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

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4 1 ***Pharmacist-Led Medication Management Services: A Qualitative Exploration***
5
6 2 ***of Cardiovascular Disease Patient Experiences***
7

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3 24 **Keywords**
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6 25 Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home
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8 26 Transition; Medication Review
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14 28 **Abstract**

Word Count: 256

15
16 29 **Objective** Hospitalisation due to medication-related problems is a major health concern,
17
18 30 particularly for those with pre-existing, or at high-risk of developing, cardiovascular disease
19
20 31 (CVD). Post-discharge medication reviews (PDMRs) may form a core component of
21
22 32 reducing hospital readmissions due to medication-related problems. This study aimed to
23
24 33 explore CVD patients' perspective of, and experiences with, pharmacist-led medication
25
26 34 management services. A secondary aim explored attitudes towards availability of PDMRs.
27
28
29
30

31 35 **Design** An interpretative qualitative study involving 16 semi-structured interviews. Data
32
33 36 were analysed using an inductive thematic approach.
34
35
36

37 37 **Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an
38
39 38 820-bed tertiary referral hospital based in New South Wales, Australia.
40
41
42

43 39 **Participants** Patients with pre-existing or newly diagnosed CVD recently discharged from
44
45 40 hospital.
46
47
48

49 41 **Results** A total of 16 interviews were conducted to reach thematic saturation. 9 Participants
50
51 42 (56%) were male. Mean age of participants was 57.5 (\pm 13.2) years. Three emergent themes
52
53 43 were identified: (i) Poor medication understanding impacts transition from hospital to home;
54
55 44 (ii) Factors influencing medication concordance following discharge, and (iii) Perceived
56
57 45 benefits of routine post-discharge medication reviews.
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3 46 **Conclusions** There is a clear need to further improve the quality use of medicines and
4
5 47 health literacy of transition-of-care CVD patients. Pharmacists are suitable to provide
6
7 48 essential and tailored medication review services to CVD patients as part of their
8
9 49 multidisciplinary healthcare team. The implementation of routine, pharmacist led PDMRs
10
11 50 may be a feasible means of providing patients with access to health education following their
12
13 51 transition from hospital back to community, improving their health literacy and reducing re-
14
15 52 hospitalisations due to medication-related issues.
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23 54 **Article Summary: Strengths and Limitations of This Study**

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25
26 55 1. Hospitalisation due to medication-related problems is a global health concern. Post-
27
28 56 discharge medication reviews may form a core component of reducing hospital
29
30 57 readmissions due to medication-related problems. Limited research focussing on the
31
32 58 perspectives of primary consumers has been conducted and thus this study aims to fill an
33
34 59 existing knowledge gap.
35
36
37 60 2. The strength of this study lies in the exploration of a heterogenous sample of people with
38
39 61 chronic cardiovascular disease across their transition-of-care.
40
41
42 62 3. The mean age of participants was relatively young and may therefore underestimate the
43
44 63 need for post-discharge medication reviews in ‘older’ adults (adults over the age of 65
45
46 64 years).
47
48
49 65 4. There is a relative lack in representation from cultural and linguistically diverse patients.
50
51 66 5. Potential reporting bias: responding participants may have had different experiences to
52
53 67 non-responders, including access to primary care where differing models of care exist.
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70 Introduction

Word Count: 4655

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

79
80 Rehospitalisation due to poor medication management presents as a significant issue for
81 cardiology patients, who have been shown to have an increased likelihood of hospital
82 readmission by 28% in the following month.⁴ Poor medication concordance is closely
83 associated with adverse outcomes in CVD patients of whom many are elderly and take 5 or
84 more medications.⁵ Poor medication concordance, use of harmful medications and
85 withdrawal of beneficial medications have been identified as precipitating factors for 20% of
86 heart failure (HF) hospitalisations.⁶ Patients with poor medication concordance also have
87 36% higher mortality from ischemic heart disease, and a 2-fold increased risk of mortality
88 from cerebral haemorrhage and cerebral infarction than those with good concordance.⁷

89
90 Internationally, the provision of pharmacist-led medication reconciliation programs during
91 hospital transitions have been established as a means for improving post-hospital healthcare
92 utilisation.⁸⁻¹¹ Growing evidence highlights that comprehensive medication reviews improve
93 health literacy, and reduce the number of medication-related errors and inappropriate use of

1
2
3 94 medicines.¹²⁻¹⁷ In Australia, medication review services were first introduced for residents of
4
5 95 aged care facilities in 1997, expanded to include those living in a community setting in
6
7 96 2001,^{18, 19} and further revised in 2020, to include referrals from hospital-based medical
8
9
10 97 practitioners. The latest amendment enables the initiation of comprehensive medication
11
12 98 reviews through hospital networks along with the allowance for pharmacist-initiated follow-
13
14 99 up reviews; promoting a patient-centred cycle-of-care whereby pharmacists are directly
15
16
17 100 involved in the follow-up of medication-specific problems.
18
19
20 101
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22

23 102 To date, previous research has explored pharmacist and general practitioner (GP)
24
25 103 perspectives of comprehensive medication reviews, including more recently pharmacist
26
27 104 perspectives on the implementation of post-discharge medication reviews (PDMRs).²⁰⁻²⁵
28
29 105 There remains a lack of evidence relating to patient perspectives on PDMRs, particularly
30
31 106 those with existing CVD or those who are at high-risk of CVD complications. Patient
32
33 107 perspectives are invaluable in assessing the effectiveness of healthcare service
34
35 108 implementations aimed at improving health literacy and self-management. Some research
36
37 109 exploring pharmacist-led medication reconciliation reviews suggesting there is improved
38
39 110 health literacy and sustained self-management upon returning to a community setting in
40
41 111 CVD patients who receive pharmacist intervention.^{26, 27} To our knowledge, this is the first
42
43 112 study exploring these perspectives of transition-of-care CVD patients and their experiences
44
45 113 with pharmacist-led medication management services. We aimed to explore the experiences
46
47 114 of patients during their transition-of-care (ToC) from hospital to home probing their
48
49 115 understanding of medication-related changes and subsequent medicine review referral.
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118 **Method**

119 *Study Design, Participant Selection and Recruitment*

120 An interpretive qualitative approach was deemed appropriate to explore our research
121 question. Patient and public involvement was not deemed necessary for the design and
122 implementation of this study. Participants were recruited from the John Hunter Hospital
123 (JHH): a major referral hospital for the Hunter New England Local Health District
124 (HNELHD) servicing over 920,000 people. Patients meeting our inclusion criteria (see **Figure**
125 **1**) being discharged from the JHH with either newly diagnosed or pre-existing CVD were
126 identified by and invited to participate by cardiology nurses and pharmacists from the
127 cardiology ward and cardiac rehabilitation clinic (CRC) at the JHH. Potential participants
128 were provided with detailed study information and had the opportunity to ask questions about
129 the research. All participants provided informed consent. Interviews were conducted between
130 Dec 2022 and July 2023. This study employed the use of semi-structured interviews and was
131 informed by the COnsolidated criteria for REporting Qualitative research (COREQ)
132 checklist.²⁸ Approval for this project was obtained from the Hunter New England Health
133 Human Research Ethics Committee (Reference Number: 2022/ETH00872).

134

135 *Data Collection and Analysis*

136 Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted
137 by a member of the research team (JB) at a mutually convenient time between 1st September
138 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent
139 and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview
140 schedule, questions aimed to probe participant experiences of their recent hospitalisation
141 experiences and subsequent implementation and management of medications, as well as

1
2
3 142 attitudes towards pharmacist-led medication management services including availability of
4
5 143 PDMR services. Identified themes informed continuing data collection and sampling
6
7 144 continued until thematic saturation (two co-coders agreeing that no new themes were
8
9 145 emerging) was achieved. Coding was performed independently by two authors (JB, JW),
10
11 146 following an inductive thematic approach.²⁹ Analysis followed a three-phase approach: (i)
12
13 147 initial familiarisation of the data following a systematic identification of salient themes within
14
15 148 each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked
16
17 149 to sections of the written transcript; (iii) collation of codes into larger themes by examining
18
19 150 relationships between each code. Transcripts were coded line-by-line, describing, and
20
21 151 interpreting emerging categories and searching for differences and similarities. The next step
22
23 152 involved examining the relationship between categories in the context of the research
24
25 153 question to form themes. Consistency of findings was upheld through immersion within the
26
27 154 data and peer debriefing with data coding reflexivity and discussion with the research team.³⁰
28
29 155 ³¹ Coders captured exemplar quotes supporting each theme.
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39 157 **Results**

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42 158 A total of 18 participants provided written informed consent to be interviewed, with 16
43
44 159 completing the interview process. One participant declined the interview and another
45
46 160 participant passed away prior to being interviewed. Demographics for the 16 participants
47
48 161 (mean age 57.5 (13.2) years, 9 (56%) male) are shown in **Figure 2**.
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51

52 162 Three emergent themes were identified:
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- 55 163 (i) *Poor medication understanding impacts transition from hospital to home;*
56
57 164 (ii) *Factors influencing medication concordance following discharge, and*
58
59 165 (iii) *Perceived benefits of routine PDMRs*

166

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)

181

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)

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3 190 Participants' understanding of their medication regime were experienced on a spectrum
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5 191 where some readily grasped changes with new information while other struggled. Difficulty
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7 192 understanding was compounded among participants who had no prior experience with taking
8
9 193 regular medications.

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13 194 "My big problem—like, I've never had anything before—is knowing what all these
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15 195 tablets do...you know nothing, you're learning it all". (P5)

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19
20 197 Participants recounted varying experiences with education during their hospital admission.
21
22 198 Most participants reported they received a combination of verbal and/or written medication
23
24 199 instructions during their hospitalisation or at discharge. Participants valued staff who took
25
26 200 the time to explain their medication regime and "were nice enough to write down" (P4) or
27
28 201 provide written information. Information sources included physicians, nurses, and
29
30 202 pharmacists; although some participants reported they were unsure as to who provided the
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32 203 information.

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37 204 "Hang on, well I know when I was [in hospital], the last doctor I'd seen there, he
38
39 205 explained to me all the way through me tablets: 'when you leave hospital, take so
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41 206 and so and so, then take another tablet', and it was all written out for me". (P17)

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45 207 "I mean, ...there was a person, or some nurse, or doctor came around and explained
46
47 208 the situation". (P5)

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52 210 However, other participants commented on the lack of information provision during their
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54 211 admission and the limited reinforcement of what medication to take and why, especially
55
56 212 during medication rounds. Participants' reports suggested they were passive during
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58 213 medication rounds and only a few pressed staff for information. Many participants perceived

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3 214 limited education was due to staff time constraints and being unable to take time to engage
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6 215 and deliver education in an impactful manner.

7
8 216 “None really. It was just, I guess, the nurses coming and saying either ‘this is due’ or
9
10 217 ‘how are you feeling? Do you need pain relief?’”. (P9)

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12
13 218 “...you know, when you’re in hospital, it’s so busy, full-on. The doctors and nurses are
14
15 219 running from patient-to-patient. So, there’s not a lot of time to actually sit and really
16
17 220 talk about medications and sort of similar things like that”. (P6)

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23 222 Participants’ reports suggested the negative impact of receiving differing information from
24
25 223 multiple sources. Some participants reported a lack of consistency between staff members
26
27 224 which accentuated anxiety and confusion.

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29
30 225 “So, I guess it’s probably a little bit of anxiousness where you get little snippets of
31
32 226 information...you’ve got no idea...like when you’re in hospital, because you have all
33
34 227 different doctors at different particular times, I think it’s because the message isn’t
35
36 228 coming from the one person all the time. Like it’s coming from various different
37
38 229 people”. (P7)

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45 231 Many participants described the difficulties engaging with self-management education when
46
47 232 they felt unwell, distracted by an unfamiliar environment, or were focussed on “wanting to
48
49 233 get home”. (P5)

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53 234 “The thing is, you’ve been sick in hospital, you don’t think. So, your mind’s all
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55 235 muddled up or you go ‘whatever, I don’t want to listen to you’”. (P17)

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3 237 Being a passive recipient of medications in hospital alongside struggling to understand a new
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5 238 medication regime reportedly impacted participants confidence to manage their medications
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8 239 on discharge. Participants reported that they were most unsure during the first few weeks
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10 240 post-discharge as they attempted to establish routines with either taking medications for the
11
12 241 first time or implementing a new medication regimen.

