study mirrors these observations concerning the perceived benefits of PDMRs, particularly the need for post-discharge follow-up and the reassurance that patients experience when receiving pharmacist input into their care.

However, the White et al study identified patient concerns around the potential for pharmacist medication reviews to be perceived as undermining the authority of the GP, thus having a negative impact on the patient's relationship with their GP.[38] Participants in our study did not share these same perspectives, and instead felt that PDMRs would have potential to improve access to primary care post-discharge through pharmacists due to the difficulties they experienced with accessing their GPs. Our study demonstrated PDMRs were considered an opportunity to ask questions and more actively engage in education within the security of their own home. We posit that PDMRs have the potential to bridge education

deficits that emerge on discharge home and promote communication between hospital and community-based medical practitioners.

The timing of service provision is crucial to ensure that QUM is maintained, and the risk of medication-related problems is minimised. Evidence detailing the incidence of medication-related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks post-discharge.[39] Recently Daliri et al demonstrated that pharmacy-led transitional care education programs reduced the proportion of patients experiencing self-reported medication-related problems four-weeks post discharge.[40] Participants in our study highlighted their desire for early pharmacist follow-up, within the first seven days post-discharge being the most common request. This demonstrates the importance of early post-discharge follow-up to promote the safe and effective use of medicines for ToC patients.

Participants in the study experienced issues engaging with primary care once discharged from hospital, with potential role for pharmacists to bridge this gap. GP access for prescription resupply was the most common challenge experienced by participants when returning home. The limited quantities of tablets provided to participants at the time of discharge was sometimes insufficient to sustain them until their GP appointment. The HNELHD is part of the NSW public health system which stipulates that take home supplies of regular medications must not exceed 7 days' supply when discharged from hospital.[41] Unfortunately, this restriction imposes significant challenges for patients discharged from NSW public hospitals. This varies considerably to other states within Australia — for example, both Queensland and Victorian public hospital networks allow a one-month supply

of regular medications under the Pharmaceutical Benefits Scheme.[42, 43] Given that access to a GP may be difficult on discharge due to lengthy wait times we advocate…

*Implications on future research and practice*

The strength of this study lies in the exploration of a heterogenous sample of cardiology patients. We acknowledge that many patients were reflecting on the potential of a PDMR rather than having received one. Our results provide a baseline understanding of the perspectives of transition-of-care CVD patients in terms of the implementation of PDMRs. Future research is needed to evaluate routine PDMRs for CVD patients to investigate the acceptability of the service, but also its impact on key CVD outcome markers, including 30-day hospital readmission rates and the incidence of major adverse cardiovascular events. In addition, future research should explore the perspectives of cultural and linguistically diverse patients and those residing in regional, rural, and remote localities.

## Conclusion

Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of a broader MDT. PDMRs are viewed by transition-of-care CVD patients as an acceptable means of improving their health literacy and QUM when transitioning from hospital back home. Routine service implementation may address the patient's desire for post-discharge follow-up and provision for education away from the busy hospital environment. Service implementation may benefit from an initial 'triage' to individualise the delivery by assessing the patient's own needs and expectations of the service, whilst screening for those who may be at high-risk of medication misadventure.

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## Author Contributions

Study design was conducted by JB, HC, JC, JW and DN. Interviews and interview transcription was performed by JB. Data analysis was completed by JB and JW. JB drafted the manuscript for publication and DN, HC, JW and JC contributed to the content and revision of the manuscript. Revisions, literature, and manuscript checking was managed by JB. All authors read and approved the final version.

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## Ethics approval and consent to participate

Ethics approval was received from Hunter New England Human Research Ethics Committee of Hunter New England Local Health District (Reference – 2022/ETH00872). All participants provided written informed consent prior to conducting interviews.

## Competing interests

JB is a credentialed pharmacist who can provide domiciliary medication management reviews funded by the Australian Government Department of Health and Aged Care.

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**Figure 1:** Inclusion and Exclusion Criteria

| Inclusion Criteria |
| --- |
| Over 18 years of age |
| Discharged from *John Hunter Hospital* into community setting |
| Pre-existing or newly diagnosed cardiovascular disease, or are considered high-risk for the development of cardiovascular disease using the *CVDCHECK*[1] online tool |
| Can provide written or verbal informed consent in the presence of a witness |
| Can participate in a telephone interview |
| **Exclusion Criteria** |
| Not considered high-risk for development of CVD (as defined previously) AND are not currently diagnosed with CVD |
| Discharged to a residential aged care facility where medications are managed according to local facility protocols |
| Are not eligible to receive a HMR service as outlined by the *Pharmacy Programs Administrator Program Rules*[2] |
| Have significant cognitive impairment and cannot participate in a semi-structured interview |
| Receiving palliative care and participation in the interview will incur foreseeable challenges |

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| Participant Characteristics | *n*, (%) |
|---|---|
| **Age** | |
| 30–39 | 2 (12.5) |
| 40–49 | 3 (19) |
| 50–59 | 5 (31) |
| 60–69 | 2 (12.5) |
| 70–79 | 4 (25) |
| **Gender** | |
| Male | 9 (56) |
| Female | 7 (44) |
| **Diagnosis** | |
| STEMI | 5 (31) |
| NSTEMI | 5 (31) |
| Ischaemic Heart Disease | 1 (6) |
| HFrEF | 1 (6) |
| HFpEF | 3 (19) |
| Infective Endocarditis | 1 (6) |
| **Regular Medications at Discharge** | |
| 1–4 | 2 (13) |
| 5–9 | 8 (50) |
| 10–14 | 5 (31) |
| 15-19 | 0 (0) |
| 20 | 1 (6) |
| **Number of Comorbidities** | |
| Zero | 3 (19) |
| 1–4 | 7 (44) |
| 5–9 | 5 (31) |
| 10+ | 1 (6) |

**Figure 2**: Demographics of Interviewed Cardiovascular Disease Patients.

STEMI: ST-elevated myocardial infarction; NSTEMI: non-ST-elevated myocardial infarction; HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction.
Regular Medications at Discharge denotes medication taken daily by patient (excludes 'when required' or 'pro re nata' (PRN) medications).
Number of comorbidities according to patient's hospital discharge paperwork.

# Standards for Reporting Qualitative Research (SRQR)*

http://www.equator-network.org/reporting-guidelines/srqr/

| | Page/line no(s). |
|---|---|
| **Title and abstract** | |
| **Title** - Concise description of the nature and topic of the study Identifying the study as qualitative or indicating the approach (e.g., ethnography, grounded theory) or data collection methods (e.g., interview, focus group) is recommended | Page 1/Lines 1-2 |
| **Abstract** - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions | Page 2-3/Lines 28-52 |
| **Introduction** | |
| **Problem formulation** - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement | Page 5/Lines 102-111 |
| **Purpose or research question** - Purpose of the study and specific objectives or questions | Page 5/Lines 111-115 |
| **Methods** | |
| **Qualitative approach and research paradigm** - Qualitative approach (e.g., ethnography, grounded theory, case study, phenomenology, narrative research) and guiding theory if appropriate; identifying the research paradigm (e.g., postpositivist, constructivist/ interpretivist) is also recommended; rationale** | Page 6/Lines 120 |
| **Researcher characteristics and reflexivity** - Researchers' characteristics that may influence the research, including personal attributes, qualifications/experience, relationship with participants, assumptions, and/or presuppositions; potential or actual interaction between researchers' characteristics and the research questions, approach, methods, results, and/or transferability | Page 7/Lines 144-150 |
| **Context** - Setting/site and salient contextual factors; rationale** | Page 6/Lines 121-123 |
| **Sampling strategy** - How and why research participants, documents, or events were selected; criteria for deciding when no further sampling was necessary (e.g., sampling saturation); rationale** | Page 6/Lines 123-127 |
| **Ethical issues pertaining to human subjects** - Documentation of approval by an appropriate ethics review board and participant consent, or explanation for lack thereof; other confidentiality and data security issues | Page 6/Lines 127-132 |
| **Data collection methods** - Types of data collected; details of data collection procedures including (as appropriate) start and stop dates of data collection and analysis, iterative process, triangulation of sources/methods, and modification of procedures in response to evolving study findings; rationale** | Page 6/Lines 135-137 |

| | |
|---|---|
| **Data collection instruments and technologies** - Description of instruments (e.g., interview guides, questionnaires) and devices (e.g., audio recorders) used for data collection; if/how the instrument(s) changed over the course of the study | Page 6-7/Lines 137-142 |
| **Units of study** - Number and relevant characteristics of participants, documents, or events included in the study; level of participation (could be reported in results) | Page 7/Lines 157-160 |
| **Data processing** - Methods for processing data prior to and during analysis, including transcription, data entry, data management and security, verification of data integrity, data coding, and anonymization/de-identification of excerpts | Page 6/Lines 137-138 |
| **Data analysis** - Process by which inferences, themes, etc., were identified and developed, including the researchers involved in data analysis; usually references a specific paradigm or approach; rationale** | Page 7/Lines 142-154 |
| **Techniques to enhance trustworthiness** - Techniques to enhance trustworthiness and credibility of data analysis (e.g., member checking, audit trail, triangulation); rationale** | Page 7/Lines 142-145, 152-154 |

**Results/findings**

| | |
|---|---|
| **Synthesis and interpretation** - Main findings (e.g., interpretations, inferences, and themes); might include development of a theory or model, or integration with prior research or theory | Page 7-19/Line 156-417 |
| **Links to empirical data** - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings | Page 7-19/Line 156-417 |

**Discussion**

| | |
|---|---|
| **Integration with prior work, implications, transferability, and contribution(s) to the field -** Short summary of main findings; explanation of how findings and conclusions connect to, support, elaborate on, or challenge conclusions of earlier scholarship; discussion of scope of application/generalizability; identification of unique contribution(s) to scholarship in a discipline or field | Page 19-22/Line 419-497 |
| **Limitations** - Trustworthiness and limitations of findings | Page 22/Line 490-497 |

**Other**

| | |
|---|---|
| **Conflicts of interest** - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed | Page 24/Line 535-537 |
| **Funding** - Sources of funding and other support; role of funders in data collection, interpretation, and reporting | Page 23/Line 519-529 |

*The authors created the SRQR by searching the literature to identify guidelines, reporting standards, and critical appraisal criteria for qualitative research; reviewing the reference lists of retrieved sources; and contacting experts to gain feedback. The SRQR aims to improve the transparency of all aspects of qualitative research by providing clear standards for reporting qualitative research.

**The rationale should briefly discuss the justification for choosing that theory, approach, method, or technique rather than other options available, the assumptions and limitations implicit in those choices, and how those choices influence study conclusions and transferability. As appropriate, the rationale for several items might be discussed together.

**Reference:**

O'Brien BC, Harris IB, Beckman TJ, Reed DA, Cook DA. **Standards for reporting qualitative research: a synthesis of recommendations.** *Academic Medicine*, Vol. 89, No. 9 / Sept 2014
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BMJ Open

# Pharmacist-Led Medication Management Services: A Qualitative Exploration of Transition-of-Care Cardiovascular Disease Patient Experiences

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# *Pharmacist-Led Medication Management Services: A Qualitative Exploration of Transition-of-Care Cardiovascular Disease Patient Experiences*

Joshua Bennetts[1,2], Jennifer White[2,3], Hayley Croft[1], Joyce Cooper[1,4], Dawn McIvor[5,6], Nicholas Eadie[7], Marcelle Appay[1,7,8], Aaron Sverdlov[2,3,6], Doan Ngo[1,2]

1. School of Biomedical Science and Pharmacy, The University of Newcastle, Callaghan, NSW 2308, Australia
2. Hunter Medical Research Institute, New Lambton Heights, NSW 2305, Australia
3. School of Medicine and Public Health, The University of Newcastle, Callaghan, NSW 2308, Australia
4. College of Medicine and Dentistry, James Cook University, Townsville, QLD 4810, Australia
5. College of Health, Medicine, and Wellbeing, The University of Newcastle, Callaghan, NSW 2308, Australia
6. Cardiovascular Department, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia
7. Department of Pharmacy, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia
8. School of Pharmacy, Faculty of Medicine and Health, University of Sydney, Camperdown, NSW 2006, Australia

**Corresponding Author:**

Professor Doan Ngo (B.Pharm, PhD, FESC, FCSANZ)

Co-Director, Heart and Stroke research program, HMRI

School of Biomedical Science and Pharmacy

T: +61 2 434 39386

E: doan.ngo@newcastle.edu.au

The University of Newcastle (UON)

University Drive, Callaghan NSW 2308 Australia

Lot 1, Kookaburra Circuit, New Lambton Heights, New South Wales, 2305, Australia

doan.ngo@newcastle.edu.au

## Keywords

Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home Transition; Medication Review

## Abstract

**Objective** Hospitalisation due to medication-related problems is a major health concern, particularly for those with pre-existing, or those at high-risk of developing, cardiovascular disease (CVD). Post-discharge medication reviews (PDMRs) may form a core component of reducing hospital readmissions due to medication-related problems. This study aimed to explore post-discharge CVD patients' perspective of, and experiences with, pharmacist-led medication management services. A secondary aim explored attitudes towards availability of PDMRs.

**Design** An interpretative qualitative study involving 16 semi-structured interviews. Data were analysed using an inductive thematic approach.

**Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an 820-bed tertiary referral hospital based in New South Wales, Australia.

**Participants** Patients with pre-existing or newly diagnosed CVD who were recently discharged from hospital.

**Results** A total of 16 interviews were conducted to reach thematic saturation. Nine participants (56%) were male. Mean age of participants was 57.5 (±13.2) years. Three emergent themes were identified: (i) Poor medication understanding impacts transition from

hospital to home; (ii) Factors influencing medication concordance following discharge, and (iii) Perceived benefits of routine PDMRs.

**Conclusions** There is a clear need to further improve the quality use of medicines and health literacy of transition-of-care CVD patients. Pharmacists are suitable to provide essential and tailored medication review services to CVD patients as part of a multidisciplinary healthcare team. The implementation of routine, pharmacist led PDMRs may be a feasible means of providing patients with access to health education following their transition from hospital back to community, improving their health literacy and reducing re-hospitalisations due to medication-related issues.

## Data Availability Statement

All data relevant to the study was included either in the manuscript or as supplementary material. Selected anonymised qualitative interview data may be made available upon request.

## Article Summary: Strengths and Limitations of This Study

1. To our knowledge, this is the first study exploring the perspectives of transition-of-care patients with CVD and their experiences with pharmacist-led medication management services.
2. The strength of this study lies in the exploration of a heterogenous sample of people with CVD across their transition of care.
3. The inductive thematic analysis approach used in this study enables the richness of the qualitative data to be captured through a more flexible and reflective process.

4. Potential reporting bias: responding participants may have had different experiences to non-responders, including access to primary care where differing models of care exist.
5. Our study recruited patients who live outside major capital city area(s) of Australia and therefore may represent unique challenges due to their geographic location, often having poorer health outcomes than those living in major capital cities.

## Introduction

**Word Count: 5083**

Cardiovascular disease (CVD) is a leading cause of death and disability in Australia. In 2021 alone, CVD was the underlying cause of death in 42,700 individuals, representing 25% of all deaths. During this same year, coronary heart disease was the leading single cause of death in Australia, accounting for 17,300 deaths, accounting for 10% of all deaths and 41% of CVD deaths [1]. Internationally, medication-related issues are a common contributor to hospitalisations and mortality for CVD patients who often have a high drug burden consisting of multiple medications and complex dosing regimens [2]. This is compounded in patients with poor health literacy: the inability to understand and act on medical information [3].

Rehospitalisation due to poor medication management presents as a significant issue for cardiology patients. The likelihood of hospital readmission for CVD patients has been shown to increase by 28% in the following month because of poorly management medication regimens [4]. Poor medication concordance is closely associated with adverse outcomes in CVD patients of whom many are elderly and take 5 or more medications [5]. Poor medication concordance, use of harmful medications and withdrawal of beneficial medications have been identified as precipitating factors for 20% of heart failure (HF) hospitalisations [6]. Patients with poor medication concordance also have 36% higher mortality from ischemic heart disease, and a 2-fold increased risk of mortality from cerebral haemorrhage and cerebral infarction than those with good concordance [7].

Internationally, the provision of pharmacist-led medication reconciliation programs during hospital transitions have been established as a means for improving post-hospital healthcare utilisation [8-11]. Growing evidence highlights that comprehensive medication reviews

improve health literacy and reduce the number of medication-related errors and inappropriate use of medicines [12-17]. In Australia, medication review services were first introduced for residents of aged care facilities in 1997, expanded to include those living in a community setting in 2001 [18, 19], and further revised in 2020, to include referrals from hospital-based medical practitioners. The latest amendment enables the initiation of comprehensive medication reviews through hospital networks along with the allowance for pharmacist-initiated follow-up reviews; promoting a patient-centred cycle-of-care whereby pharmacists are directly involved in the follow-up of medication-specific problems.

To date, previous research has explored pharmacist and general practitioner (GP) perspectives of comprehensive medication reviews, including more recently pharmacist perspectives on the implementation of post-discharge medication reviews (PDMRs) [20-25]. There remains a lack of evidence relating to patient perspectives on PDMRs, particularly those with existing CVD or those who are at high-risk of CVD complications. Patient perspectives are invaluable in assessing the effectiveness of healthcare service implementations aimed at improving health literacy and self-management. Some research exploring pharmacist-led medication reconciliation reviews suggesting there is improved health literacy and sustained self-management upon returning to a community setting in CVD patients who receive pharmacist intervention [26, 27]. To our knowledge, this is the first study exploring these perspectives of (ToC) CVD patients and their experiences with pharmacist-led medication management services. We aimed to explore the experiences of patients during their ToC from hospital to home probing their understanding of medication-related changes and subsequent medicine review referral.

## Method

*Study Design, Participant Selection and Recruitment*

An interpretive qualitative approach was deemed appropriate to explore our research question. Participants were recruited from the John Hunter Hospital (JHH): a major referral hospital for the Hunter New England Local Health District (HNELHD) servicing over 920,000 people. To reduce the risk of recruitment bias, a clear set of inclusion criteria as shown in **Figure 1** was created to assist with identifying potential participants. Patients meeting our inclusion criteria being discharged from the JHH with either newly diagnosed or pre-existing CVD were identified by, and invited to participate, by cardiology nurses and pharmacists from the cardiology ward and cardiac rehabilitation clinic (CRC) at the JHH. Purposive sampling was used when identifying and selecting CVD patients as potential participants for the study to create a diverse and heterogeneous cohort.

Potential participants were provided with detailed study information and had the opportunity to ask questions about the research and were aware of the voluntary nature of their participation in the study. All participants provided informed consent. Interviews were conducted between 1st September 2022 and 30th September 2023. This study employed the use of semi-structured interviews and was informed by the COnsolidated criteria for REporting Qualitative research (COREQ) checklist [28]. The interview guide was designed by a sub-group of the investigators (JB, HC, JC, and DN) following a review of existing literature. The sub-group then constructed questions based on this literature review that address the central aim of the study. However, considering the semi-structured interview design, participants had freedom to express views and experiences in their own words and diverge from the interview guide. Approval for this project was obtained from the Hunter

New England Health Human Research Ethics Committee (Reference Number: 2022/ETH00872).

*Patient and Public Involvement*

Patient and public involvement was not deemed necessary for the design and implementation of this study.

*Data Collection and Analysis*

Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted by a member of the research team (JB) at a mutually convenient time between 1st September 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview schedule, questions aimed to probe participant experiences of their recent hospitalisation experiences and subsequent implementation and management of medications, as well as attitudes towards pharmacist-led medication management services including availability of PDMR services. Identified themes informed continuing data collection and sampling continued until thematic saturation (two co-coders agreeing that no new themes were emerging) was achieved. Coding was performed independently by two authors (JB, JW), following an inductive thematic approach [29]. Analysis followed a three-phase approach: (i) initial familiarisation of the data following a systematic identification of salient themes within each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked to sections of the written transcript; (iii) collation of codes into larger themes by examining relationships between each code. Transcripts were coded line-by-line, describing and interpreting emerging categories, and searching for differences and similarities. The next step

involved examining the relationship between categories in the context of the research question to form themes. Consistency of findings was upheld through immersion within the data, and peer debriefing with data coding reflexivity and discussion with the research team [30, 31]. Coders captured exemplar quotes supporting each theme.

## Results

A total of 18 participants provided written informed consent to be interviewed, with 16 completing the interview process. One participant declined the interview and another participant passed away prior to being interviewed. Demographics for the 16 participants (mean age 57.5 (±13.2) years, 9 (56%) male) are shown in **Figure 2**.