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15 242 “But at the time it’s a bit like, I’m a bit confused about what is what, going through
16
17 243 boxes and reading my list. So yeah, the first few weeks was a bit confusing with what
18
19
20 244 I was taking”. (P4)
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26 246 While some participants reported ongoing feelings of anxiety and being overwhelmed by
27
28 247 a lack of familiarity with medication terminology and understanding the purpose of their
29
30 248 medication, others took on the role of educating themselves. For many this involved
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32 249 online searching or talking to family member who were health professionals, especially
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34
35 250 when experiencing side effects.
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37

38 251 “I came home without too much insight into what they [medications] are and that sort
39
40 252 of thing. It’s been kind of left up to my own accord to basically prepare myself”. (P9)
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42

43 253 “I asked my sister – she’s a cardiothoracic nurse – so I asked her, you know, side
44
45 254 effects I was having that I got on the weekend”. (P2)
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50 51 256 *2. Factors influencing medication concordance following discharge*

52 53 54 257 *Discharge home*

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56
57 258 For many participants the reality of needing to take life-saving medication became apparent
58
59 259 on return home when they were confronted with the seriousness of the situation and the need

1
2
3 260 to develop new daily medication routines. Many were grateful they were on sick leave or
4
5 261 had time post-discharge to establish a routine including being mindful of when medications
6
7
8 262 needed to be taken and if they needed to be taken with meals or not.
9

10 263 “And generally, I get up at the same time each day. Having said that, I am on sick
11
12 264 leave at the moment. So that will take time and breakfast will change when I go
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14
15 265 back to work. But that’s down the track management”. (P1)
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21 267 For participants, especially those without prior experience with taking medication,
22
23 268 remembering to administer doses, manage prescriptions and medication supply, and follow-
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25 269 up appointments with GPs whilst balancing prior commitments with family or work was an
26
27
28 270 additional burden.
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31 271 “I’m just a really busy person. I work full-time and then I’ve got two kids. So, by
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33 272 having to throw medication in on that...I guess it’s like when you’re a new person to
34
35 273 start taking medication...you’ve got to take the medication seriously. And I’m the sort
36
37
38 274 of person who, like, I know I’ve got to take it but I’m just, like, busy. Like it’s not the
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40 275 first thing that’s on my mind which is not good. I need to change that”. (P7)
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46 277 *Cardiac Rehabilitation* 47

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49 278 Several participants reported they continued to lack understanding of their medication
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51 279 regime, which was apparent when engaging with other health professionals such as dentists
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53
54 280 or rehabilitation therapists.
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56
57 281 “I even went to the dentist, and they said: ‘what are you on, we need to update your
58
59 282 records’, and I didn’t even know”. (P9)
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3 283 “I was just at Cardio Rehab [CRC]...and they asked me if I was on a beta-blocker,
4
5 284 and I actually didn’t know what a beta-blocker was. I was, like, not sure!”. (P7)
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11 286 Nine participants were recruited through the CRC at the JHH and reported increased
12
13 287 accessibility and reinforcement of medication information through the clinic. Participation in
14
15 288 the CRC provided participants with an opportunity for further engagement with specialists
16
17 289 in cardiology and ask questions or raise concerns related to medications or management of
18
19 290 their CVD.
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23
24 291 “I actually had a chat with one of the nurses at rehab today, and I was going to have a
25
26 292 chat with one of the guys at the pharmacy but I though I’m at rehab today, I’ll chat
27
28 293 with them about the cholesterol medication I’m on”. (P6)
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34 295 *External support*
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36

37 296 Many participants relied on others to help manage their medications and adhere to them, be
38
39 297 that family members, carers, or community pharmacists. While this was most evident in the
40
41 298 weeks following discharge, others reported an ongoing reliance on family members or
42
43 299 carers. As such, some participants acknowledged they had less opportunity to engage with
44
45 300 community pharmacists for ongoing education, information, or intervention if necessary.
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48

49 301 “Just take them when I’m supposed to take them. My son sort of gets them out and
50
51 302 gives them to me, and I just take them as I’m supposed to. I’m a bit foggy at the
52
53 303 moment, but he’s looking after it. I’ll have to get more involved very shortly”. (P15)
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1
2
3 304 “Because say I say to my wife “I’m too sick to get my tablets today, can you pick
4
5 305 them up for me”? So, if someone else goes and picks up your tablets for you, you
6
7 306 don’t have any interaction with the pharmacist.” (P5)
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13
14 308 *Community care*

15
16 309 Participants readily identified the importance of community pharmacies managing their
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18
19 310 prescriptions and medications, including use dose administration aids.
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21

22 311 “So obviously looking at things of whether Webster-paks® or blister packs —
23
24 312 pre-made medications — that sort of thing as well I think is really important.”
25
26 313 (P1)
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30 314

31
32 315 However, some participants acknowledge that by relying on an external source there was the
33
34 316 potential for error or oversight if they weren’t familiar with changes to their medications.
35
36

37 317 “I gave my prescriptions actually to the pharmacist. They know what they’re doing,
38
39 318 and I don’t have to worry about it. You don’t have to think about sitting at the table
40
41
42 319 and dividing them all up and hoping that they’re not all wrong...which has happened a
43
44 320 couple of times. I’ve gone a couple of weeks without realising I wasn’t taking one
45
46 321 particular [medication]”. (P18)
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50 322

51
52 323 Participants who followed through with an appointment to see their GP on discharge
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54 324 indicated the benefit in gaining further understanding of their recent hospitalisation and
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56 325 medication changes, including accessing new prescriptions.
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3 326 “I was told to go to my GP a week after which I did yesterday...she reinforced what
4
5 327 [medications] they had sent me home with”. (P11)
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9
10 329 Overall, participants reported a wide range of challenges attempting to implement a
11
12 330 medication regime on discharge. Many participants were not supplied with sufficient
13
14 331 medication quantities on discharge to see them through to their follow-up GP appointment,
15
16 332 who were often required to wait several weeks.
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19
20 333 “...because my GP is booked out that far ahead, I’m looking at two to three weeks.
21
22 334 When I rang up to say that I need an appointment to arrange some medications after I
23
24 335 had a heart attack, they had to put me on an emergency waiting list, and even then, it
25
26 336 took them seven days to get me in.” (P3)
27
28

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30 337
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32
33 338 Younger participants were reportedly confronted with the concept of taking multiple
34
35 339 medications and some were reluctant to use dose administration aids which they associated
36
37 340 with ‘older people’.
38
39

40 341 “And for me, personally, I still consider myself still fairly young, and I think this [dose
41
42 342 administration aids] is an old person’s thing. So, getting your head around it all, you
43
44 343 know, it’s a little new”. (P2)
45
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48 344
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50
51 345 Many participants commented on the benefit of accessing a community pharmacist for
52
53 346 medication-related information and health advice prior to escalating any concerns to their GP.
54
55

56 347 “I’m wary about that. I wouldn’t go and pick up a multivitamin or something without
57
58 348 talking to the Chemist: ‘this is what I take. Could there be any interactions?’” (P12)
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2
3 349 “Because sometimes it’s hard to get into see your GP. And sometimes it’s not
4
5 350 necessary to see your GP. I feel that [the community pharmacist] is the ‘first port-of-
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7
8 351 call’; unless you’re really, really sick.” (P6)
9

10 352
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12
13 353 Conversations with a community pharmacist on discharge home provided many participants
14
15
16 354 with the reassurance they needed to better manage their medications. However, some
17
18 355 participants reported they were reticent to speak to their community pharmacist due to
19
20 356 privacy concerns associated with discussing personal medical information in public or being
21
22 357 a burden when the pharmacist was perceived to be “busy”. (P11)
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25

26 358 “But what I really hate when I go to the chemist is when you first give them the
27
28 359 script and it’s the first time you’re getting it back, they want to talk to you — and
29
30 360 there are so many people around...and I actually feel uncomfortable talking about
31
32 361 that in front of other people...it’s probably not actually sinking in because I’m like
33
34 362 ‘who’s standing behind me, is there someone here that I know’ you know? And I
35
36 363 think that’s probably why I didn’t know a lot about my medications. I was just like
37
38 364 ‘yep, yep’; do you know what I mean?”. (P7)
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45 366 For some participants, accessing a community pharmacist and pharmacy services centred
46
47 367 around medication cost whereby participants would seek multiple pharmacies to obtain the
48
49 368 best price for their medications. Participants acknowledged this had potential to impact
50
51 369 continuity of care facilitated by seeing the same pharmacist.
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55 370 “So, we try to keep costs down where we can...at least by going to that [discount
56
57 371 pharmacy] kind of thing, we are trying to keep costs down. But in a way of a
58
59 372 relationship, I wouldn’t know any of the people in there”. (P9)
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56 374 3. *Perceived benefits of routine PDMRs*
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8
9 375 Most participants acknowledged the importance of taking responsibility for their
10
11 376 medications. However, all participants could foresee circumstances where the availability of
12
13
14 377 PDMRs would prove beneficial.

15
16 378 “I think it [post-discharge medicines reviews] would be really valuable. For me who’s
17
18 379 never really taken any medication, you know, it’s all a bit daunting all of a sudden
19
20
21 380 having to take medication”. (P2)

22
23
24 381 “As a nurse, there a lot of people out there who have no clue what their medication are
25
26 382 or how they should be working, or when they should be taking them. So, I can see the
27
28 383 benefits of it — even for myself”. (P16)

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32 384

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34
35 385 Participants reported that PDMR would provide the opportunity for a tailored provision of
36
37 386 information. Some participants suggested incorporating a ‘triage’ system to account for each
38
39 387 patient’s individual social situation and educational needs, along with assessing those who
40
41 388 may be at high-risk for medication misadventure.

42
43
44 389 “There could be benefits from them [post-discharge medication reviews] that you
45
46 390 don’t see until you actually have someone come to have a look. I think that you would
47
48 391 probably ideally... make contact with a person in hospital, so you understand what
49
50 392 they’re circumstances are. And then you could make the decision from there. It’s very
51
52 393 person-orientated”. (P12)

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3 394 "...then maybe from that phone call going "okay you sound really stressed about your
4
5 395 medication we'll try and squeeze you in tomorrow" ...I guess maybe, like, a phone
6
7 396 call to kinda like 'triage' how urgently they need it". (P1)
8
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11 397

12
13 398 The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety
14
15 399 experienced during and after discharge home. Participants reported that PDMR would
16
17 400 benefit transition back into a community setting to monitor, reinforce information and
18
19 401 provide reassurance and support. Similarly, participants perceived that receiving a PDMR at
20
21 402 home gave them time to process their hospitalisation and any changes implemented, which
22
23 403 might raise issues to be discussed.
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27
28 404 "And also, when you're in the hospital, you might not be thinking of these things to
29
30 405 ask either because it's all new and stuff. So, by the time you get home you can all of a
31
32 406 sudden sit down and sort of absorb the information." (P2)
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34

35
36 407 "I would say within the week of coming home. I wouldn't leave it much later. Because
37
38 408 in that week, you're still feeling...like you feel quite safe while in hospital. But when
39
40 409 you come home, it's a little bit daunting." (P6)
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46 411 Home visitation for a PDMR was also perceived to be more conducive for medication-
47
48 412 related education, away from the time pressures experienced of other settings.
49
50

51 413 "You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get
52
53 414 out of the way'. And even you're not sitting in the doctor's surgery thinking 'I'm
54
55 415 getting charged for every 5 minutes I'm sitting here'". (P9)
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57
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1
2
3 416 “And when you go to the GP, it’s very transactional. Like it’s just like you’re in, out,
4
5 417 they’re really busy to the point that you don’t feel confident that they really listen”.

6
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8 418 (P7)

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12 13 14 420 **Discussion**

15 16 17 421 *Summary of main findings*

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19
20 422 Our study explored perspectives of CVD patients on their experiences with medication
21
22 423 management and pharmacist-led medication review services during their ToC, including
23
24 424 attitudes towards having access to PDRMs. Cardiology patients’ ToC following a hospital
25
26 425 admission is often associated with a period of vulnerability that may be ameliorated through
27
28 426 pharmacist medication reconciliation, especially in patients with CVD.³² Our findings
29
30 427 identified that the hospital environment presented several challenges which impacted the
31
32 428 effective delivery of education for inpatients. Participants detailed difficulties understanding
33
34 429 and retaining medication-related information during admission for a significant health event.
35
36 430 Feelings of anxiety and being overwhelmed contributed to poor information retention and
37
38 431 meant participants returning home lacking confidence in managing their medications.
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41 432 Overall, while participants took time to establish a routine back home, many gradually
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43 433 became confident and expressed value in a medication review to monitor and provide
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45 434 support.