Three emergent themes were identified:

(i) *Poor medication understanding impacts transition from hospital to home;*

(ii) *Factors influencing medication concordance following discharge, and*

(iii) *Perceived benefits of routine PDMRs*

1. *Poor medication understanding impacts transition from hospital to home*

*The Overwhelming Hospital Experience*

Many participants reported difficulties comprehending health-related information during their hospital admission, including understanding the cause of their cardiovascular event, and subsequent medication and lifestyle changes recommended following their discharge. Participants reflected on their feelings of anxiety and being overwhelmed in response to the experience of a life-threatening cardiovascular event. Participants reportedly attributed

anxiety with difficulties in comprehending the initiation of, or changes to, medications during their acute hospital admission.

> *[It's] obviously a very stressful situation I was in, being so young and having a cardiac thing go on. So, I didn't take everything in those first couple of days. (P1)*

> *Because when you're in hospital and they're telling you what tablets to take, you're going 'okay, there's just so much going on in hospital.' Yeah, it's not until you get home that you think 'okay, what was that all about?' It was just a whirlwind I went through. (P4)*

Participants reported that understanding copious amounts of new medication-related information was more difficult to comprehend whilst trying to grasp the extensiveness of medications now required.

> *...so, they gave me a week's medication from the pharmacy at the hospital and this big, two A4 sheets of all the tablets that you get. I go 'oh s**t' because you don't know this. I'm going to check-out, and they go 'oh, here are all your tablets' and I go 'oh s**t, look at all this!' (P5)*

*Challenges Associated with Education within a Hospital Environment*

Participants' understanding of their medication regime were experienced on a spectrum where some readily grasped changes with new information while others struggled. Difficulty understanding was compounded among participants who had no prior experience with taking regular medications.

> *My big problem—like, I've never had anything before—is knowing what all these tablets do…you know nothing, you're learning it all. (P5)*

Participants recounted varying experiences with education during their hospital admission. Most participants reported they received a combination of verbal and/or written medication instructions during their hospitalisation or at discharge. Participants valued staff who took the time to explain their medication regime and *"were nice enough to write down" (P4)* or provide written information. Information sources included physicians, nurses, and pharmacists; although some participants reported they were unsure as to who provided the information.

> *...the last doctor I'd seen there [in hospital], he explained to me all the way through me tablets... and it was all written out for me. (P17)*

> *I mean, ...there was a person, or some nurse, or doctor came around and explained the situation. (P5)*

However, other participants commented on the lack of information provision during their admission and the limited reinforcement of what medication to take and why, especially during medication rounds. Participants' reports suggested they were passive during medication rounds and only a few pressed staff for information. Many participants perceived limited education was due to staff time constraints and being unable to take time to engage and deliver education in an impactful manner.

> *None really. It was just, I guess, the nurses coming and saying either 'this is due' or 'how are you feeling? Do you need pain relief?' (P9)*

> *...you know, when you're in hospital, it's so busy, full-on. The doctors and nurses are running from patient-to-patient. So, there's not a lot of time to actually sit and really talk about medications and sort of similar things like that. (P6)*

Participants' reports suggested the negative impact of receiving differing information from multiple sources. Some participants reported a lack of consistency between staff members which accentuated anxiety and confusion.

> *So, I guess it's probably a little bit of anxiousness where you get little snippets of information…you've got no idea… I think it's because the message isn't coming from the one person all the time. Like it's coming from various different people. (P7)*

*Implementing Medication Self-Management*

Many participants described the difficulties engaging with self-management education when they felt unwell, distracted by an unfamiliar environment, or were focussed on *"wanting to get home." (P5)*

> *The thing is, you've been sick in hospital, you don't think. So, your mind's all muddled up or you go 'whatever, I don't want to listen to you.' (P17)*

Being a passive recipient of medications in hospital, alongside struggling to understand a new medication regime, reportedly impacted participants' confidence to manage their medications on discharge. Participants reported that they were most unsure during the first few weeks post-discharge as they attempted to establish routines with either taking medications for the first time or implementing a new medication regimen.

> *But at the time it's a bit, like, I'm a bit confused about what is what, going though boxes and reading my list. So yeah, the first few weeks was a bit confusing with what I was taking. (P4)*

While some participants reported ongoing feelings of anxiety and being overwhelmed by a lack of familiarity with medication terminology and understanding the purpose of their medication, others embraced self-education. For many, this involved conducting online research or talking to family members who were health professionals, especially in relation to side effects.

> *I came home without too much insight into what they [medications] are and that sort of thing. It's been kind of left up to my own accord to basically prepare myself. (P9)*

> *I asked my sister — she's a cardiothoracic nurse. So, I asked her, you know, side effects I was having that I got on the weekend. (P2)*

2. *Factors influencing medication concordance following discharge*

*Discharge home*

For many participants, the reality of needing to take life-saving medication became apparent on return home when they were confronted with the seriousness of the situation and the need to develop new daily medication routines. Many were grateful they were on sick leave or had time post-discharge to establish a routine, including being mindful of when medications needed to be taken and if they needed to be taken with meals or not.

> *And generally, I get up at the same time each day. Having said that, I am on sick leave at the moment. So that will take time and breakfast will change when I go back to work. But that's down the track management. (P1)*

For participants, especially those without prior experience with taking medication, remembering to administer doses, manage prescriptions and medication supply, and follow-up appointments with GPs whilst balancing prior commitments with family or work was an additional burden.

> *I'm just a really busy person. I work full-time and then I've got two kids. So, by having to throw medication in on that…I guess it's like when you're a new person to start taking medication…you've got to take the medication seriously. Like it's not the first thing that's on my mind which is not good. I need to change that. (P7)*

*Cardiac Rehabilitation*

Several participants reported they continued to lack understanding of their medication regime, which was apparent when engaging with other health professionals such as dentists or rehabilitation therapists.

> *I even went to the dentist, and they said: 'what are you on, we need to update your records', and I didn't even know. (P9)*

> *I was just at Cardio Rehab [CRC]…and they asked me if I was on a beta-blocker, and I actually didn't know what a beta-blocker was. I was, like, not sure! (P7)*

Nine participants were recruited through the CRC at the JHH and reported increased accessibility and reinforcement of medication information through the clinic. Participation in the CRC provided participants with an opportunity for further engagement with specialists in cardiology and ask questions or raise concerns related to medications or management of their CVD.

*...I was going to have a chat with one of the guys at the pharmacy, but I thought I'm at rehab [CRC] today, I'll chat with them [the nurses] about the cholesterol medication I'm on. (P6)*

*External support*

Many participants relied on others to help manage their medications and adhere to them, be that family members, carers, or community pharmacists. While this was most evident in the weeks following discharge, others reported an ongoing reliance on family members or carers. As such, some participants acknowledged they had less opportunity to engage with community pharmacists for ongoing education, information, or intervention if necessary.

*My son sort of gets them out and gives them to me, and I just take them as I'm supposed to. I'm a bit foggy at the moment, but he's looking after it. I'll have to get more involved very shortly. (P15)*

*Because, say I say to my wife: 'I'm too sick to get my tablets today, can you pick them up for me?' So, if someone else goes and picks up your tablets for you, you don't have any interaction with the pharmacist. (P5)*

*Engagement with Pharmacist-Led Medication Management Services*

Many participants stated that their experience with pharmacist-led medication management services was limited to medication supply and prescription management, predominantly delivered in a community setting.

*So, you know, I guess their role is pretty broad. But personally, I use them for prescriptions and information around that and that's probably about it. (P12)*

> *Sort of nothing really. Just when it comes to medication-wise. Like that's the only time I sort of have anything to do with pharmacists, it's when I've gotta pick up medication. (P14)*

Participants readily identified the importance of community pharmacies managing their prescriptions and medications, including the use of dose administration aids (DAAs).

> *So obviously looking at things of whether* Webster-paks® *or blister packs [medication compliance packaging] — pre-made medications — that sort of thing as well I think is really important. (P1)*

However, some participants acknowledged that by relying on an external source there was the potential for error or oversight if they weren't familiar with changes to their medications.

> *I gave my prescriptions actually to the pharmacist. You don't have to think about sitting at the table and dividing them all up and hoping that they're not all wrong…which has happened a couple of times. I've gone a couple of weeks without realising I wasn't taking one particular [medication]. (P18)*

*Engagement with community care*

Participants who followed through with an appointment to see their GP on discharge indicated the benefit in gaining further understanding of their recent hospitalisation and medication changes, including accessing new prescriptions.

> *I was told to go to my GP a week after which I did yesterday…she reinforced what [medications] they had sent me home with. (P11)*

Overall, participants reported a wide range of challenges adhering to a medication regime on discharge. Many participants were not supplied with sufficient medication quantities on discharge to seen them through to their follow-up GP appointment, who were often required to wait several weeks.

> *...because my GP is booked out that far ahead, I'm looking at two to three weeks. When I rang up to say that I need an appointment to arrange some medications after I had a heart attack, they had to put me on an emergency waiting list, and even then, it took them seven days to get me in. (P3)*

Participants were reportedly confronted with the concept of taking multiple medications, highlighting their embarrassment and the stigma associated with medication use. Some participants were reluctant to seek pharmacist-led medication management services, such as DAAs, due to its perceived association with advanced age.

> *...going into the pharmacy and just slapping them [the prescriptions] down on the counter, it's just going to feel like I'm a walking medication taker! Once I get over the initial embarrassment...I'm actually going to be calling them and saying, 'I need to fill my medication'. (P7)*

> *And for me, personally, I still consider myself still fairly young, and I think this [DAA] is an old person's thing. So, getting your head around it all, you know, it's a little new. (P2)*

Many participants commented on the benefit of accessing a community pharmacist for medication-related information and health advice prior to escalating any concerns to their GP.

*I wouldn't go and pick up a multivitamin or something without talking to the chemist [pharmacist]: 'this is what I take. Could there be any interactions?' (P12)*

*Because sometimes it's hard to get into see your GP. And sometimes it's not necessary to see your GP. I feel that [the community pharmacist] is the 'first port-of-call'; unless you're really, really sick. (P6)*

Conversations with a community pharmacist on discharge home provided many participants with the reassurance they needed to better manage their medications. However, some participants reported they were reticent to speak to their community pharmacist due to privacy concerns associated with discussing personal medical information in public or being a burden when the pharmacist was perceived to be *"busy". (P11)*

*But what I really hate when I go to the chemist [pharmacy] is…they want to talk to you — and there are so many people around… I actually feel uncomfortable talking about that in front of other people…it's probably not actually sinking in because I'm like 'who's standing behind me, is there someone here that I know' you know? And I think that's probably why I didn't know a lot about my medications. (P7)*

For some participants, accessing a community pharmacist and pharmacy services centred around medication cost whereby participants would seek multiple pharmacies to obtain the best price for their medications. Participants acknowledged this had potential to impact continuity of care facilitated by seeing the same pharmacist.

*So, we try to keep costs down where we can…at least by going to that [discount pharmacy] kind of thing…but in a way of a relationship, I wouldn't know any of the people in there. (P9)*

3. *Perceived benefits of routine Post-Discharge Medication Reviews*

Most participants acknowledged the importance of taking responsibility for their medications. However, all participants could foresee circumstances where the availability of PDMRs would prove beneficial.

*I think it [PDMRs] would be really valuable. For me who's never really taken any medication, you know, it's all a bit daunting all of a sudden having to take medication. (P2)*

*As a nurse, there a lot of people out there who have no clue what their medication are or how they should be working, or when they should be taking them. So, I can see the benefits of it — even for myself. (P16)*

*Incorporation of Post-Discharge Medication Reviews into Standard of Care*

Participants reported that PDMR would provide an opportunity for a tailored provision of information. Some participants suggested incorporating a 'triage' system to account for each patient's individual social situation and educational needs, along with assessing those who may be at high-risk for medication misadventure.

*There could be benefits from them [PDMRs] that you don't see until you actually have someone come to have a look. I think that you would probably ideally…make contact*

*with a person in hospital, so you understand what they're circumstances are. And then you could make the decision from there. It's very person orientated. (P12)*

*...then maybe from that phone call going 'okay you sound really stressed about your medication we'll try and squeeze you in tomorrow'...I guess maybe, like, a phone call to kinda like "triage" how urgently they need it. (P1)*

The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety experienced during and after discharge home. Participants reported that a PDMR would benefit their transition back into a community setting to reinforce information and provide ongoing monitoring, reassurance, and support. Similarly, participants perceived that receiving a PDMR at home gave them time to process their hospitalisation and any changes implemented, which might raise issues to be discussed.

*And also, when you're in the hospital, you might not be thinking of these things to ask either because it's all new and stuff. So, by the time you get home you can all of a sudden sit down and sort of absorb the information. (P2)*

*like you feel quite safe while in hospital. But when you come home, it's a little bit daunting. (P6)*

Home visitation for a PDMR was also perceived to be more conducive for medication-related education, away from the time pressures experienced in other settings.

*You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get out of the way.' And even you're not sitting in the doctor's surgery thinking 'I'm getting charged for every 5 minutes I'm sitting here.' (P9)*

*And when you go to the GP, it's very transactional. Like, it's just like you're in, out. They're really busy to the point that you don't feel confident that they really listen. (P7)*

## Discussion

*Summary of main findings*

Our study explored perspectives of CVD patients on their experiences with medication management and pharmacist-led medication review services during their ToC, including attitudes towards having access to PDMRs. Cardiology patients' ToC following a hospital admission is often associated with a period of vulnerability that may be ameliorated through pharmacist medication reconciliation [32]. Our findings identified that the hospital environment presented several challenges which impacted the effective delivery of education for inpatients. Participants detailed difficulties understanding and retaining medication-related information during admission for a significant health event. Feelings of anxiety and being overwhelmed contributed to poor information retention and meant participants returning home lacking confidence in managing their medications. Despite these feelings, many participants received minimal support through pharmacist-led medication management services across their ToC. Overall, while participants took time to establish a routine back home, many gradually became confidant and expressed value in a medication review to monitor and provide support upon their return to a community setting.

*Comparison with existing literature*

Existing literature highlights the impact of time pressures on the quality and efficacy of hospital-delivered education for inpatients has been extensively covered in the available evidence base [33-36]. In response patients may be less equipped to manage their medications on discharge to a community setting, thus affecting their quality use of medicines (QUM) — the safe, effective, and appropriate use of medicines — and increasing the risks of future hospitalisations.

Obtaining the patient perspective is a critically important phase of implementing new health services. Our results provide the perspectives of CVD patients, thus building on existing literature [37]. For example, White et al (2012) [38] conducted a qualitative study that identified four key benefits of medication reviews as perceived by patients eligible for these reviews: (i) acquisition of personalised medication information and advice; (ii) reassurance regarding medications and coordination of their care; (iii) feeling valued and cared for by a health care provider; (iv) enhancing the patient-provider and pharmacist-GP relationships. Our study mirrors these observations concerning the perceived benefits of PDMRs, particularly the need for post-discharge follow-up and the reassurance that patients experience when receiving pharmacist input into their care.

However, the White et al study identified patient concerns around the potential for pharmacist medication reviews to be perceived as undermining the authority of the GP, thus having a negative impact on the patient's relationship with their GP [38]. Participants in our study did not share these same perspectives, and instead felt that PDMRs would have potential to improve access to primary care post-discharge through pharmacists due to difficulties experienced with accessing their GPs. Our study demonstrated PDMRs were

considered an opportunity to ask questions and more actively engage in education within the security of their own home. We posit that PDMRs have the potential to bridge education deficits that emerge on discharge home and promote communication between hospital and community-based medical practitioners.

The timing of service provision is crucial to ensure that QUM is maintained, and the risk of medication-related problems is minimised. Evidence detailing the incidence of medication-related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks post-discharge [39]. Recently, Daliri et al demonstrated that pharmacy-led transitional care education programs reduced the proportion of patients experiencing self-reported medication-related problems four-weeks post discharge [40]. Participants in our study highlighted their desire for early pharmacist follow-up, within the first seven days post-discharge being the most common request. This demonstrates the importance of early post-discharge follow-up to promote the safe and effective use of medicines for ToC patients.

Participants in the study experienced issues engaging with primary care once discharged from hospital, with potential role for pharmacists to bridge this gap. GP access for prescription resupply was the most common challenge experienced by participants when returning home. The limited quantities of tablets provided to participants at the time of discharge was sometimes insufficient to sustain them until their GP appointment. The HNELHD is part of the New South Wales (NSW) public health system which stipulates that take home supplies of regular medications must not exceed 7 days' supply when discharged from hospital [41]. Unfortunately, this restriction imposes significant challenges for patients discharged from NSW public hospitals. This varies considerably to other states within

Australia — for example, both Queensland and Victorian public hospital networks allow a one-month supply of regular medications under the Pharmaceutical Benefits Scheme [42, 43]. Given that access to a GP may be difficult on discharge due to lengthy wait times, we advocate that pharmacists may in fact play an important role in ensuring the continuity of care and appropriate access to medications through the incorporation of a PDMR as standard of care for ToC patients.

*Implications on future research and practice*

The strength of this study lies in the exploration of a heterogenous sample of cardiology patients. A diverse cohort of participants was purposively selected to capture the broadest range of perspectives possible. Furthermore, the inductive thematic analysis approach used in this study enables the richness of the qualitative data to be captured through a more flexible and reflective process. This method aims to remove a researcher's analytic preconceptions, ensuring thematic analysis is data-driven rather than researcher-driven. We acknowledge that many patients were reflecting on the prospect of a PDMR across their ToC rather than having received one. A limitation of this study includes the potential for reporting bias. It is possible that ToC CVD patients who engaged with the study may in fact have a differing experience with pharmacist-led medication management services compared to those who did not participate. The relatively young mean age of participants (57.5 years of age) may also not accurately reflect the views and experiences of 'older' adult patients (over the age of 65 years) surrounding their need for pharmacist-led medication management services. It is well-documented that patients living outside major Australian capital cities have poorer health outcomes [44]. Our study recruited patients who predominantly live outside major capital city area(s) of Australia. Hence, their inclusion may therefore represent unique health outcome

challenges associated with their geographic location. Our results provide a baseline understanding of the perspectives of ToC CVD patients in terms of the implementation of PDMRs. Future research is needed to evaluate the clinical benefit of routine PDMRs for CVD patients to investigate the acceptability of the service, but also its impact on key CVD outcome markers, including 30-day hospital readmission rates and the incidence of major adverse cardiovascular events. In addition, future research should explore the perspectives of cultural and linguistically diverse patients and those residing in regional, rural, and remote localities.

## Conclusion

Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of a broader MDT. PDMRs are viewed by ToC CVD patients as an acceptable means of improving their health literacy and QUM when transitioning from hospital back home. Routine service implementation may address the patient's desire for post-discharge follow-up and provision for education away from the busy hospital environment. Service implementation may benefit from an initial 'triage' to individualise the delivery by assessing the patient's own needs and expectations of the service, whilst screening for those who may be at high-risk of medication misadventure.

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## Author Contributions

Study design was conducted by JB, HC, JC, JW, and DN. Recruitment was conducted by JB, DM, NE, and MA. Interviews and interview transcription was performed by JB. Data analysis was completed by JB and JW. JB drafted the manuscript for publication and DN, AS, HC, JW and JC contributed to the content and revision of the manuscript. Revisions, literature, and manuscript checking was managed by JB. All authors read and approved the final version.

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## Ethics approval and consent to participate

Ethics approval was received from Hunter New England Human Research Ethics Committee of HNELHD (Reference – 2022/ETH00872). All participants provided written informed consent prior to conducting interviews.

## Competing interests

JB is a credentialed pharmacist who can provide domiciliary medication management reviews funded by the Australian Government Department of Health and Aged Care.

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**Figure 1:** Inclusion and Exclusion Criteria

| Inclusion Criteria |
| --- |
| Over 18 years of age |
| Discharged from *John Hunter Hospital* into a community setting |
| Pre-existing or newly diagnosed cardiovascular disease, or are considered high-risk for the development of cardiovascular disease using the *CVDCHECK* online tool [1] |
| Can provide written or verbal informed consent in the presence of a witness |
| Can participate in a telephone interview |
| **Exclusion Criteria** |
| Not considered high-risk for development of CVD (as defined previously) AND are not currently diagnosed with CVD |
| Discharged to a residential aged care facility where medications are managed according to local facility protocols |
| Are not eligible to receive an Australian comprehensive medication review service as outlined by the *Pharmacy Programs Administrator Program Rules* [2] |
| Have significant cognitive impairment and cannot participate in a semi-structured interview |
| Receiving palliative care and participation in the interview will incur foreseeable challenges |

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| Participant Characteristics | *n*, (%) |
|---|---|
| **Age** | |
| 30–39 | 2 (12.5) |
| 40–49 | 3 (19) |
| 50–59 | 5 (31) |
| 60–69 | 2 (12.5) |
| 70–79 | 4 (25) |
| **Gender** | |
| Male | 9 (56) |
| Female | 7 (44) |
| **Diagnosis** | |
| STEMI | 5 (31) |
| NSTEMI | 5 (31) |
| Ischaemic Heart Disease | 1 (6) |
| HFrEF | 1 (6) |
| HFpEF | 3 (19) |
| Infective Endocarditis | 1 (6) |
| **Regular Prescribed Medications at Discharge** | |
| 1–4 | 2 (13) |
| 5–9 | 8 (50) |
| 10–14 | 5 (31) |
| 15–19 | 0 (0) |
| 20+ | 1 (6) |
| **Number of Comorbidities** | |
| Zero | 3 (19) |
| 1–4 | 7 (44) |
| 5–9 | 5 (31) |
| 10+ | 1 (6) |

**Figure 2**: Demographics of Interviewed Cardiovascular Disease Patients.

STEMI: ST-elevated myocardial infarction; NSTEMI: non-ST-elevated myocardial infarction; HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction.
Regular Medications at Discharge denotes medications taken daily by patient (excludes 'when required' or 'pro re nata' (PRN) medications).
Number of comorbidities according to patient's hospital discharge paperwork.