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51 52 53 436 *Comparison with existing literature*

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56 437 Existing literature highlights the impact of time pressures on the quality and efficacy of
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58 438 hospital-delivered education for inpatients has been extensively covered in the available
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3 439 evidence base.³³⁻³⁶ In response patients may be less equipped to manage their medications on
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5 440 discharge to a community setting, thus affecting their quality use of medicines (QUM) — the
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7 441 safe, effective, and appropriate use of medicines — and increasing the risks of future
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10 442 hospitalisations.

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16 444 Obtaining the patient perspective is a critically important phase of implementing new health
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18 445 services. Our results provide the perspectives of CVD patients thus building on existing
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20 446 literature.³⁷ For example, White et al (2012)³⁸ conducted a qualitative study that identified
21
22 447 four key benefits of medication reviews as perceived by patients eligible for these reviews:
23
24 448 (i) acquisition of personalised medication information and advice; (ii) reassurance regarding
25
26 449 medications and coordination of their care; (iii) feeling valued and cared for by a health care
27
28 450 provider; (iv) enhancing the patient-provider and pharmacist-GP relationships. Our study
29
30 451 mirrors these observations concerning the perceived benefits of PDMRs, particularly the
31
32 452 need for post-discharge follow-up and the reassurance that patients experience when
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34 453 receiving pharmacist input into their care.
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42 455 However, the White et al study identified patient concerns around the potential for
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44 456 pharmacist medication reviews to be perceived as undermining the authority of the GP, thus
45
46 457 having a negative impact on the patient's relationship with their GP.³⁸ Participants in our
47
48 458 study did not share these same perspectives, and instead felt that PDMRs would have
49
50 459 potential to improve access to primary care post-discharge through pharmacists due to the
51
52 460 difficulties they experienced with accessing their GPs. Our study demonstrated PDMRs were
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54 461 considered an opportunity to ask questions and more actively engage in education within the
55
56 462 security of their own home. We posit that PDMRs have the potential to bridge education
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3 463 deficits that emerge on discharge home and promote communication between hospital and
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5 464 community-based medical practitioners.
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11 466 The timing of service provision is crucial to ensure that QUM is maintained, and the risk of
12
13 467 medication-related problems is minimised. Evidence detailing the incidence of medication-
14
15 468 related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks
16
17 469 post-discharge.³⁹ Recently Daliri et al demonstrated that pharmacy-led transitional care
18
19 470 education programs reduced the proportion of patients experiencing self-reported
20
21 471 medication-related problems four-weeks post discharge.⁴⁰ Participants in our study
22
23 472 highlighted their desire for early pharmacist follow-up, within the first seven days post-
24
25 473 discharge being the most common request. This demonstrates the importance of early post-
26
27 474 discharge follow-up to promote the safe and effective use of medicines for ToC patients.
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35 476 Participants in the study experienced issues engaging with primary care once discharged
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37 477 from hospital, with potential role for pharmacists to bridge this gap. GP access for
38
39 478 prescription resupply was the most common challenge experienced by participants when
40
41 479 returning home. The limited quantities of tablets provided to participants at the time of
42
43 480 discharge was sometimes insufficient to sustain them until their GP appointment. The
44
45 481 HNELHD is part of the NSW public health system which stipulates that take home supplies
46
47 482 of regular medications must not exceed 7 days' supply when discharged from hospital.⁴¹
48
49 483 Unfortunately, this restriction imposes significant challenges for patients discharged from
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51 484 NSW public hospitals. This varies considerably to other states within Australia — for
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53 485 example, both Queensland and Victorian public hospital networks allow a one-month supply
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3 486 of regular medications under the Pharmaceutical Benefits Scheme.^{42, 43} Given that access to
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5 487 a GP may be difficult on discharge due to lengthy wait times we advocate...
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11 489 *Implications on future research and practice*
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13
14 490 The strength of this study lies in the exploration of a heterogenous sample of cardiology
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16 491 patients. We acknowledge that many patients were reflecting on the potential of a PDMR
17
18 492 rather than having received one. Our results provide a baseline understanding of the
19
20 493 perspectives of transition-of-care CVD patients in terms of the implementation of PDMRs.
21
22 494 Future research is needed to evaluate routine PDMRs for CVD patients to investigate the
23
24 495 acceptability of the service, but also its impact on key CVD outcome markers, including 30-
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26 496 day hospital readmission rates and the incidence of major adverse cardiovascular events. In
27
28 497 addition, future research should explore the perspectives of cultural and linguistically diverse
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30 498 patients and those residing in regional, rural, and remote localities.
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39 500 **Conclusion**
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41 501 Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of
42
43 502 a broader MDT. PDMRs are viewed by transition-of-care CVD patients as an acceptable
44
45 503 means of improving their health literacy and QUM when transitioning from hospital back
46
47 504 home. Routine service implementation may address the patient's desire for post-discharge
48
49 505 follow-up and provision for education away from the busy hospital environment. Service
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51 506 implementation may benefit from an initial 'triage' to individualise the delivery by assessing
52
53 507 the patient's own needs and expectations of the service, whilst screening for those who may
54
55 508 be at high-risk of medication misadventure.
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514 Study design was conducted by JB, HC, JC, JW and DN. Interviews and interview
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517 revision of the manuscript. Revisions, literature, and manuscript checking was managed by
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6 532 Ethics approval was received from Hunter New England Human Research Ethics Committee
7
8
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10
11 534 participants provided written informed consent prior to conducting interviews.
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17 536 **Competing interests**
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19
20 537 JB is a credentialed pharmacist who can provide domiciliary medication management
21
22
23 538 reviews funded by the Australian Government Department of Health and Aged Care.
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For peer review only

Figure 1: Inclusion and Exclusion Criteria

Inclusion Criteria
Over 18 years of age
Discharged from <i>John Hunter Hospital</i> into community setting
Pre-existing or newly diagnosed cardiovascular disease, or are considered high-risk for the development of cardiovascular disease using the <i>CVDCHECK</i> 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 <i>Pharmacy Programs Administrator Program Rules</i> 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

<p>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</p>	Page 1/Lines 1-2
<p>Abstract - Summary of key elements of the study using the abstract format of the intended publication; typically includes background, purpose, methods, results, and conclusions</p>	Page 2-3/Lines 28-52

Introduction

<p>Problem formulation - Description and significance of the problem/phenomenon studied; review of relevant theory and empirical work; problem statement</p>	Page 5/Lines 102-111
<p>Purpose or research question - Purpose of the study and specific objectives or questions</p>	Page 5/Lines 111-115

Methods

<p>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**</p>	Page 6/Lines 120
<p>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</p>	Page 7/Lines 144-150
<p>Context - Setting/site and salient contextual factors; rationale**</p>	Page 6/Lines 121-123
<p>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**</p>	Page 6/Lines 123-127
<p>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</p>	Page 6/Lines 127-132
<p>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**</p>	Page 6/Lines 135-137

1 2 3 4 5	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
6 7 8	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
9 10 11 12	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
13 14 15 16	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
17 18 19 20	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

23 24 25 26	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
27 28 29	Links to empirical data - Evidence (e.g., quotes, field notes, text excerpts, photographs) to substantiate analytic findings	Page 7-19/Line 156-417

Discussion

32 33 34 35 36 37 38	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
39 40	Limitations - Trustworthiness and limitations of findings	Page 22/Line 490-497

Other

43 44 45	Conflicts of interest - Potential sources of influence or perceived influence on study conduct and conclusions; how these were managed	Page 24/Line 535-537
46 47 48	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.

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**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
DOI: 10.1097/ACM.0000000000000388

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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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Primary Subject Heading:	Health services research
Secondary Subject Heading:	Cardiovascular medicine, Medical management, Patient-centred medicine, Pharmacology and therapeutics, Qualitative research
Keywords:	Pharmacists, Medication Reconciliation, Cardiovascular Disease, Hospital to Home Transition, Medication Review, CARDIOLOGY

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4 1 ***Pharmacist-Led Medication Management Services: A Qualitative Exploration***
5
6 2 ***of Transition-of-Care Cardiovascular Disease Patient Experiences***
7

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3 **32 Keywords**
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6 **33 Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home**
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8 **34 Transition; Medication Review**
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12 **35**
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14 **36 Abstract**
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16 **37 Objective** Hospitalisation due to medication-related problems is a major health concern,
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18 particularly for those with pre-existing, or those at high-risk of developing, cardiovascular
19 **38 disease (CVD). Post-discharge medication reviews (PDMRs) may form a core component of**
20
21 **39 reducing hospital readmissions due to medication-related problems. This study aimed to**
22
23 **40 explore post-discharge CVD patients' perspective of, and experiences with, pharmacist-led**
24
25 **41 medication management services. A secondary aim explored attitudes towards availability of**
26
27 **42 PDMRs.**
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33
34 **44 Design** An interpretative qualitative study involving 16 semi-structured interviews. Data
35
36 **45 were analysed using an inductive thematic approach.**
37
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39
40 **46 Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an
41
42 **47 820-bed tertiary referral hospital based in New South Wales, Australia.**
43
44

45
46 **48 Participants** Patients with pre-existing or newly diagnosed CVD who were recently
47
48 **49 discharged from hospital.**
49
50

51
52 **50 Results** A total of 16 interviews were conducted to reach thematic saturation. Nine
53
54 **51 participants (56%) were male. Mean age of participants was 57.5 (\pm 13.2) years. Three**
55
56 **52 emergent themes were identified: (i) Poor medication understanding impacts transition from**
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3 53 hospital to home; (ii) Factors influencing medication concordance following discharge, and
4
5 54 (iii) Perceived benefits of routine PDMRs.
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9 **Conclusions** There is a clear need to further improve the quality use of medicines and
10
11 56 health literacy of transition-of-care CVD patients. Pharmacists are suitable to provide
12
13 57 essential and tailored medication review services to CVD patients as part of a
14
15 58 multidisciplinary healthcare team. The implementation of routine, pharmacist led PDMRs
16
17 59 may be a feasible means of providing patients with access to health education following their
18
19 60 transition from hospital back to community, improving their health literacy and reducing re-
20
21 61 hospitalisations due to medication-related issues.
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29 63 **Data Availability Statement**

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32 64 All data relevant to the study was included either in the manuscript or as supplementary
33
34 65 material. Selected anonymised qualitative interview data may be made available upon
35
36 66 request.
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43 68 **Article Summary: Strengths and Limitations of This Study**

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45
46 69 1. To our knowledge, this is the first study exploring the perspectives of transition-of-care
47
48 70 patients with CVD and their experiences with pharmacist-led medication management
49
50 71 services.
51
52 72 2. The strength of this study lies in the exploration of a heterogenous sample of people with
53
54 73 CVD across their transition of care.
55
56 74 3. The inductive thematic analysis approach used in this study enables the richness of the
57
58 75 qualitative data to be captured through a more flexible and reflective process.
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3 76 4. Potential reporting bias: responding participants may have had different experiences to
4
5 77 non-responders, including access to primary care where differing models of care exist.
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8 78 5. Our study recruited patients who live outside major capital city area(s) of Australia and
9
10 79 therefore may represent unique challenges due to their geographic location, often having
11
12 80 poorer health outcomes than those living in major capital cities.
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82 Introduction

Word Count: 5083

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

91
92 Rehospitalisation due to poor medication management presents as a significant issue for
93 cardiology patients. The likelihood of hospital readmission for CVD patients has been shown
94 to increase by 28% in the following month because of poorly management medication
95 regimens [4]. Poor medication concordance is closely associated with adverse outcomes in
96 CVD patients of whom many are elderly and take 5 or more medications [5]. Poor medication
97 concordance, use of harmful medications and withdrawal of beneficial medications have been
98 identified as precipitating factors for 20% of heart failure (HF) hospitalisations [6]. Patients
99 with poor medication concordance also have 36% higher mortality from ischemic heart
100 disease, and a 2-fold increased risk of mortality from cerebral haemorrhage and cerebral
101 infarction than those with good concordance [7].