# *Patient Perspectives of Pharmacist-Provided Medication Reviews*

## *Semi-Structured Interview Questions*

**Research Question**: what are the current experiences of high-risk cardiovascular disease patients with pharmacist-led medication reviews following discharge from hospital?

**Aim**: To investigate the current model of medication review provision for high-risk cardiovascular disease patients upon discharge from hospital.

*General Introduction to Commence Interview:*

- Interviewer introduction and salutation
- Brief explanation of the purpose of the interviews and study
- Provide overview of interview format including the freedom to refuse response provision and requesting breaks at any stage; advise that interview will be audio-recorded
- Request verbal consent to proceed

***Current Medication Management of Patient***

1. Can you describe to me how you currently manage you medicines at home?
2. How many medicines are you taking (including any complimentary and non-oral formulations)?
3. After your recent visit to hospital, how comfortable do you feel managing your medicines?
4. Since your visit to hospital, how has your need to visit a pharmacy or speak with a pharmacist changed?

***Patient Perceptions of Pharmacist Medication Management***

5. What role do you think pharmacists have in supporting you in your day-to-day management of your medicines?
6. What interactions do you have with your regular pharmacist/pharmacy?
7. What is your understanding of medication reviews performed by a pharmacist?

***Previous Experiences with Medication Reviews***

8. Have you ever sat down in a pharmacy to chat with the pharmacist about your medicines?
9. Has a pharmacist ever come out to your home to review your medicines?
10. What medicines review services have been offered to you?

***Prospective Engagement with Pharmacists for Medication Reviews***

11. What medication management help was provided to you while you were in hospital? Who provided you this help?
12. What medication management help has been provided to you since leaving hospital? Who provided you this help?
13. Think back now to the days and weeks since leaving hospital. During this time, when would be the most appropriate time for a pharmacist to help manage your medicines?
14. How comfortable do you feel about a pharmacist coming to your home to review your medicines?
15. Tell us how a pharmacist can help with your day-to-day medicines management?

# COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | |
| Occupation | 3 | What was their occupation at the time of the study? | |
| Gender | 4 | Was the researcher male or female? | |
| Experience and training | 5 | What experience or training did the researcher have? | |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | |
| Sample size | 12 | How many participants were in the study? | |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | |
| Field notes | 20 | Were field notes made during and/or after the inter view or focus group? | |
| Duration | 21 | What was the duration of the inter views or focus group? | |
| Data saturation | 22 | Was data saturation discussed? | |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or | |

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| | | correction? | |
| **Domain 3: analysis and findings** | | | |
| *Data analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | |
| Software | 27 | What software, if applicable, was used to manage the data? | |
| Participant checking | 28 | Did participants provide feedback on the findings? | |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | |

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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BMJ Open

# Pharmacist-Led Medication Management Services: A Qualitative Exploration of Transition-of-Care Cardiovascular Disease Patient Experiences



| | |
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# *Pharmacist-Led Medication Management Services: A Qualitative Exploration of Transition-of-Care Cardiovascular Disease Patient Experiences*

Joshua Bennetts[1,2], Jennifer White[2,3], Hayley Croft[1], Joyce Cooper[1,4], Dawn McIvor[5,6], Nicholas Eadie[7], Marcelle Appay[1,7,8], Aaron Sverdlov[2,3,6], Doan Ngo[1,2]

1. School of Biomedical Science and Pharmacy, The University of Newcastle, Callaghan, NSW 2308, Australia
2. Hunter Medical Research Institute, New Lambton Heights, NSW 2305, Australia
3. School of Medicine and Public Health, The University of Newcastle, Callaghan, NSW 2308, Australia
4. College of Medicine and Dentistry, James Cook University, Townsville, QLD 4810, Australia
5. College of Health, Medicine, and Wellbeing, The University of Newcastle, Callaghan, NSW 2308, Australia
6. Cardiovascular Department, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia
7. Department of Pharmacy, John Hunter Hospital, Hunter New England Local Health District, New Lambton Heights, NSW 2305, Australia
8. School of Pharmacy, Faculty of Medicine and Health, University of Sydney, Camperdown, NSW 2006, Australia

**Corresponding Author:**

Professor Doan Ngo (B.Pharm, PhD, FESC, FCSANZ)

Co-Director, Heart and Stroke research program, HMRI

School of Biomedical Science and Pharmacy

T: +61 2 434 39386

E: doan.ngo@newcastle.edu.au

The University of Newcastle (UON)

University Drive, Callaghan NSW 2308 Australia

Lot 1, Kookaburra Circuit, New Lambton Heights, New South Wales, 2305, Australia

doan.ngo@newcastle.edu.au

## Keywords

Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home Transition; Medication Review

## Abstract

**Objective** Hospitalisation due to medication-related problems is a major health concern, particularly for those with pre-existing, or those at high-risk of developing, cardiovascular disease (CVD). Post-discharge medication reviews (PDMRs) may form a core component of reducing hospital readmissions due to medication-related problems. This study aimed to explore post-discharge CVD patients' perspective of, and experiences with, pharmacist-led medication management services. A secondary aim explored attitudes towards availability of PDMRs.

**Design** An interpretative qualitative study involving 16 semi-structured interviews. Data were analysed using an inductive thematic approach.

**Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an 820-bed tertiary referral hospital based in New South Wales, Australia.

**Participants** Patients with pre-existing or newly diagnosed CVD who were recently discharged from hospital.

**Results** A total of 16 interviews were conducted to reach thematic saturation. Nine participants (56%) were male. Mean age of participants was 57.5 (±13.2) years. Three emergent themes were identified: (i) Poor medication understanding impacts transition from

hospital to home; (ii) Factors influencing medication concordance following discharge, and (iii) Perceived benefits of routine PDMRs.

**Conclusions** There is a clear need to further improve the quality use of medicines and health literacy of transition-of-care CVD patients. Our findings indicate that the engagement of transition-of-care CVD patients with pharmacist-led medication management services is minimal. Pharmacists are suitable to provide essential and tailored medication review services to CVD patients as part of a multidisciplinary healthcare team. The implementation of routine, pharmacist led PDMRs may be a feasible means of providing patients with access to health education following their transition from hospital back to community, improving their health literacy and reducing re-hospitalisations due to medication-related issues.

**Article Summary: Strengths and Limitations of This Study**

1. The strength of this study lies in the exploration of a heterogenous sample of people with CVD across their transition of care.
2. The inductive thematic analysis approach used in this study enables the richness of the qualitative data to be captured through a more flexible and reflective process.
3. Potential reporting bias: responding participants may have had different experiences to non-responders, including access to primary care where differing models of care exist.
4. Our study recruited patients who live outside major capital city area(s) of Australia and therefore may represent unique challenges due to their geographic location, often having poorer health outcomes than those living in major capital cities.

## Introduction

**Word Count: 5083**

Cardiovascular disease (CVD) is a leading cause of death and disability in Australia. In 2021 alone, CVD was the underlying cause of death in 42,700 individuals, representing 25% of all deaths. During this same year, coronary heart disease was the leading single cause of death in Australia, accounting for 17,300 deaths, accounting for 10% of all deaths and 41% of CVD deaths [1]. Internationally, medication-related issues are a common contributor to hospitalisations and mortality for CVD patients who often have a high drug burden consisting of multiple medications and complex dosing regimens [2]. This is compounded in patients with poor health literacy: the inability to understand and act on medical information [3].

Rehospitalisation due to poor medication management presents as a significant issue for cardiology patients. The likelihood of hospital readmission for CVD patients has been shown to increase by 28% in the following month because of poorly management medication regimens [4]. Poor medication concordance is closely associated with adverse outcomes in CVD patients of whom many are elderly and take 5 or more medications [5]. Poor medication concordance, use of harmful medications and withdrawal of beneficial medications have been identified as precipitating factors for 20% of heart failure (HF) hospitalisations [6]. Patients with poor medication concordance also have 36% higher mortality from ischemic heart disease, and a 2-fold increased risk of mortality from cerebral haemorrhage and cerebral infarction than those with good concordance [7].

Internationally, the provision of pharmacist-led medication reconciliation programs during hospital transitions have been established as a means for improving post-hospital healthcare utilisation [8-11]. Growing evidence highlights that comprehensive medication reviews

improve health literacy and reduce the number of medication-related errors and inappropriate use of medicines [12-17]. In Australia, medication review services were first introduced for residents of aged care facilities in 1997, expanded to include those living in a community setting in 2001 [18, 19], and further revised in 2020, to include referrals from hospital-based medical practitioners. The latest amendment enables the initiation of comprehensive medication reviews through hospital networks along with the allowance for pharmacist-initiated follow-up reviews; promoting a patient-centred cycle-of-care whereby pharmacists are directly involved in the follow-up of medication-specific problems.

To date, previous research has explored pharmacist and general practitioner (GP) perspectives of comprehensive medication reviews, including more recently pharmacist perspectives on the implementation of post-discharge medication reviews (PDMRs) [20-25]. There remains a lack of evidence relating to patient perspectives on PDMRs, particularly those with existing CVD or those who are at high-risk of CVD complications. Patient perspectives are invaluable in assessing the effectiveness of healthcare service implementations aimed at improving health literacy and self-management. Some research exploring pharmacist-led medication reconciliation reviews suggesting there is improved health literacy and sustained self-management upon returning to a community setting in CVD patients who receive pharmacist intervention [26, 27]. To our knowledge, this is the first study exploring these perspectives of (ToC) CVD patients and their experiences with pharmacist-led medication management services. We aimed to explore the experiences of patients during their ToC from hospital to home probing their understanding of medication-related changes and subsequent medicine review referral.

## Method

*Study Design, Participant Selection and Recruitment*

An interpretive qualitative approach was deemed appropriate to explore our research question. Participants were recruited from the John Hunter Hospital (JHH): a major referral hospital for the Hunter New England Local Health District (HNELHD) servicing over 920,000 people. To reduce the risk of recruitment bias, a clear set of inclusion criteria — partly informed by the *Australian Chronic Disease Prevention Alliance* [28] and the *Pharmacy Programs Administrator Program Rules* [29] — as shown in **Figure 1** was created to assist with identifying potential participants. Patients meeting our inclusion criteria being discharged from the JHH with either newly diagnosed or pre-existing CVD were identified by, and invited to participate, by cardiology nurses and pharmacists from the cardiology ward and cardiac rehabilitation clinic (CRC) at the JHH. Purposive sampling was used when identifying and selecting CVD patients as potential participants for the study to create a diverse and heterogeneous cohort.

Potential participants were provided with detailed study information and had the opportunity to ask questions about the research and were aware of the voluntary nature of their participation in the study and were not reimbursed for their participation. All participants provided informed consent. Interviews were conducted between 1st September 2022 and 30th September 2023. This study employed the use of semi-structured interviews and was informed by the COnsolidated criteria for REporting Qualitative research (COREQ) checklist [30]. The interview guide was designed by a sub-group of the investigators (JB, HC, JC, and DN) following a review of existing literature. The sub-group then constructed questions based on this literature review that address the central aim of the study as shown in

Supplementary File 1. However, considering the semi-structured interview design, participants had freedom to express views and experiences in their own words and diverge from the interview guide. Approval for this project was obtained from the Hunter New England Health Human Research Ethics Committee (Reference Number: 2022/ETH00872).

*Patient and Public Involvement*

Patient and public involvement was not deemed necessary for the design and implementation of this study.

*Data Collection and Analysis*

Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted by a member of the research team (JB) at a mutually convenient time between 1st September 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview schedule, questions aimed to probe participant experiences of their recent hospitalisation experiences and subsequent implementation and management of medications, as well as attitudes towards pharmacist-led medication management services including availability of PDMR services. Identified themes informed continuing data collection and sampling continued until thematic saturation (two co-coders agreeing that no new themes were emerging) was achieved. Coding was performed independently by two authors (JB, JW), following an inductive thematic approach [31]. Analysis followed a three-phase approach: (i) initial familiarisation of the data following a systematic identification of salient themes within each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked to sections of the written transcript; (iii) collation of codes into larger themes by examining

relationships between each code. Transcripts were coded line-by-line, describing and interpreting emerging categories, and searching for differences and similarities. The next step involved examining the relationship between categories in the context of the research question to form themes. Consistency of findings was upheld through immersion within the data, and peer debriefing with data coding reflexivity and discussion with the research team [32, 33]. Coders captured exemplar quotes supporting each theme.

## Results

A total of 18 participants provided written informed consent to be interviewed, with 16 completing the interview process. One participant declined the interview and another participant passed away prior to being interviewed. Demographics for the 16 participants (mean age 57.5 (±13.2) years, 9 (56%) male) are shown in **Figure 2**.

Three emergent themes were identified:

(i) *Poor medication understanding impacts transition from hospital to home;*

(ii) *Factors influencing medication concordance following discharge, and*

(iii) *Perceived benefits of routine PDMRs*

1. *Poor medication understanding impacts transition from hospital to home*

*The Overwhelming Hospital Experience*

Many participants reported difficulties comprehending health-related information during their hospital admission, including understanding the cause of their cardiovascular event, and subsequent medication and lifestyle changes recommended following their discharge. Participants reflected on their feelings of anxiety and being overwhelmed in response to the

experience of a life-threatening cardiovascular event. Participants reportedly attributed anxiety with difficulties in comprehending the initiation of, or changes to, medications during their acute hospital admission.

> *[It's] obviously a very stressful situation I was in, being so young and having a cardiac thing go on. So, I didn't take everything in those first couple of days. (P1)*

> *Because when you're in hospital and they're telling you what tablets to take, you're going 'okay, there's just so much going on in hospital.' Yeah, it's not until you get home that you think 'okay, what was that all about?' It was just a whirlwind I went through. (P4)*

Participants reported that understanding copious amounts of new medication-related information was more difficult to comprehend whilst trying to grasp the extensiveness of medications now required.

> *...so, they gave me a week's medication from the pharmacy at the hospital and this big, two A4 sheets of all the tablets that you get. I go 'oh s**t' because you don't know this. I'm going to check-out, and they go 'oh, here are all your tablets' and I go 'oh s**t, look at all this!' (P5)*

*Challenges Associated with Education within a Hospital Environment*

Participants' understanding of their medication regime were experienced on a spectrum where some readily grasped changes with new information while others struggled. Difficulty understanding was compounded among participants who had no prior experience with taking regular medications.

*My big problem—like, I've never had anything before—is knowing what all these tablets do…you know nothing, you're learning it all. (P5)*

Participants recounted varying experiences with education during their hospital admission. Most participants reported they received a combination of verbal and/or written medication instructions during their hospitalisation or at discharge. Participants valued staff who took the time to explain their medication regime and *"were nice enough to write down" (P4)* or provide written information. Information sources included physicians, nurses, and pharmacists; although some participants reported they were unsure as to who provided the information.

*…the last doctor I'd seen there [in hospital], he explained to me all the way through me tablets… and it was all written out for me. (P17)*

*I mean, …there was a person, or some nurse, or doctor came around and explained the situation. (P5)*

However, other participants commented on the lack of information provision during their admission and the limited reinforcement of what medication to take and why, especially during medication rounds. Participants' reports suggested they were passive during medication rounds and only a few pressed staff for information. Many participants perceived limited education was due to staff time constraints and being unable to take time to engage and deliver education in an impactful manner.

*None really. It was just, I guess, the nurses coming and saying either 'this is due' or 'how are you feeling? Do you need pain relief?' (P9)*

*...you know, when you're in hospital, it's so busy, full-on. The doctors and nurses are running from patient-to-patient. So, there's not a lot of time to actually sit and really talk about medications and sort of similar things like that. (P6)*

Participants' reports suggested the negative impact of receiving differing information from multiple sources. Some participants reported a lack of consistency between staff members which accentuated anxiety and confusion.

*So, I guess it's probably a little bit of anxiousness where you get little snippets of information...you've got no idea... I think it's because the message isn't coming from the one person all the time. Like it's coming from various different people. (P7)*

*Implementing Medication Self-Management*

Many participants described the difficulties engaging with self-management education when they felt unwell, distracted by an unfamiliar environment, or were focussed on *"wanting to get home." (P5)*

*The thing is, you've been sick in hospital, you don't think. So, your mind's all muddled up or you go 'whatever, I don't want to listen to you.' (P17)*

Being a passive recipient of medications in hospital, alongside struggling to understand a new medication regime, reportedly impacted participants' confidence to manage their medications on discharge. Participants reported that they were most unsure during the first few weeks post-discharge as they attempted to establish routines with either taking medications for the first time or implementing a new medication regimen.

*But at the time it's a bit, like, I'm a bit confused about what is what, going though boxes and reading my list. So yeah, the first few weeks was a bit confusing with what I was taking. (P4)*

While some participants reported ongoing feelings of anxiety and being overwhelmed by a lack of familiarity with medication terminology and understanding the purpose of their medication, others embraced self-education. For many, this involved conducting online research or talking to family members who were health professionals, especially in relation to side effects.

*I came home without too much insight into what they [medications] are and that sort of thing. It's been kind of left up to my own accord to basically prepare myself. (P9)*

*I asked my sister — she's a cardiothoracic nurse. So, I asked her, you know, side effects I was having that I got on the weekend. (P2)*

2. *Factors influencing medication concordance following discharge*

*Discharge home*

For many participants, the reality of needing to take life-saving medication became apparent on return home when they were confronted with the seriousness of the situation and the need to develop new daily medication routines. Many were grateful they were on sick leave or had time post-discharge to establish a routine, including being mindful of when medications needed to be taken and if they needed to be taken with meals or not.

*And generally, I get up at the same time each day. Having said that, I am on sick leave at the moment. So that will take time and breakfast will change when I go back to work. But that's down the track management. (P1)*

For participants, especially those without prior experience with taking medication, remembering to administer doses, manage prescriptions and medication supply, and follow-up appointments with GPs whilst balancing prior commitments with family or work was an additional burden.

*I'm just a really busy person. I work full-time and then I've got two kids. So, by having to throw medication in on that…I guess it's like when you're a new person to start taking medication…you've got to take the medication seriously. Like it's not the first thing that's on my mind which is not good. I need to change that. (P7)*

*Cardiac Rehabilitation*

Several participants reported they continued to lack understanding of their medication regime, which was apparent when engaging with other health professionals such as dentists or rehabilitation therapists.

*I even went to the dentist, and they said: 'what are you on, we need to update your records', and I didn't even know. (P9)*

*I was just at Cardio Rehab [CRC]…and they asked me if I was on a beta-blocker, and I actually didn't know what a beta-blocker was. I was, like, not sure! (P7)*

Nine participants were recruited through the CRC at the JHH and reported increased accessibility and reinforcement of medication information through the clinic. Participation in the CRC provided participants with an opportunity for further engagement with specialists in cardiology and ask questions or raise concerns related to medications or management of their CVD.

> *...I was going to have a chat with one of the guys at the pharmacy, but I thought I'm at rehab [CRC] today, I'll chat with them [the nurses] about the cholesterol medication I'm on. (P6)*

*External support*

Many participants relied on others to help manage their medications and adhere to them, be that family members, carers, or community pharmacists. While this was most evident in the weeks following discharge, others reported an ongoing reliance on family members or carers. As such, some participants acknowledged they had less opportunity to engage with community pharmacists for ongoing education, information, or intervention if necessary.

> *My son sort of gets them out and gives them to me, and I just take them as I'm supposed to. I'm a bit foggy at the moment, but he's looking after it. I'll have to get more involved very shortly. (P15)*

> *Because, say I say to my wife: 'I'm too sick to get my tablets today, can you pick them up for me?' So, if someone else goes and picks up your tablets for you, you don't have any interaction with the pharmacist. (P5)*

*Engagement with Pharmacist-Led Medication Management Services*

Many participants stated that their experience with pharmacist-led medication management services was limited to medication supply and prescription management, predominantly delivered in a community setting.