102
103 Internationally, the provision of pharmacist-led medication reconciliation programs during
104 hospital transitions have been established as a means for improving post-hospital healthcare
105 utilisation [8-11]. Growing evidence highlights that comprehensive medication reviews

1
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3 106 improve health literacy and reduce the number of medication-related errors and inappropriate
4
5 107 use of medicines [12-17]. In Australia, medication review services were first introduced for
6
7 108 residents of aged care facilities in 1997, expanded to include those living in a community
8
9
10 109 setting in 2001 [18, 19], and further revised in 2020, to include referrals from hospital-based
11
12 110 medical practitioners. The latest amendment enables the initiation of comprehensive
13
14 111 medication reviews through hospital networks along with the allowance for pharmacist-
15
16 112 initiated follow-up reviews; promoting a patient-centred cycle-of-care whereby pharmacists
17
18 113 are directly involved in the follow-up of medication-specific problems.
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25 114
26 115 To date, previous research has explored pharmacist and general practitioner (GP)
27
28 116 perspectives of comprehensive medication reviews, including more recently pharmacist
29
30 117 perspectives on the implementation of post-discharge medication reviews (PDMRs) [20-25].
31
32 118 There remains a lack of evidence relating to patient perspectives on PDMRs, particularly
33
34 119 those with existing CVD or those who are at high-risk of CVD complications. Patient
35
36 120 perspectives are invaluable in assessing the effectiveness of healthcare service
37
38 121 implementations aimed at improving health literacy and self-management. Some research
39
40 122 exploring pharmacist-led medication reconciliation reviews suggesting there is improved
41
42 123 health literacy and sustained self-management upon returning to a community setting in
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44 124 CVD patients who receive pharmacist intervention [26, 27]. To our knowledge, this is the
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46 125 first study exploring these perspectives of (ToC) CVD patients and their experiences with
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48 126 pharmacist-led medication management services. We aimed to explore the experiences of
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50 127 patients during their ToC from hospital to home probing their understanding of medication-
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52 128 related changes and subsequent medicine review referral.
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130 **Method**

131 *Study Design, Participant Selection and Recruitment*

132 An interpretive qualitative approach was deemed appropriate to explore our research
133 question. Participants were recruited from the John Hunter Hospital (JHH): a major referral
134 hospital for the Hunter New England Local Health District (HNELHD) servicing over
135 920,000 people. To reduce the risk of recruitment bias, a clear set of inclusion criteria as
136 shown in **Figure 1** was created to assist with identifying potential participants. Patients
137 meeting our inclusion criteria being discharged from the JHH with either newly diagnosed or
138 pre-existing CVD were identified by, and invited to participate, by cardiology nurses and
139 pharmacists from the cardiology ward and cardiac rehabilitation clinic (CRC) at the JHH.
140 Purposive sampling was used when identifying and selecting CVD patients as potential
141 participants for the study to create a diverse and heterogeneous cohort.

142
143 Potential participants were provided with detailed study information and had the opportunity
144 to ask questions about the research and were aware of the voluntary nature of their
145 participation in the study. All participants provided informed consent. Interviews were
146 conducted between 1st September 2022 and 30th September 2023. This study employed the
147 use of semi-structured interviews and was informed by the COnsolidated criteria for
148 REporting Qualitative research (COREQ) checklist [28]. The interview guide was designed
149 by a sub-group of the investigators (JB, HC, JC, and DN) following a review of existing
150 literature. The sub-group then constructed questions based on this literature review that
151 address the central aim of the study. However, considering the semi-structured interview
152 design, participants had freedom to express views and experiences in their own words and
153 diverge from the interview guide. Approval for this project was obtained from the Hunter

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3 154 New England Health Human Research Ethics Committee (Reference Number:
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5 155 2022/ETH00872).

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11 157 *Patient and Public Involvement*

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14 158 Patient and public involvement was not deemed necessary for the design and implementation
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16 159 of this study.

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22 161 *Data Collection and Analysis*

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25 162 Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted
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27 163 by a member of the research team (JB) at a mutually convenient time between 1st September
28
29 164 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent
30
31 165 and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview
32
33 166 schedule, questions aimed to probe participant experiences of their recent hospitalisation
34
35 167 experiences and subsequent implementation and management of medications, as well as
36
37 168 attitudes towards pharmacist-led medication management services including availability of
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39 169 PDMR services. Identified themes informed continuing data collection and sampling
40
41 170 continued until thematic saturation (two co-coders agreeing that no new themes were
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43 171 emerging) was achieved. Coding was performed independently by two authors (JB, JW),
44
45 172 following an inductive thematic approach [29]. Analysis followed a three-phase approach: (i)
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47 173 initial familiarisation of the data following a systematic identification of salient themes within
48
49 174 each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked
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51 175 to sections of the written transcript; (iii) collation of codes into larger themes by examining
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53 176 relationships between each code. Transcripts were coded line-by-line, describing and
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55 177 interpreting emerging categories, and searching for differences and similarities. The next step
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3 178 involved examining the relationship between categories in the context of the research
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5 179 question to form themes. Consistency of findings was upheld through immersion within the
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8 180 data, and peer debriefing with data coding reflexivity and discussion with the research team
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10 181 [30, 31]. Coders captured exemplar quotes supporting each theme.
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13 182

16 183 **Results**

19 184 A total of 18 participants provided written informed consent to be interviewed, with 16
20
21 185 completing the interview process. One participant declined the interview and another
22
23 186 participant passed away prior to being interviewed. Demographics for the 16 participants
24
25
26 187 (mean age 57.5 (\pm 13.2) years, 9 (56%) male) are shown in **Figure 2**.
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29 188 Three emergent themes were identified:
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31

- 32 189 (i) *Poor medication understanding impacts transition from hospital to home;*
33
34 190 (ii) *Factors influencing medication concordance following discharge, and*
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36 191 (iii) *Perceived benefits of routine PDMRs*
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40 192

43 193 1. *Poor medication understanding impacts transition from hospital to home*

45 194 *The Overwhelming Hospital Experience*

47 195 Many participants reported difficulties comprehending health-related information during
48
49 196 their hospital admission, including understanding the cause of their cardiovascular event, and
50
51
52 197 subsequent medication and lifestyle changes recommended following their discharge.
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54 198 Participants reflected on their feelings of anxiety and being overwhelmed in response to the
55
56 199 experience of a life-threatening cardiovascular event. Participants reportedly attributed
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3 200 anxiety with difficulties in comprehending the initiation of, or changes to, medications
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5 201 during their acute hospital admission.
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8 202 *[It's] obviously a very stressful situation I was in, being so young and having a*
9
10 203 *cardiac thing go on. So, I didn't take everything in those first couple of days. (P1)*
11
12
13 204 *Because when you're in hospital and they're telling you what tablets to take, you're*
14
15 205 *going 'okay, there's just so much going on in hospital.' Yeah, it's not until you get*
16
17 206 *home that you think 'okay, what was that all about?' It was just a whirlwind I went*
18
19 207 *through. (P4)*
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26 209 Participants reported that understanding copious amounts of new medication-related
27
28 210 information was more difficult to comprehend whilst trying to grasp the extensiveness of
29
30 211 medications now required.
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32 212 *...so, they gave me a week's medication from the pharmacy at the hospital and this*
33
34 213 *big, two A4 sheets of all the tablets that you get. I go 'oh s**t' because you don't*
35
36 214 *know this. I'm going to check-out, and they go 'oh, here are all your tablets' and I*
37
38 215 *go 'oh s**t, look at all this!' (P5)*
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42 216 43 44 217 *Challenges Associated with Education within a Hospital Environment*

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46
47 218 Participants' understanding of their medication regime were experienced on a spectrum
48
49 219 where some readily grasped changes with new information while others struggled. Difficulty
50
51 220 understanding was compounded among participants who had no prior experience with taking
52
53 221 regular medications.
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57 222 *My big problem—like, I've never had anything before—is knowing what all these*
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59 223 *tablets do...you know nothing, you're learning it all. (P5)*
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6 225 Participants recounted varying experiences with education during their hospital admission.
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8 226 Most participants reported they received a combination of verbal and/or written medication
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10 227 instructions during their hospitalisation or at discharge. Participants valued staff who took
11
12 228 the time to explain their medication regime and “*were nice enough to write down*” (P4) or
13
14 229 provide written information. Information sources included physicians, nurses, and
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16
17 230 pharmacists; although some participants reported they were unsure as to who provided the
18
19 231 information.

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22 232 *...the last doctor I'd seen there [in hospital], he explained to me all the way*
23
24 233 *through me tablets... and it was all written out for me. (P17)*

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27 234 *I mean, ...there was a person, or some nurse, or doctor came around and explained*
28
29 235 *the situation. (P5)*

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35 237 However, other participants commented on the lack of information provision during their
36
37 238 admission and the limited reinforcement of what medication to take and why, especially
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39 239 during medication rounds. Participants' reports suggested they were passive during
40
41 240 medication rounds and only a few pressed staff for information. Many participants perceived
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43 241 limited education was due to staff time constraints and being unable to take time to engage
44
45 242 and deliver education in an impactful manner.

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49 243 *None really. It was just, I guess, the nurses coming and saying either 'this is due' or*
50
51 244 *'how are you feeling? Do you need pain relief?' (P9)*

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53
54 245 *...you know, when you're in hospital, it's so busy, full-on. The doctors and nurses are*
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56 246 *running from patient-to-patient. So, there's not a lot of time to actually sit and really*
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58 247 *talk about medications and sort of similar things like that. (P6)*
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6 249 Participants' reports suggested the negative impact of receiving differing information from
7
8 250 multiple sources. Some participants reported a lack of consistency between staff members
9
10 251 which accentuated anxiety and confusion.

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12
13 252 *So, I guess it's probably a little bit of anxiousness where you get little snippets of*
14
15 253 *information...you've got no idea... I think it's because the message isn't coming from*
16
17 254 *the one person all the time. Like it's coming from various different people. (P7)*
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22 23 256 *Implementing Medication Self-Management*

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26 257 Many participants described the difficulties engaging with self-management education when
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28 258 they felt unwell, distracted by an unfamiliar environment, or were focussed on "wanting to
29
30 259 *get home.*" (P5)

31
32
33
34 260 *The thing is, you've been sick in hospital, you don't think. So, your mind's all muddled*
35
36 261 *up or you go 'whatever, I don't want to listen to you.'* (P17)
37
38

39 262

40
41
42 263 Being a passive recipient of medications in hospital, alongside struggling to understand a
43
44 264 new medication regime, reportedly impacted participants' confidence to manage their
45
46 265 medications on discharge. Participants reported that they were most unsure during the first
47
48 266 few weeks post-discharge as they attempted to establish routines with either taking
49
50 267 medications for the first time or implementing a new medication regimen.

51
52
53
54 268 *But at the time it's a bit, like, I'm a bit confused about what is what, going through*
55
56 269 *boxes and reading my list. So yeah, the first few weeks was a bit confusing with what I*
57
58 270 *was taking. (P4)*
59
60

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4
5

6 272 While some participants reported ongoing feelings of anxiety and being overwhelmed by
7
8 273 a lack of familiarity with medication terminology and understanding the purpose of their
9
10 274 medication, others embraced self-education. For many, this involved conducting online
11
12 275 research or talking to family members who were health professionals, especially in
13
14 276 relation to side effects.

17
18 277 *I came home without too much insight into what they [medications] are and that sort*
19
20 278 *of thing. It's been kind of left up to my own accord to basically prepare myself. (P9)*

21
22
23 279 *I asked my sister — she's a cardiothoracic nurse. So, I asked her, you know, side*
24
25 280 *effects I was having that I got on the weekend. (P2)*

26
27
28
29 281
30
31

32 282 2. Factors influencing medication concordance following discharge

33 34 283 *Discharge home*

35
36
37 284 For many participants, the reality of needing to take life-saving medication became apparent
38
39 285 on return home when they were confronted with the seriousness of the situation and the need
40
41 286 to develop new daily medication routines. Many were grateful they were on sick leave or
42
43 287 had time post-discharge to establish a routine, including being mindful of when medications
44
45 288 needed to be taken and if they needed to be taken with meals or not.

46
47
48
49 289 *And generally, I get up at the same time each day. Having said that, I am on sick*
50
51 290 *leave at the moment. So that will take time and breakfast will change when I go*
52
53 291 *back to work. But that's down the track management. (P1)*

54
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57 292
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1
2
3 293 For participants, especially those without prior experience with taking medication,
4
5 294 remembering to administer doses, manage prescriptions and medication supply, and follow-
6
7
8 295 up appointments with GPs whilst balancing prior commitments with family or work was an
9
10 296 additional burden.