> *So, you know, I guess their role is pretty broad. But personally, I use them for prescriptions and information around that and that's probably about it. (P12)*

> *Sort of nothing really. Just when it comes to medication-wise. Like that's the only time I sort of have anything to do with pharmacists, it's when I've gotta pick up medication. (P14)*

Participants readily identified the importance of community pharmacies managing their prescriptions and medications, including the use of dose administration aids (DAAs).

> *So obviously looking at things of whether* Webster-paks® *or blister packs [medication compliance packaging] — pre-made medications — that sort of thing as well I think is really important. (P1)*

However, some participants acknowledged that by relying on an external source there was the potential for error or oversight if they weren't familiar with changes to their medications.

> *I gave my prescriptions actually to the pharmacist. You don't have to think about sitting at the table and dividing them all up and hoping that they're not all wrong…which has happened a couple of times. I've gone a couple of weeks without realising I wasn't taking one particular [medication]. (P18)*

*Engagement with community care*

Participants who followed through with an appointment to see their GP on discharge indicated the benefit in gaining further understanding of their recent hospitalisation and medication changes, including accessing new prescriptions.

*I was told to go to my GP a week after which I did yesterday…she reinforced what [medications] they had sent me home with. (P11)*

Overall, participants reported a wide range of challenges adhering to a medication regime on discharge. Many participants were not supplied with sufficient medication quantities on discharge to seen them through to their follow-up GP appointment, who were often required to wait several weeks.

*…because my GP is booked out that far ahead, I'm looking at two to three weeks. When I rang up to say that I need an appointment to arrange some medications after I had a heart attack, they had to put me on an emergency waiting list, and even then, it took them seven days to get me in. (P3)*

Participants were reportedly confronted with the concept of taking multiple medications, highlighting their embarrassment and the stigma associated with medication use. Some participants were reluctant to seek pharmacist-led medication management services, such as DAAs, due to its perceived association with advanced age.

*…going into the pharmacy and just slapping them [the prescriptions] down on the counter, it's just going to feel like I'm a walking medication taker! Once I get over the initial embarrassment…I'm actually going to be calling them and saying, 'I need to fill my medication'. (P7)*

*And for me, personally, I still consider myself still fairly young, and I think this [DAA] is an old person's thing. So, getting your head around it all, you know, it's a little new. (P2)*

Many participants commented on the benefit of accessing a community pharmacist for medication-related information and health advice prior to escalating any concerns to their GP.

*I wouldn't go and pick up a multivitamin or something without talking to the chemist [pharmacist]: 'this is what I take. Could there be any interactions?' (P12)*

*Because sometimes it's hard to get into see your GP. And sometimes it's not necessary to see your GP. I feel that [the community pharmacist] is the 'first port-of-call'; unless you're really, really sick. (P6)*

Conversations with a community pharmacist on discharge home provided many participants with the reassurance they needed to better manage their medications. However, some participants reported they were reticent to speak to their community pharmacist due to privacy concerns associated with discussing personal medical information in public or being a burden when the pharmacist was perceived to be *"busy". (P11)*

*But what I really hate when I go to the chemist [pharmacy] is…they want to talk to you — and there are so many people around… I actually feel uncomfortable talking about that in front of other people…it's probably not actually sinking in because I'm like 'who's standing behind me, is there someone here that I know' you know? And I think that's probably why I didn't know a lot about my medications. (P7)*

For some participants, accessing a community pharmacist and pharmacy services centred around medication cost whereby participants would seek multiple pharmacies to obtain the best price for their medications. Participants acknowledged this had potential to impact continuity of care facilitated by seeing the same pharmacist.

*So, we try to keep costs down where we can…at least by going to that [discount pharmacy] kind of thing…but in a way of a relationship, I wouldn't know any of the people in there. (P9)*

3. *Perceived benefits of routine Post-Discharge Medication Reviews*

Most participants acknowledged the importance of taking responsibility for their medications. However, all participants could foresee circumstances where the availability of PDMRs would prove beneficial.

*I think it [PDMRs] would be really valuable. For me who's never really taken any medication, you know, it's all a bit daunting all of a sudden having to take medication. (P2)*

*As a nurse, there a lot of people out there who have no clue what their medication are or how they should be working, or when they should be taking them. So, I can see the benefits of it — even for myself. (P16)*

*Incorporation of Post-Discharge Medication Reviews into Standard of Care*

Participants reported that PDMR would provide an opportunity for a tailored provision of information. Some participants suggested incorporating a 'triage' system to account for each

patient's individual social situation and educational needs, along with assessing those who may be at high-risk for medication misadventure.

> *There could be benefits from them [PDMRs] that you don't see until you actually have someone come to have a look. I think that you would probably ideally…make contact with a person in hospital, so you understand what they're circumstances are. And then you could make the decision from there. It's very person orientated. (P12)*

> *…then maybe from that phone call going 'okay you sound really stressed about your medication we'll try and squeeze you in tomorrow'…I guess maybe, like, a phone call to kinda like "triage" how urgently they need it. (P1)*

The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety experienced during and after discharge home. Participants reported that a PDMR would benefit their transition back into a community setting to reinforce information and provide ongoing monitoring, reassurance, and support. Similarly, participants perceived that receiving a PDMR at home gave them time to process their hospitalisation and any changes implemented, which might raise issues to be discussed.

> *And also, when you're in the hospital, you might not be thinking of these things to ask either because it's all new and stuff. So, by the time you get home you can all of a sudden sit down and sort of absorb the information. (P2)*

> *like you feel quite safe while in hospital. But when you come home, it's a little bit daunting. (P6)*

Home visitation for a PDMR was also perceived to be more conducive for medication-related education, away from the time pressures experienced in other settings.

> *You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get out of the way.' And even you're not sitting in the doctor's surgery thinking 'I'm getting charged for every 5 minutes I'm sitting here.' (P9)*

> *And when you go to the GP, it's very transactional. Like, it's just like you're in, out. They're really busy to the point that you don't feel confident that they really listen. (P7)*

## Discussion

*Summary of main findings*

Our study explored perspectives of CVD patients on their experiences with medication management and pharmacist-led medication review services during their ToC, including attitudes towards having access to PDMRs. Cardiology patients' ToC following a hospital admission is often associated with a period of vulnerability that may be ameliorated through pharmacist medication reconciliation [34]. Our findings identified that the hospital environment presented several challenges which impacted the effective delivery of education for inpatients. Participants detailed difficulties understanding and retaining medication-related information during admission for a significant health event. Feelings of anxiety and being overwhelmed contributed to poor information retention and meant participants returning home lacking confidence in managing their medications. Despite these feelings, many participants received minimal support through pharmacist-led medication management services across their ToC. Overall, while participants took time to establish a routine back

home, many gradually became confidant and expressed value in a medication review to monitor and provide support upon their return to a community setting.

*Comparison with existing literature*

Existing literature highlights the impact of time pressures on the quality and efficacy of hospital-delivered education for inpatients has been extensively covered in the available evidence base [35-38]. In response patients may be less equipped to manage their medications on discharge to a community setting, thus affecting their quality use of medicines (QUM) — the safe, effective, and appropriate use of medicines — and increasing the risks of future hospitalisations.

Obtaining the patient perspective is a critically important phase of implementing new health services. Our results provide the perspectives of CVD patients, thus building on existing literature [39]. For example, White et al (2012) [40] conducted a qualitative study that identified four key benefits of medication reviews as perceived by patients eligible for these reviews: (i) acquisition of personalised medication information and advice; (ii) reassurance regarding medications and coordination of their care; (iii) feeling valued and cared for by a health care provider; (iv) enhancing the patient-provider and pharmacist-GP relationships. Our study mirrors these observations concerning the perceived benefits of PDMRs, particularly the need for post-discharge follow-up and the reassurance that patients experience when receiving pharmacist input into their care.

However, the White et al study identified patient concerns around the potential for pharmacist medication reviews to be perceived as undermining the authority of the GP, thus having a negative impact on the patient's relationship with their GP [40]. Participants in our study did not share these same perspectives, and instead felt that PDMRs would have potential to improve access to primary care post-discharge through pharmacists due to difficulties experienced with accessing their GPs. Our study demonstrated PDMRs were considered an opportunity to ask questions and more actively engage in education within the security of their own home. We posit that PDMRs have the potential to bridge education deficits that emerge on discharge home and promote communication between hospital and community-based medical practitioners.

The timing of service provision is crucial to ensure that QUM is maintained, and the risk of medication-related problems is minimised. Evidence detailing the incidence of medication-related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks post-discharge [41]. Recently, Daliri et al demonstrated that pharmacy-led transitional care education programs reduced the proportion of patients experiencing self-reported medication-related problems four-weeks post discharge [42]. Participants in our study highlighted their desire for early pharmacist follow-up, within the first seven days post-discharge being the most common request. This demonstrates the importance of early post-discharge follow-up to promote the safe and effective use of medicines for ToC patients.

Participants in the study experienced issues engaging with primary care once discharged from hospital, with potential role for pharmacists to bridge this gap. GP access for prescription resupply was the most common challenge experienced by participants when

returning home. The limited quantities of tablets provided to participants at the time of discharge was sometimes insufficient to sustain them until their GP appointment. The HNELHD is part of the New South Wales (NSW) public health system which stipulates that take home supplies of regular medications must not exceed 7 days' supply when discharged from hospital [43]. Unfortunately, this restriction imposes significant challenges for patients discharged from NSW public hospitals. This varies considerably to other states within Australia — for example, both Queensland and Victorian public hospital networks allow a one-month supply of regular medications under the Pharmaceutical Benefits Scheme [44, 45]. Given that access to a GP may be difficult on discharge due to lengthy wait times, we advocate that pharmacists may in fact play an important role in ensuring the continuity of care and appropriate access to medications through the incorporation of a PDMR as standard of care for ToC patients.