11
12
13 297 *I'm just a really busy person. I work full-time and then I've got two kids. So, by having*
14
15 298 *to throw medication in on that...I guess it's like when you're a new person to start*
16
17 299 *taking medication...you've got to take the medication seriously. Like it's not the first*
18
19 300 *thing that's on my mind which is not good. I need to change that. (P7)*
20
21
22

23 301

24 25 302 *Cardiac Rehabilitation*

26
27
28
29 303 Several participants reported they continued to lack understanding of their medication
30
31 304 regime, which was apparent when engaging with other health professionals such as dentists
32
33 305 or rehabilitation therapists.

34
35
36 306 *I even went to the dentist, and they said: 'what are you on, we need to update your*
37
38 307 *records', and I didn't even know. (P9)*

39
40
41 308 *I was just at Cardio Rehab [CRC]...and they asked me if I was on a beta-blocker,*
42
43 309 *and I actually didn't know what a beta-blocker was. I was, like, not sure! (P7)*
44
45
46

47 310

48
49
50 311 Nine participants were recruited through the CRC at the JHH and reported increased
51
52 312 accessibility and reinforcement of medication information through the clinic. Participation in
53
54 313 the CRC provided participants with an opportunity for further engagement with specialists
55
56 314 in cardiology and ask questions or raise concerns related to medications or management of
57
58 315 their CVD.
59
60

1
2
3 316 *...I was going to have a chat with one of the guys at the pharmacy, but I thought I'm at*
4
5 317 *rehab [CRC] today, I'll chat with them [the nurses] about the cholesterol medication*
6
7
8 318 *I'm on. (P6)*
9

10
11 319

12
13
14 320 *External support*

15
16
17 321 Many participants relied on others to help manage their medications and adhere to them, be
18
19 322 that family members, carers, or community pharmacists. While this was most evident in the
20
21 323 weeks following discharge, others reported an ongoing reliance on family members or
22
23 324 carers. As such, some participants acknowledged they had less opportunity to engage with
24
25 325 community pharmacists for ongoing education, information, or intervention if necessary.
26
27

28
29 326 *My son sort of gets them out and gives them to me, and I just take them as I'm*
30
31 327 *supposed to. I'm a bit foggy at the moment, but he's looking after it. I'll have to get*
32
33 328 *more involved very shortly. (P15)*
34

35
36 329 *Because, say I say to my wife: 'I'm too sick to get my tablets today, can you pick*
37
38 330 *them up for me?' So, if someone else goes and picks up your tablets for you, you*
39
40 331 *don't have any interaction with the pharmacist. (P5)*
41
42

43
44 332

45
46
47 333 *Engagement with Pharmacist-Led Medication Management Services*

48
49
50 334 Many participants stated that their experience with pharmacist-led medication management
51
52 335 services was limited to medication supply and prescription management, predominantly
53
54 336 delivered in a community setting.
55

56
57 337 *So, you know, I guess their role is pretty broad. But personally, I use them for*
58
59 338 *prescriptions and information around that and that's probably about it. (P12)*
60

1
2
3 339 *Sort of nothing really. Just when it comes to medication-wise. Like that's the only time I*
4
5 340 *sort of have anything to do with pharmacists, it's when I've gotta pick up medication.*
6
7 341 *(P14)*
8
9

10 342
11
12 343 Participants readily identified the importance of community pharmacies managing their
13
14 344 prescriptions and medications, including the use of dose administration aids (DAAs).
15
16

17 345 *So obviously looking at things of whether Webster-paks® or blister packs*
18
19 346 *[medication compliance packaging] — pre-made medications — that sort of*
20
21 347 *thing as well I think is really important. (P1)*
22
23
24

25 348 However, some participants acknowledged that by relying on an external source there was
26
27 349 the potential for error or oversight if they weren't familiar with changes to their medications.
28
29

30 350 *I gave my prescriptions actually to the pharmacist. You don't have to think about*
31
32 351 *sitting at the table and dividing them all up and hoping that they're not all*
33
34 352 *wrong...which has happened a couple of times. I've gone a couple of weeks without*
35
36 353 *realising I wasn't taking one particular [medication]. (P18)*
37
38
39

40 354
41
42 355 *Engagement with community care*
43
44

45 356 Participants who followed through with an appointment to see their GP on discharge
46
47 357 indicated the benefit in gaining further understanding of their recent hospitalisation and
48
49 358 medication changes, including accessing new prescriptions.
50
51

52
53 359 *I was told to go to my GP a week after which I did yesterday...she reinforced what*
54
55 360 *[medications] they had sent me home with. (P11)*
56
57

58 361
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60

1
2
3 362 Overall, participants reported a wide range of challenges adhering to a medication regime on
4
5 363 discharge. Many participants were not supplied with sufficient medication quantities on
6
7 364 discharge to seen them through to their follow-up GP appointment, who were often required
8
9
10 365 to wait several weeks.

11
12
13 366 *...because my GP is booked out that far ahead, I'm looking at two to three weeks.*

14
15 367 *When I rang up to say that I need an appointment to arrange some medications after I*
16
17 368 *had a heart attack, they had to put me on an emergency waiting list, and even then, it*
18
19 369 *took them seven days to get me in. (P3)*

20
21
22
23 370

24
25
26 371 Participants were reportedly confronted with the concept of taking multiple medications,
27
28 372 highlighting their embarrassment and the stigma associated with medication use. Some
29
30 373 participants were reluctant to seek pharmacist-led medication management services, such as
31
32 374 DAAs, due to its perceived association with advanced age.

33
34
35 375 *...going into the pharmacy and just slapping them [the prescriptions] down on the*
36
37 376 *counter, it's just going to feel like I'm a walking medication taker! Once I get over the*
38
39 377 *initial embarrassment...I'm actually going to be calling them and saying, 'I need to fill*
40
41 378 *my medication'. (P7)*

42
43
44
45 379 *And for me, personally, I still consider myself still fairly young, and I think this [DAA]*
46
47 380 *is an old person's thing. So, getting your head around it all, you know, it's a little new.*
48
49 381 *(P2)*

50
51
52
53 382

54
55
56 383 Many participants commented on the benefit of accessing a community pharmacist for
57
58 384 medication-related information and health advice prior to escalating any concerns to their GP.

1
2
3 385 *I wouldn't go and pick up a multivitamin or something without talking to the chemist*

4
5 386 *[pharmacist]: 'this is what I take. Could there be any interactions?'* (P12)

6
7
8 387 *Because sometimes it's hard to get into see your GP. And sometimes it's not necessary*

9
10 388 *to see your GP. I feel that [the community pharmacist] is the 'first port-of-call'; unless*

11
12 389 *you're really, really sick. (P6)*

13
14
15
16 390

17
18
19 391 Conversations with a community pharmacist on discharge home provided many participants

20
21 392 with the reassurance they needed to better manage their medications. However, some

22
23 393 participants reported they were reticent to speak to their community pharmacist due to

24
25 394 privacy concerns associated with discussing personal medical information in public or being

26
27 395 a burden when the pharmacist was perceived to be "busy". (P11)

28
29
30 396 *But what I really hate when I go to the chemist [pharmacy] is...they want to talk to*

31
32 397 *you — and there are so many people around... I actually feel uncomfortable talking*

33
34 398 *about that in front of other people...it's probably not actually sinking in because*

35
36 399 *I'm like 'who's standing behind me, is there someone here that I know' you know?*

37
38 400 *And I think that's probably why I didn't know a lot about my medications. (P7)*

39
40
41
42
43 401

44
45
46 402 For some participants, accessing a community pharmacist and pharmacy services centred

47
48 403 around medication cost whereby participants would seek multiple pharmacies to obtain the

49
50 404 best price for their medications. Participants acknowledged this had potential to impact

51
52 405 continuity of care facilitated by seeing the same pharmacist.

1
2
3 406 *So, we try to keep costs down where we can...at least by going to that [discount*
4
5 407 *pharmacy] kind of thing...but in a way of a relationship, I wouldn't know any of the*
6
7
8 408 *people in there. (P9)*
9

10
11 409

12 13 410 3. *Perceived benefits of routine Post-Discharge Medication Reviews*

14
15
16 411 Most participants acknowledged the importance of taking responsibility for their
17
18 412 medications. However, all participants could foresee circumstances where the availability of
19
20
21 413 PDMRs would prove beneficial.

22
23
24 414 *I think it [PDMRs] would be really valuable. For me who's never really taken any*
25
26 415 *medication, you know, it's all a bit daunting all of a sudden having to take medication.*
27
28
29 416 *(P2)*

30
31
32 417 *As a nurse, there a lot of people out there who have no clue what their medication are*
33
34 418 *or how they should be working, or when they should be taking them. So, I can see the*
35
36 419 *benefits of it — even for myself. (P16)*
37
38

39 420

40 41 42 421 *Incorporation of Post-Discharge Medication Reviews into Standard of Care*

43
44
45 422 Participants reported that PDMR would provide an opportunity for a tailored provision of
46
47 423 information. Some participants suggested incorporating a 'triage' system to account for each
48
49 424 patient's individual social situation and educational needs, along with assessing those who
50
51 425 may be at high-risk for medication misadventure.

52
53
54
55 426 *There could be benefits from them [PDMRs] that you don't see until you actually have*
56
57 427 *someone come to have a look. I think that you would probably ideally...make contact*
58
59
60

1
2
3 428 *with a person in hospital, so you understand what they're circumstances are. And then*
4
5 429 *you could make the decision from there. It's very person orientated. (P12)*
6
7

8 430 *...then maybe from that phone call going 'okay you sound really stressed about your*
9
10 431 *medication we'll try and squeeze you in tomorrow' ...I guess maybe, like, a phone call*
11
12 432 *to kinda like "triage" how urgently they need it. (P1)*
13
14
15

16 433

17
18
19 434 The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety
20
21 435 experienced during and after discharge home. Participants reported that a PDMR would
22
23 436 benefit their transition back into a community setting to reinforce information and provide
24
25 437 ongoing monitoring, reassurance, and support. Similarly, participants perceived that
26
27 438 receiving a PDMR at home gave them time to process their hospitalisation and any changes
28
29 439 implemented, which might raise issues to be discussed.
30
31

32
33 440 *And also, when you're in the hospital, you might not be thinking of these things to ask*
34
35 441 *either because it's all new and stuff. So, by the time you get home you can all of a*
36
37 442 *sudden sit down and sort of absorb the information. (P2)*
38
39

40
41 443 *like you feel quite safe while in hospital. But when you come home, it's a little bit*
42
43 444 *daunting. (P6)*
44
45

46 445

47
48
49 446 Home visitation for a PDMR was also perceived to be more conducive for medication-
50
51 447 related education, away from the time pressures experienced in other settings.
52
53

54 448 *You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get*
55
56 449 *out of the way.'* And even you're not sitting in the doctor's surgery thinking 'I'm
57
58 450 *getting charged for every 5 minutes I'm sitting here.'* (P9)
59
60

1
2
3 451 *And when you go to the GP, it's very transactional. Like, it's just like you're in, out.*

4
5 452 *They're really busy to the point that you don't feel confident that they really listen.*

6
7
8 453 *(P7)*

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11 454

12 13 14 455 **Discussion**

15 16 17 456 *Summary of main findings*

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19
20 457 Our study explored perspectives of CVD patients on their experiences with medication
21
22 458 management and pharmacist-led medication review services during their ToC, including
23
24 459 attitudes towards having access to PDMRs. Cardiology patients' ToC following a hospital
25
26 460 admission is often associated with a period of vulnerability that may be ameliorated through
27
28 461 pharmacist medication reconciliation [32]. Our findings identified that the hospital
29
30 462 environment presented several challenges which impacted the effective delivery of education
31
32 463 for inpatients. Participants detailed difficulties understanding and retaining medication-
33
34 464 related information during admission for a significant health event. Feelings of anxiety and
35
36 465 being overwhelmed contributed to poor information retention and meant participants
37
38 466 returning home lacking confidence in managing their medications. Despite these feelings,
39
40 467 many participants received minimal support through pharmacist-led medication management
41
42 468 services across their ToC. Overall, while participants took time to establish a routine back
43
44 469 home, many gradually became confident and expressed value in a medication review to
45
46 470 monitor and provide support upon their return to a community setting.

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53 471

54 55 56 472 *Comparison with existing literature*

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1
2
3 473 Existing literature highlights the impact of time pressures on the quality and efficacy of
4
5 474 hospital-delivered education for inpatients has been extensively covered in the available
6
7 475 evidence base [33-36]. In response patients may be less equipped to manage their
8
9 476 medications on discharge to a community setting, thus affecting their quality use of
10
11 477 medicines (QUM) — the safe, effective, and appropriate use of medicines — and increasing
12
13 478 the risks of future hospitalisations.
14
15
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18 479

19
20 480 Obtaining the patient perspective is a critically important phase of implementing new health
21
22 481 services. Our results provide the perspectives of CVD patients, thus building on existing
23
24 482 literature [37]. For example, White et al (2012) [38] conducted a qualitative study that
25
26 483 identified four key benefits of medication reviews as perceived by patients eligible for these
27
28 484 reviews: (i) acquisition of personalised medication information and advice; (ii) reassurance
29
30 485 regarding medications and coordination of their care; (iii) feeling valued and cared for by a
31
32 486 health care provider; (iv) enhancing the patient-provider and pharmacist-GP relationships.
33
34 487 Our study mirrors these observations concerning the perceived benefits of PDMRs,
35
36 488 particularly the need for post-discharge follow-up and the reassurance that patients
37
38 489 experience when receiving pharmacist input into their care.
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491 However, the White et al study identified patient concerns around the potential for
492 pharmacist medication reviews to be perceived as undermining the authority of the GP, thus
493 having a negative impact on the patient's relationship with their GP [38]. Participants in our
494 study did not share these same perspectives, and instead felt that PDMRs would have
495 potential to improve access to primary care post-discharge through pharmacists due to
496 difficulties experienced with accessing their GPs. Our study demonstrated PDMRs were

1
2
3 497 considered an opportunity to ask questions and more actively engage in education within the
4
5 498 security of their own home. We posit that PDMRs have the potential to bridge education
6
7 499 deficits that emerge on discharge home and promote communication between hospital and
8
9
10 500 community-based medical practitioners.
11

12
13 501

14
15
16 502 The timing of service provision is crucial to ensure that QUM is maintained, and the risk of
17
18 503 medication-related problems is minimised. Evidence detailing the incidence of medication-
19
20 504 related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks
21
22
23 505 post-discharge [39]. Recently, Daliri et al demonstrated that pharmacy-led transitional care
24
25 506 education programs reduced the proportion of patients experiencing self-reported
26
27 507 medication-related problems four-weeks post discharge [40]. Participants in our study
28
29
30 508 highlighted their desire for early pharmacist follow-up, within the first seven days post-
31
32 509 discharge being the most common request. This demonstrates the importance of early post-
33
34 510 discharge follow-up to promote the safe and effective use of medicines for ToC patients.
35

36
37 511

38
39
40 512 Participants in the study experienced issues engaging with primary care once discharged
41
42 513 from hospital, with potential role for pharmacists to bridge this gap. GP access for
43
44 514 prescription resupply was the most common challenge experienced by participants when
45
46
47 515 returning home. The limited quantities of tablets provided to participants at the time of
48
49 516 discharge was sometimes insufficient to sustain them until their GP appointment. The
50
51
52 517 HNELHD is part of the New South Wales (NSW) public health system which stipulates that
53
54 518 take home supplies of regular medications must not exceed 7 days' supply when discharged
55
56 519 from hospital [41]. Unfortunately, this restriction imposes significant challenges for patients
57
58
59 520 discharged from NSW public hospitals. This varies considerably to other states within
60

1
2
3 521 Australia — for example, both Queensland and Victorian public hospital networks allow a
4
5 522 one-month supply of regular medications under the Pharmaceutical Benefits Scheme [42,
6
7 523 43]. Given that access to a GP may be difficult on discharge due to lengthy wait times, we
8
9 524 advocate that pharmacists may in fact play an important role in ensuring the continuity of
10
11 525 care and appropriate access to medications through the incorporation of a PDMR as standard
12
13 526 of care for ToC patients.
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18 527
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20
21 528 *Implications on future research and practice*
22

23
24 529 The strength of this study lies in the exploration of a heterogenous sample of cardiology
25
26 530 patients. A diverse cohort of participants was purposively selected to capture the broadest
27
28 531 range of perspectives possible. Furthermore, the inductive thematic analysis approach used in
29
30 532 this study enables the richness of the qualitative data to be captured through a more flexible
31
32 533 and reflective process. This method aims to remove a researcher's analytic preconceptions,
33
34 534 ensuring thematic analysis is data-driven rather than researcher-driven. We acknowledge that
35
36 535 many patients were reflecting on the prospect of a PDMR across their ToC rather than having
37
38 536 received one. A limitation of this study includes the potential for reporting bias. It is possible
39
40 537 that ToC CVD patients who engaged with the study may in fact have a differing experience
41
42 538 with pharmacist-led medication management services compared to those who did not
43
44 539 participate. The relatively young mean age of participants (57.5 years of age) may also not
45
46 540 accurately reflect the views and experiences of 'older' adult patients (over the age of 65
47
48 541 years) surrounding their need for pharmacist-led medication management services. It is well-
49
50 542 documented that patients living outside major Australian capital cities have poorer health
51
52 543 outcomes [44]. Our study recruited patients who predominantly live outside major capital city
53
54 544 area(s) of Australia. Hence, their inclusion may therefore represent unique health outcome
55
56
57
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1
2
3 545 challenges associated with their geographic location. Our results provide a baseline
4
5 546 understanding of the perspectives of ToC CVD patients in terms of the implementation of
6
7 547 PDMRs. Future research is needed to evaluate the clinical benefit of routine PDMRs for
8
9 548 CVD patients to investigate the acceptability of the service, but also its impact on key CVD
10
11 549 outcome markers, including 30-day hospital readmission rates and the incidence of major
12
13 550 adverse cardiovascular events. In addition, future research should explore the perspectives of
14
15 551 cultural and linguistically diverse patients and those residing in regional, rural, and remote
16
17 552 localities.
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553

554 **Conclusion**

555 Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of
556 a broader MDT. PDMRs are viewed by ToC CVD patients as an acceptable means of
557 improving their health literacy and QUM when transitioning from hospital back home.
558 Routine service implementation may address the patient's desire for post-discharge follow-up
559 and provision for education away from the busy hospital environment. Service
560 implementation may benefit from an initial 'triage' to individualise the delivery by assessing
561 the patient's own needs and expectations of the service, whilst screening for those who may
562 be at high-risk of medication misadventure.
563

563

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567

567

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569 Study design was conducted by JB, HC, JC, JW, and DN. Recruitment was conducted by JB,
570 DM, NE, and MA. Interviews and interview transcription was performed by JB. Data
571 analysis was completed by JB and JW. JB drafted the manuscript for publication and DN,
572 AS, HC, JW and JC contributed to the content and revision of the manuscript. Revisions,
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575

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589

590 **Ethics approval and consent to participate**

1
2
3 591 Ethics approval was received from Hunter New England Human Research Ethics Committee
4
5 592 of HNELHD (Reference – 2022/ETH00872). All participants provided written informed
6
7
8 593 consent prior to conducting interviews.
9

10 594

14 595 **Competing interests**

17 596 JB is a credentialed pharmacist who can provide domiciliary medication management
18
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20
21

22 598

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Figure 1: Inclusion and Exclusion Criteria

Inclusion Criteria
Over 18 years of age
Discharged from <i>John Hunter Hospital</i> into a community setting
Pre-existing or newly diagnosed cardiovascular disease, or are considered high-risk for the development of cardiovascular disease using the <i>CVDCHECK</i> 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 <i>Pharmacy Programs Administrator Program Rules</i> [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		<i>n</i> , (%)
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.

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Patient Perspectives of Pharmacist-Provided Medication Reviews

Semi-Structured Interview Questions

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

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

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19
General Introduction to Commence Interview:

- 20 • Interviewer introduction and salutation
- 21 • Brief explanation of the purpose of the interviews and study
- 22 • Provide overview of interview format including the freedom to refuse response
- 23 provision and requesting breaks at any stage; advise that interview will be audio-
- 24 recorded
- 25 • Request verbal consent to proceed
- 26
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30
Current Medication Management of Patient

- 31 1. Can you describe to me how you currently manage you medicines at home?
- 32 2. How many medicines are you taking (including any complimentary and non-oral
- 33 formulations)?
- 34 3. After your recent visit to hospital, how comfortable do you feel managing your
- 35 medicines?
- 36 4. Since your visit to hospital, how has your need to visit a pharmacy or speak with a
- 37 pharmacist changed?
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Patient Perceptions of Pharmacist Medication Management

- 45 5. What role do you think pharmacists have in supporting you in your day-to-day
- 46 management of your medicines?
- 47 6. What interactions do you have with your regular pharmacist/pharmacy?
- 48 7. What is your understanding of medication reviews performed by a pharmacist?
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54
Previous Experiences with Medication Reviews

- 55 8. Have you ever sat down in a pharmacy to chat with the pharmacist about your
- 56 medicines?
- 57 9. Has a pharmacist ever come out to your home to review your medicines?
- 58 10. What medicines review services have been offered to you?
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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?
- For peer review only

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			
<i>Personal characteristics</i>			
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?	
<i>Relationship with participants</i>			
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 interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
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?	
<i>Setting</i>			
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	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews 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 interview or focus group?	
Duration	21	What was the duration of the interviews 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			
<i>Data analysis</i>			
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?	
<i>Reporting</i>			
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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Primary Subject Heading:	Health services research
Secondary Subject Heading:	Cardiovascular medicine, Medical management, Patient-centred medicine, Pharmacology and therapeutics, Qualitative research
Keywords:	Pharmacists, Medication Reconciliation, Cardiovascular Disease, Hospital to Home Transition, Medication Review, CARDIOLOGY

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4 1 ***Pharmacist-Led Medication Management Services: A Qualitative Exploration***
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6 2 ***of Transition-of-Care Cardiovascular Disease Patient Experiences***
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3 **32 Keywords**
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6 **33 Pharmacist; Medication Reconciliation; Cardiovascular Disease; Hospital to Home**
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8 **34 Transition; Medication Review**
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12 **35**
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14 **36 Abstract**
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16 **37 Objective** Hospitalisation due to medication-related problems is a major health concern,
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18 particularly for those with pre-existing, or those at high-risk of developing, cardiovascular
19 **38 disease (CVD). Post-discharge medication reviews (PDMRs) may form a core component of**
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21 **39 reducing hospital readmissions due to medication-related problems. This study aimed to**
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23 **40 explore post-discharge CVD patients' perspective of, and experiences with, pharmacist-led**
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25 **41 medication management services. A secondary aim explored attitudes towards availability of**
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27 **42 PDMRs.**
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34 **44 Design** An interpretative qualitative study involving 16 semi-structured interviews. Data
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36 **45 were analysed using an inductive thematic approach.**
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40 **46 Setting** CVD patients discharged to a community setting from the John Hunter Hospital, an
41
42 **47 820-bed tertiary referral hospital based in New South Wales, Australia.**
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46 **48 Participants** Patients with pre-existing or newly diagnosed CVD who were recently
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48 **49 discharged from hospital.**
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52 **50 Results** A total of 16 interviews were conducted to reach thematic saturation. Nine
53
54 **51 participants (56%) were male. Mean age of participants was 57.5 (\pm 13.2) years. Three**
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56 **52 emergent themes were identified: (i) Poor medication understanding impacts transition from**
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3 53 hospital to home; (ii) Factors influencing medication concordance following discharge, and
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5 54 (iii) Perceived benefits of routine PDMRs.
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9 55 **Conclusions** There is a clear need to further improve the quality use of medicines and
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11 56 health literacy of transition-of-care CVD patients. Our findings indicate that the engagement
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13 57 of transition-of-care CVD patients with pharmacist-led medication management services is
14
15 58 minimal. Pharmacists are suitable to provide essential and tailored medication review
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17 59 services to CVD patients as part of a multidisciplinary healthcare team. The implementation
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19 60 of routine, pharmacist led PDMRs may be a feasible means of providing patients with access
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21 61 to health education following their transition from hospital back to community, improving
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23 62 their health literacy and reducing re-hospitalisations due to medication-related issues.
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31 64 **Article Summary: Strengths and Limitations of This Study**

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34 65 1. The strength of this study lies in the exploration of a heterogenous sample of people with
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36 66 CVD across their transition of care.
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39 67 2. The inductive thematic analysis approach used in this study enables the richness of the
40
41 68 qualitative data to be captured through a more flexible and reflective process.
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44 69 3. Potential reporting bias: responding participants may have had different experiences to
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46 70 non-responders, including access to primary care where differing models of care exist.
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49 71 4. Our study recruited patients who live outside major capital city area(s) of Australia and
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51 72 therefore may represent unique challenges due to their geographic location, often having
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53 73 poorer health outcomes than those living in major capital cities.
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75 **Introduction**

Word Count: 5083

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

84
85 Rehospitalisation due to poor medication management presents as a significant issue for
86 cardiology patients. The likelihood of hospital readmission for CVD patients has been shown
87 to increase by 28% in the following month because of poorly management medication
88 regimens [4]. Poor medication concordance is closely associated with adverse outcomes in
89 CVD patients of whom many are elderly and take 5 or more medications [5]. Poor medication
90 concordance, use of harmful medications and withdrawal of beneficial medications have been
91 identified as precipitating factors for 20% of heart failure (HF) hospitalisations [6]. Patients
92 with poor medication concordance also have 36% higher mortality from ischemic heart
93 disease, and a 2-fold increased risk of mortality from cerebral haemorrhage and cerebral
94 infarction than those with good concordance [7].