*Strengths, Limitations, and Implications on future research and practice*

The strength of this study lies in the exploration of a heterogenous sample of cardiology patients. A diverse cohort of participants was purposively selected to capture the broadest range of perspectives possible. Furthermore, the inductive thematic analysis approach used in this study enables the richness of the qualitative data to be captured through a more flexible and reflective process. This method aims to remove a researcher's analytic preconceptions, ensuring thematic analysis is data-driven rather than researcher-driven. We acknowledge that many patients were reflecting on the prospect of a PDMR across their ToC rather than having received one. A limitation of this study includes the potential for reporting bias. It is possible that ToC CVD patients who engaged with the study may in fact have a differing experience with pharmacist-led medication management services compared to those who did not

participate. The relatively young mean age of participants (57.5 years of age) may also not accurately reflect the views and experiences of 'older' adult patients (over the age of 65 years) surrounding their need for pharmacist-led medication management services. It is well-documented that patients living outside major Australian capital cities have poorer health outcomes [46]. Our study recruited patients who predominantly live outside major capital city area(s) of Australia. Hence, their inclusion may therefore represent unique health outcome challenges associated with their geographic location. Our results provide a baseline understanding of the perspectives of ToC CVD patients in terms of the implementation of PDMRs. Future research is needed to evaluate the clinical benefit of routine PDMRs for CVD patients to investigate the acceptability of the service, but also its impact on key CVD outcome markers, including 30-day hospital readmission rates and the incidence of major adverse cardiovascular events. In addition, future research should explore the perspectives of other population groups and their engagement with pharmacist-led medication management services. This may include the perspectives of patients who are not immediately engaged with the hospital system, along with cultural and linguistically diverse patients and those residing in regional, rural, and remote localities.

## Conclusion

Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of a broader MDT. PDMRs are viewed by ToC CVD patients as an acceptable means of improving their health literacy and QUM when transitioning from hospital back home. However, our study indicates that patients with CVD do not frequently engage with pharmacist-led medication management services during their ToC. Routine service implementation may address the patient's desire for post-discharge follow-up and provision

for education away from the busy hospital environment. Service implementation may benefit from an initial 'triage' to individualise the delivery by assessing the patient's own needs and expectations of the service, whilst screening for those who may be at high-risk of medication misadventure.

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## Author Contributions

Study design was conducted by JB, HC, JC, JW, and DN. Recruitment was conducted by JB, DM, NE, and MA. Interviews and interview transcription was performed by JB. Data analysis was completed by JB and JW. JB drafted the manuscript for publication and DN, AS, HC, JW and JC contributed to the content and revision of the manuscript. Revisions, literature, and manuscript checking was managed by JB. All authors read and approved the final version.

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## Ethics approval and consent to participate

Ethics approval was received from Hunter New England Human Research Ethics Committee of HNELHD (Reference – 2022/ETH00872). All participants provided written informed consent prior to conducting interviews.

## Competing interests

JB is a credentialed pharmacist who can provide domiciliary medication management reviews funded by the Australian Government Department of Health and Aged Care.

## Data Availability Statement

All data relevant to the study was included either in the manuscript or as supplementary material. Selected anonymised qualitative interview data may be made available upon request.

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**Figure 1:** Inclusion and Exclusion

**Figure 2**: Demographics of Interviewed Cardiovascular Disease Patients.

STEMI: ST-elevated myocardial infarction; NSTEMI: non-ST-elevated myocardial infarction; HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction.

Regular Medications at Discharge denotes medications taken daily by patient (excludes 'when required' or 'pro re nata' (PRN) medications).

Number of comorbidities according to patient's hospital discharge paperwork.

**Figure 1:** Inclusion and Exclusion Criteria

| **Inclusion Criteria** |
| --- |
| Over 18 years of age |
| Discharged from *John Hunter Hospital* into a community setting |
| Pre-existing or newly diagnosed cardiovascular disease, or are considered high-risk for the development of cardiovascular disease using the *CVDCHECK* online tool [28] |
| Can provide written or verbal informed consent in the presence of a witness |
| Can participate in a telephone interview |
| **Exclusion Criteria** |
| Not considered high-risk for development of CVD (as defined previously) AND are not currently diagnosed with CVD |
| Discharged to a residential aged care facility where medications are managed according to local facility protocols |
| Are not eligible to receive an Australian comprehensive medication review service as outlined by the *Pharmacy Programs Administrator Program Rules* [29] |
| Have significant cognitive impairment and cannot participate in a semi-structured interview |
| Receiving palliative care and participation in the interview will incur foreseeable challenges |

| Participant Characteristics | *n*, (%) |
|---|---|
| **Age** | |
| 30–39 | 2 (12.5) |
| 40–49 | 3 (19) |
| 50–59 | 5 (31) |
| 60–69 | 2 (12.5) |
| 70–79 | 4 (25) |
| **Gender** | |
| Male | 9 (56) |
| Female | 7 (44) |
| **Diagnosis** | |
| STEMI | 5 (31) |
| NSTEMI | 5 (31) |
| Ischaemic Heart Disease | 1 (6) |
| HFrEF | 1 (6) |
| HFpEF | 3 (19) |
| Infective Endocarditis | 1 (6) |
| **Regular Prescribed Medications at Discharge** | |
| 1–4 | 2 (13) |
| 5–9 | 8 (50) |
| 10–14 | 5 (31) |
| 15–19 | 0 (0) |
| 20+ | 1 (6) |
| **Number of Comorbidities** | |
| Zero | 3 (19) |
| 1–4 | 7 (44) |
| 5–9 | 5 (31) |
| 10+ | 1 (6) |

**Figure 2**: Demographics of Interviewed Cardiovascular Disease Patients.

STEMI: ST-elevated myocardial infarction; NSTEMI: non-ST-elevated myocardial infarction; HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with preserved ejection fraction.
Regular Medications at Discharge denotes medications taken daily by patient (excludes 'when required' or 'pro re nata' (PRN) medications).
Number of comorbidities according to patient's hospital discharge paperwork.

# *Patient Perspectives of Pharmacist-Provided Medication Reviews*

## *Semi-Structured Interview Questions*

**Research Question**: what are the current experiences of high-risk cardiovascular disease patients with pharmacist-led medication reviews following discharge from hospital?

**Aim**: To investigate the current model of medication review provision for high-risk cardiovascular disease patients upon discharge from hospital.

*General Introduction to Commence Interview:*

- Interviewer introduction and salutation
- Brief explanation of the purpose of the interviews and study
- Provide overview of interview format including the freedom to refuse response provision and requesting breaks at any stage; advise that interview will be audio-recorded
- Request verbal consent to proceed

***Current Medication Management of Patient***

1. Can you describe to me how you currently manage you medicines at home?
2. How many medicines are you taking (including any complimentary and non-oral formulations)?
3. After your recent visit to hospital, how comfortable do you feel managing your medicines?
4. Since your visit to hospital, how has your need to visit a pharmacy or speak with a pharmacist changed?

***Patient Perceptions of Pharmacist Medication Management***

5. What role do you think pharmacists have in supporting you in your day-to-day management of your medicines?
6. What interactions do you have with your regular pharmacist/pharmacy?
7. What is your understanding of medication reviews performed by a pharmacist?

***Previous Experiences with Medication Reviews***

8. Have you ever sat down in a pharmacy to chat with the pharmacist about your medicines?
9. Has a pharmacist ever come out to your home to review your medicines?
10. What medicines review services have been offered to you?

***Prospective Engagement with Pharmacists for Medication Reviews***

11. What medication management help was provided to you while you were in hospital? Who provided you this help?
12. What medication management help has been provided to you since leaving hospital? Who provided you this help?
13. Think back now to the days and weeks since leaving hospital. During this time, when would be the most appropriate time for a pharmacist to help manage your medicines?
14. How comfortable do you feel about a pharmacist coming to your home to review your medicines?
15. Tell us how a pharmacist can help with your day-to-day medicines management?

# COREQ (COnsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| **Domain 1: Research team and reflexivity** | | | |
| *Personal characteristics* | | | |
| Interviewer/facilitator | 1 | Which author/s conducted the interview or focus group? | |
| Credentials | 2 | What were the researcher's credentials? E.g. PhD, MD | |
| Occupation | 3 | What was their occupation at the time of the study? | |
| Gender | 4 | Was the researcher male or female? | |
| Experience and training | 5 | What experience or training did the researcher have? | |
| *Relationship with participants* | | | |
| Relationship established | 6 | Was a relationship established prior to study commencement? | |
| Participant knowledge of the interviewer | 7 | What did the participants know about the researcher? e.g. personal goals, reasons for doing the research | |
| Interviewer characteristics | 8 | What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic | |
| **Domain 2: Study design** | | | |
| *Theoretical framework* | | | |
| Methodological orientation and Theory | 9 | What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis | |
| *Participant selection* | | | |
| Sampling | 10 | How were participants selected? e.g. purposive, convenience, consecutive, snowball | |
| Method of approach | 11 | How were participants approached? e.g. face-to-face, telephone, mail, email | |
| Sample size | 12 | How many participants were in the study? | |
| Non-participation | 13 | How many people refused to participate or dropped out? Reasons? | |
| *Setting* | | | |
| Setting of data collection | 14 | Where was the data collected? e.g. home, clinic, workplace | |
| Presence of non-participants | 15 | Was anyone else present besides the participants and researchers? | |
| Description of sample | 16 | What are the important characteristics of the sample? e.g. demographic data, date | |
| *Data collection* | | | |
| Interview guide | 17 | Were questions, prompts, guides provided by the authors? Was it pilot tested? | |
| Repeat interviews | 18 | Were repeat inter views carried out? If yes, how many? | |
| Audio/visual recording | 19 | Did the research use audio or visual recording to collect the data? | |
| Field notes | 20 | Were field notes made during and/or after the inter view or focus group? | |
| Duration | 21 | What was the duration of the inter views or focus group? | |
| Data saturation | 22 | Was data saturation discussed? | |
| Transcripts returned | 23 | Were transcripts returned to participants for comment and/or | |

| Topic | Item No. | Guide Questions/Description | Reported on Page No. |
|---|---|---|---|
| | | correction? | |
| **Domain 3: analysis and findings** | | | |
| *Data analysis* | | | |
| Number of data coders | 24 | How many data coders coded the data? | |
| Description of the coding tree | 25 | Did authors provide a description of the coding tree? | |
| Derivation of themes | 26 | Were themes identified in advance or derived from the data? | |
| Software | 27 | What software, if applicable, was used to manage the data? | |
| Participant checking | 28 | Did participants provide feedback on the findings? | |
| *Reporting* | | | |
| Quotations presented | 29 | Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number | |
| Data and findings consistent | 30 | Was there consistency between the data presented and the findings? | |
| Clarity of major themes | 31 | Were major themes clearly presented in the findings? | |
| Clarity of minor themes | 32 | Is there a description of diverse cases or discussion of minor themes? | |

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

**Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.**