95
96 Internationally, the provision of pharmacist-led medication reconciliation programs during
97 hospital transitions have been established as a means for improving post-hospital healthcare
98 utilisation [8-11]. Growing evidence highlights that comprehensive medication reviews

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3 99 improve health literacy and reduce the number of medication-related errors and inappropriate
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5 100 use of medicines [12-17]. In Australia, medication review services were first introduced for
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7 101 residents of aged care facilities in 1997, expanded to include those living in a community
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10 102 setting in 2001 [18, 19], and further revised in 2020, to include referrals from hospital-based
11
12 103 medical practitioners. The latest amendment enables the initiation of comprehensive
13
14 104 medication reviews through hospital networks along with the allowance for pharmacist-
15
16 105 initiated follow-up reviews; promoting a patient-centred cycle-of-care whereby pharmacists
17
18 106 are directly involved in the follow-up of medication-specific problems.
19
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21
22 107

23
24
25 108 To date, previous research has explored pharmacist and general practitioner (GP)
26
27 109 perspectives of comprehensive medication reviews, including more recently pharmacist
28
29 110 perspectives on the implementation of post-discharge medication reviews (PDMRs) [20-25].
30
31 111 There remains a lack of evidence relating to patient perspectives on PDMRs, particularly
32
33 112 those with existing CVD or those who are at high-risk of CVD complications. Patient
34
35 113 perspectives are invaluable in assessing the effectiveness of healthcare service
36
37 114 implementations aimed at improving health literacy and self-management. Some research
38
39 115 exploring pharmacist-led medication reconciliation reviews suggesting there is improved
40
41 116 health literacy and sustained self-management upon returning to a community setting in
42
43 117 CVD patients who receive pharmacist intervention [26, 27]. To our knowledge, this is the
44
45 118 first study exploring these perspectives of (ToC) CVD patients and their experiences with
46
47 119 pharmacist-led medication management services. We aimed to explore the experiences of
48
49 120 patients during their ToC from hospital to home probing their understanding of medication-
50
51 121 related changes and subsequent medicine review referral.
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123 **Method**

124 *Study Design, Participant Selection and Recruitment*

125 An interpretive qualitative approach was deemed appropriate to explore our research
126 question. Participants were recruited from the John Hunter Hospital (JHH): a major referral
127 hospital for the Hunter New England Local Health District (HNELHD) servicing over
128 920,000 people. To reduce the risk of recruitment bias, a clear set of inclusion criteria —
129 partly informed by the *Australian Chronic Disease Prevention Alliance* [28] and the
130 *Pharmacy Programs Administrator Program Rules* [29] — as shown in **Figure 1** was created
131 to assist with identifying potential participants. Patients meeting our inclusion criteria being
132 discharged from the JHH with either newly diagnosed or pre-existing CVD were identified
133 by, and invited to participate, by cardiology nurses and pharmacists from the cardiology ward
134 and cardiac rehabilitation clinic (CRC) at the JHH. Purposive sampling was used when
135 identifying and selecting CVD patients as potential participants for the study to create a
136 diverse and heterogeneous cohort.

137
138 Potential participants were provided with detailed study information and had the opportunity
139 to ask questions about the research and were aware of the voluntary nature of their
140 participation in the study and were not reimbursed for their participation. All participants
141 provided informed consent. Interviews were conducted between 1st September 2022 and 30th
142 September 2023. This study employed the use of semi-structured interviews and was
143 informed by the COnsolidated criteria for REporting Qualitative research (COREQ) checklist
144 [30]. The interview guide was designed by a sub-group of the investigators (JB, HC, JC, and
145 DN) following a review of existing literature. The sub-group then constructed questions
146 based on this literature review that address the central aim of the study as shown in

1
2
3 147 Supplementary File 1. However, considering the semi-structured interview design,
4
5 148 participants had freedom to express views and experiences in their own words and diverge
6
7 149 from the interview guide. Approval for this project was obtained from the Hunter New
8
9 150 England Health Human Research Ethics Committee (Reference Number: 2022/ETH00872).
11
12

13 151

16 152 *Patient and Public Involvement*

17
18
19 153 Patient and public involvement was not deemed necessary for the design and implementation
20
21 154 of this study.
22
23

24 155

27 156 *Data Collection and Analysis*

28
29
30 157 Semi-structured telephone interviews (n=16), ranging from 30-60 minutes, were conducted
31
32 158 by a member of the research team (JB) at a mutually convenient time between 1st September
33
34 159 2022 and 30th September 2023. Interviews were audio recorded with the participant's consent
35
36 160 and transcribed *ad verbatim* by JB with all identifying data removed. Guided by an interview
37
38 161 schedule, questions aimed to probe participant experiences of their recent hospitalisation
39
40 162 experiences and subsequent implementation and management of medications, as well as
41
42 163 attitudes towards pharmacist-led medication management services including availability of
43
44 164 PDMR services. Identified themes informed continuing data collection and sampling
45
46 165 continued until thematic saturation (two co-coders agreeing that no new themes were
47
48 166 emerging) was achieved. Coding was performed independently by two authors (JB, JW),
49
50 167 following an inductive thematic approach [31]. Analysis followed a three-phase approach: (i)
51
52 168 initial familiarisation of the data following a systematic identification of salient themes within
53
54 169 each interview transcript; (ii) generation of a coding scheme with distinct boundaries linked
55
56 170 to sections of the written transcript; (iii) collation of codes into larger themes by examining
57
58
59
60

171 relationships between each code. Transcripts were coded line-by-line, describing and
172 interpreting emerging categories, and searching for differences and similarities. The next step
173 involved examining the relationship between categories in the context of the research
174 question to form themes. Consistency of findings was upheld through immersion within the
175 data, and peer debriefing with data coding reflexivity and discussion with the research team
176 [32, 33]. Coders captured exemplar quotes supporting each theme.

177

178 **Results**

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

183 Three emergent themes were identified:

- 184 (i) *Poor medication understanding impacts transition from hospital to home;*
- 185 (ii) *Factors influencing medication concordance following discharge, and*
- 186 (iii) *Perceived benefits of routine PDMRs*

187

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

189 *The Overwhelming Hospital Experience*

190 Many participants reported difficulties comprehending health-related information during
191 their hospital admission, including understanding the cause of their cardiovascular event, and
192 subsequent medication and lifestyle changes recommended following their discharge.

193 Participants reflected on their feelings of anxiety and being overwhelmed in response to the

1
2
3 194 experience of a life-threatening cardiovascular event. Participants reportedly attributed
4
5 195 anxiety with difficulties in comprehending the initiation of, or changes to, medications
6
7
8 196 during their acute hospital admission.
9

10
11 197 *[It's] obviously a very stressful situation I was in, being so young and having a*
12
13 198 *cardiac thing go on. So, I didn't take everything in those first couple of days. (P1)*

14
15
16 199 *Because when you're in hospital and they're telling you what tablets to take, you're*
17
18 200 *going 'okay, there's just so much going on in hospital.' Yeah, it's not until you get*
19
20 201 *home that you think 'okay, what was that all about?' It was just a whirlwind I went*
21
22 202 *through. (P4)*
23
24
25

26 203

27
28 204 Participants reported that understanding copious amounts of new medication-related
29
30 205 information was more difficult to comprehend whilst trying to grasp the extensiveness of
31
32 206 medications now required.
33

34
35 207 *...so, they gave me a week's medication from the pharmacy at the hospital and this*
36
37 208 *big, two A4 sheets of all the tablets that you get. I go 'oh s**t' because you don't*
38
39 209 *know this. I'm going to check-out, and they go 'oh, here are all your tablets' and I*
40
41 210 *go 'oh s**t, look at all this!' (P5)*
42
43

44 211

45 46 212 *Challenges Associated with Education within a Hospital Environment*

47
48
49 213 Participants' understanding of their medication regime were experienced on a spectrum
50
51 214 where some readily grasped changes with new information while others struggled. Difficulty
52
53 215 understanding was compounded among participants who had no prior experience with taking
54
55 216 regular medications.
56
57
58
59
60

1
2
3 217 *My big problem—like, I’ve never had anything before—is knowing what all these*
4
5 218 *tablets do...you know nothing, you’re learning it all. (P5)*
6
7
8
9 219

10 220 Participants recounted varying experiences with education during their hospital admission.
11
12 221 Most participants reported they received a combination of verbal and/or written medication
13
14 222 instructions during their hospitalisation or at discharge. Participants valued staff who took
15
16 223 the time to explain their medication regime and “were nice enough to write down” (P4) or
17
18 224 provide written information. Information sources included physicians, nurses, and
19
20 225 pharmacists; although some participants reported they were unsure as to who provided the
21
22 226 information.
23
24
25
26

27 227 *...the last doctor I’d seen there [in hospital], he explained to me all the way*
28
29 228 *through me tablets... and it was all written out for me. (P17)*
30
31

32 229 *I mean, ...there was a person, or some nurse, or doctor came around and explained*
33
34 230 *the situation. (P5)*
35
36
37

38 231

39
40 232 However, other participants commented on the lack of information provision during their
41
42 233 admission and the limited reinforcement of what medication to take and why, especially
43
44 234 during medication rounds. Participants’ reports suggested they were passive during
45
46 235 medication rounds and only a few pressed staff for information. Many participants perceived
47
48 236 limited education was due to staff time constraints and being unable to take time to engage
49
50 237 and deliver education in an impactful manner.
51
52

53
54 238 *None really. It was just, I guess, the nurses coming and saying either ‘this is due’ or*
55
56 239 *‘how are you feeling? Do you need pain relief?’ (P9)*
57
58
59
60

1
2
3 240 *...you know, when you're in hospital, it's so busy, full-on. The doctors and nurses are*
4
5 241 *running from patient-to-patient. So, there's not a lot of time to actually sit and really*
6
7 242 *talk about medications and sort of similar things like that. (P6)*
8
9

10 243

11
12
13 244 Participants' reports suggested the negative impact of receiving differing information from
14
15 245 multiple sources. Some participants reported a lack of consistency between staff members
16
17 246 which accentuated anxiety and confusion.

18
19
20 247 *So, I guess it's probably a little bit of anxiousness where you get little snippets of*
21
22 248 *information...you've got no idea... I think it's because the message isn't coming from*
23
24 249 *the one person all the time. Like it's coming from various different people. (P7)*
25
26

27 250

28 251 *Implementing Medication Self-Management*

29
30
31 252 Many participants described the difficulties engaging with self-management education when
32
33 253 they felt unwell, distracted by an unfamiliar environment, or were focussed on "wanting to
34
35 254 *get home.*" (P5)

36
37 255 *The thing is, you've been sick in hospital, you don't think. So, your mind's all muddled*
38
39 256 *up or you go 'whatever, I don't want to listen to you.'* (P17)
40
41

42 257

43
44
45 258 Being a passive recipient of medications in hospital, alongside struggling to understand a
46
47 259 new medication regime, reportedly impacted participants' confidence to manage their
48
49 260 medications on discharge. Participants reported that they were most unsure during the first
50
51 261 few weeks post-discharge as they attempted to establish routines with either taking
52
53 262 medications for the first time or implementing a new medication regimen.
54
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1
2
3 263 *But at the time it's a bit, like, I'm a bit confused about what is what, going through*
4
5 264 *boxes and reading my list. So yeah, the first few weeks was a bit confusing with what I*
6
7
8 265 *was taking. (P4)*
9

10
11 266

12
13
14 267 While some participants reported ongoing feelings of anxiety and being overwhelmed by
15
16 268 a lack of familiarity with medication terminology and understanding the purpose of their
17
18 269 medication, others embraced self-education. For many, this involved conducting online
19
20 270 research or talking to family members who were health professionals, especially in
21
22
23 271 relation to side effects.

24
25
26 272 *I came home without too much insight into what they [medications] are and that sort*
27
28 273 *of thing. It's been kind of left up to my own accord to basically prepare myself. (P9)*

29
30
31 274 *I asked my sister — she's a cardiothoracic nurse. So, I asked her, you know, side*
32
33 275 *effects I was having that I got on the weekend. (P2)*

34
35
36 276

37
38
39 277 *2. Factors influencing medication concordance following discharge*

40
41
42 278 *Discharge home*

43
44
45 279 For many participants, the reality of needing to take life-saving medication became apparent
46
47 280 on return home when they were confronted with the seriousness of the situation and the need
48
49 281 to develop new daily medication routines. Many were grateful they were on sick leave or
50
51 282 had time post-discharge to establish a routine, including being mindful of when medications
52
53 283 needed to be taken and if they needed to be taken with meals or not.
54
55
56
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1
2
3 284 *And generally, I get up at the same time each day. Having said that, I am on sick*
4
5 285 *leave at the moment. So that will take time and breakfast will change when I go*
6
7 286 *back to work. But that's down the track management. (P1)*
8
9

10
11 287

12
13
14 288 For participants, especially those without prior experience with taking medication,
15
16 289 remembering to administer doses, manage prescriptions and medication supply, and follow-
17
18 290 up appointments with GPs whilst balancing prior commitments with family or work was an
19
20 291 additional burden.

21
22
23 292 *I'm just a really busy person. I work full-time and then I've got two kids. So, by having*
24
25 293 *to throw medication in on that...I guess it's like when you're a new person to start*
26
27 294 *taking medication...you've got to take the medication seriously. Like it's not the first*
28
29 295 *thing that's on my mind which is not good. I need to change that. (P7)*
30
31

32
33 296

34 35 36 297 *Cardiac Rehabilitation*

37
38
39 298 Several participants reported they continued to lack understanding of their medication
40
41 299 regime, which was apparent when engaging with other health professionals such as dentists
42
43 300 or rehabilitation therapists.

44
45
46
47 301 *I even went to the dentist, and they said: 'what are you on, we need to update your*
48
49 302 *records', and I didn't even know. (P9)*

50
51
52 303 *I was just at Cardio Rehab [CRC]...and they asked me if I was on a beta-blocker,*
53
54 304 *and I actually didn't know what a beta-blocker was. I was, like, not sure! (P7)*

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1
2
3 306 Nine participants were recruited through the CRC at the JHH and reported increased
4
5 307 accessibility and reinforcement of medication information through the clinic. Participation in
6
7 308 the CRC provided participants with an opportunity for further engagement with specialists
8
9
10 309 in cardiology and ask questions or raise concerns related to medications or management of
11
12 310 their CVD.

13
14
15 311 *...I was going to have a chat with one of the guys at the pharmacy, but I thought I'm at*
16
17 312 *rehab [CRC] today, I'll chat with them [the nurses] about the cholesterol medication*
18
19
20 313 *I'm on. (P6)*
21
22

23 314

24 25 26 315 *External support*

27
28
29 316 Many participants relied on others to help manage their medications and adhere to them, be
30
31 317 that family members, carers, or community pharmacists. While this was most evident in the
32
33 318 weeks following discharge, others reported an ongoing reliance on family members or
34
35 319 carers. As such, some participants acknowledged they had less opportunity to engage with
36
37 320 community pharmacists for ongoing education, information, or intervention if necessary.

38
39
40
41 321 *My son sort of gets them out and gives them to me, and I just take them as I'm*
42
43 322 *supposed to. I'm a bit foggy at the moment, but he's looking after it. I'll have to get*
44
45 323 *more involved very shortly. (P15)*
46
47

48
49 324 *Because, say I say to my wife: 'I'm too sick to get my tablets today, can you pick*
50
51 325 *them up for me?' So, if someone else goes and picks up your tablets for you, you*
52
53 326 *don't have any interaction with the pharmacist. (P5)*
54
55

56 327

57
58
59 328 *Engagement with Pharmacist-Led Medication Management Services*
60

1
2
3 329 Many participants stated that their experience with pharmacist-led medication management
4
5 330 services was limited to medication supply and prescription management, predominantly
6
7
8 331 delivered in a community setting.

9
10 332 *So, you know, I guess their role is pretty broad. But personally, I use them for*
11
12 333 *prescriptions and information around that and that's probably about it. (P12)*
13
14
15
16 334 *Sort of nothing really. Just when it comes to medication-wise. Like that's the only time I*
17
18 335 *sort of have anything to do with pharmacists, it's when I've gotta pick up medication.*
19
20 336 *(P14)*
21
22

23 337
24
25 338 Participants readily identified the importance of community pharmacies managing their
26
27 339 prescriptions and medications, including the use of dose administration aids (DAAs).

28
29
30 340 *So obviously looking at things of whether Webster-paks® or blister packs*
31
32 341 *[medication compliance packaging] — pre-made medications — that sort of*
33
34 342 *thing as well I think is really important. (P1)*
35
36
37

38 343 However, some participants acknowledged that by relying on an external source there was
39
40 344 the potential for error or oversight if they weren't familiar with changes to their medications.

41
42
43 345 *I gave my prescriptions actually to the pharmacist. You don't have to think about*
44
45 346 *sitting at the table and dividing them all up and hoping that they're not all*
46
47 347 *wrong...which has happened a couple of times. I've gone a couple of weeks without*
48
49 348 *realising I wasn't taking one particular [medication]. (P18)*
50
51
52

53 349
54
55 350 *Engagement with community care*
56
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3 351 Participants who followed through with an appointment to see their GP on discharge
4
5 352 indicated the benefit in gaining further understanding of their recent hospitalisation and
6
7 353 medication changes, including accessing new prescriptions.
8
9

10 354 *I was told to go to my GP a week after which I did yesterday...she reinforced what*
11
12
13 355 *[medications] they had sent me home with. (P11)*
14
15

16 356

17
18 357 Overall, participants reported a wide range of challenges adhering to a medication regime on
19
20 358 discharge. Many participants were not supplied with sufficient medication quantities on
21
22 359 discharge to see them through to their follow-up GP appointment, who were often required
23
24 360 to wait several weeks.
25
26

27
28 361 *...because my GP is booked out that far ahead, I'm looking at two to three weeks.*
29

30 362 *When I rang up to say that I need an appointment to arrange some medications after I*
31
32 363 *had a heart attack, they had to put me on an emergency waiting list, and even then, it*
33
34 364 *took them seven days to get me in. (P3)*
35
36

37 365

38
39
40 366 Participants were reportedly confronted with the concept of taking multiple medications,
41
42 367 highlighting their embarrassment and the stigma associated with medication use. Some
43
44 368 participants were reluctant to seek pharmacist-led medication management services, such as
45
46 369 DAAs, due to its perceived association with advanced age.
47
48

49
50 370 *...going into the pharmacy and just slapping them [the prescriptions] down on the*
51
52 371 *counter, it's just going to feel like I'm a walking medication taker! Once I get over the*
53
54 372 *initial embarrassment...I'm actually going to be calling them and saying, 'I need to fill*
55
56 373 *my medication'. (P7)*
57
58
59
60

1
2
3 374 *And for me, personally, I still consider myself still fairly young, and I think this [DAA]*
4
5 375 *is an old person's thing. So, getting your head around it all, you know, it's a little new.*
6
7
8 376 *(P2)*
9

10
11 377

12
13
14 378 Many participants commented on the benefit of accessing a community pharmacist for
15
16 379 medication-related information and health advice prior to escalating any concerns to their GP.

17
18
19 380 *I wouldn't go and pick up a multivitamin or something without talking to the chemist*
20
21 381 *[pharmacist]: 'this is what I take. Could there be any interactions?' (P12)*
22

23
24 382 *Because sometimes it's hard to get into see your GP. And sometimes it's not necessary*
25
26 383 *to see your GP. I feel that [the community pharmacist] is the 'first port-of-call'; unless*
27
28 384 *you're really, really sick. (P6)*
29

30
31
32 385

33
34
35 386 Conversations with a community pharmacist on discharge home provided many participants
36
37 387 with the reassurance they needed to better manage their medications. However, some
38
39 388 participants reported they were reticent to speak to their community pharmacist due to
40
41 389 privacy concerns associated with discussing personal medical information in public or being
42
43 390 a burden when the pharmacist was perceived to be "busy". (P11)
44
45

46
47 391 *But what I really hate when I go to the chemist [pharmacy] is...they want to talk to*
48
49 392 *you — and there are so many people around... I actually feel uncomfortable talking*
50
51 393 *about that in front of other people...it's probably not actually sinking in because*
52
53 394 *I'm like 'who's standing behind me, is there someone here that I know' you know?*
54
55 395 *And I think that's probably why I didn't know a lot about my medications. (P7)*
56
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59 396
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1
2
3 397 For some participants, accessing a community pharmacist and pharmacy services centred
4
5 398 around medication cost whereby participants would seek multiple pharmacies to obtain the
6
7
8 399 best price for their medications. Participants acknowledged this had potential to impact
9
10 400 continuity of care facilitated by seeing the same pharmacist.

11
12
13 401 *So, we try to keep costs down where we can...at least by going to that [discount*
14
15 402 *pharmacy] kind of thing...but in a way of a relationship, I wouldn't know any of the*
16
17 403 *people in there. (P9)*

18
19
20
21 404

22 23 405 3. *Perceived benefits of routine Post-Discharge Medication Reviews*

24
25
26 406 Most participants acknowledged the importance of taking responsibility for their
27
28
29 407 medications. However, all participants could foresee circumstances where the availability of
30
31 408 PDMRs would prove beneficial.

32
33
34 409 *I think it [PDMRs] would be really valuable. For me who's never really taken any*
35
36 410 *medication, you know, it's all a bit daunting all of a sudden having to take medication.*
37
38 411 *(P2)*

39
40
41 412 *As a nurse, there a lot of people out there who have no clue what their medication are*
42
43 413 *or how they should be working, or when they should be taking them. So, I can see the*
44
45 414 *benefits of it — even for myself. (P16)*

46
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49 415

50 51 52 416 *Incorporation of Post-Discharge Medication Reviews into Standard of Care*

53
54
55 417 Participants reported that PDMR would provide an opportunity for a tailored provision of
56
57 418 information. Some participants suggested incorporating a 'triage' system to account for each
58
59
60

1
2
3 419 patient's individual social situation and educational needs, along with assessing those who
4
5 420 may be at high-risk for medication misadventure.
6
7

8 421 *There could be benefits from them [PDMRs] that you don't see until you actually have*
9
10 422 *someone come to have a look. I think that you would probably ideally...make contact*
11
12 423 *with a person in hospital, so you understand what they're circumstances are. And then*
13
14 424 *you could make the decision from there. It's very person orientated. (P12)*
15
16

17
18 425 *...then maybe from that phone call going 'okay you sound really stressed about your*
19
20 426 *medication we'll try and squeeze you in tomorrow'...I guess maybe, like, a phone call*
21
22 427 *to kinda like "triage" how urgently they need it. (P1)*
23
24
25

26 428

27
28
29 429 The option for a PDMR with a pharmacist was perceived as a means of easing the anxiety
30
31 430 experienced during and after discharge home. Participants reported that a PDMR would
32
33 431 benefit their transition back into a community setting to reinforce information and provide
34
35 432 ongoing monitoring, reassurance, and support. Similarly, participants perceived that
36
37 433 receiving a PDMR at home gave them time to process their hospitalisation and any changes
38
39 434 implemented, which might raise issues to be discussed.
40
41

42
43 435 *And also, when you're in the hospital, you might not be thinking of these things to ask*
44
45 436 *either because it's all new and stuff. So, by the time you get home you can all of a*
46
47 437 *sudden sit down and sort of absorb the information. (P2)*
48
49

50
51 438 *like you feel quite safe while in hospital. But when you come home, it's a little bit*
52
53 439 *daunting. (P6)*
54
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3 441 Home visitation for a PDMR was also perceived to be more conducive for medication-
4
5 442 related education, away from the time pressures experienced in other settings.
6
7

8 443 *You're not in the pharmacy with people glaring at you thinking 'hurry, hurry up, get*
9
10 444 *out of the way.' And even you're not sitting in the doctor's surgery thinking 'I'm*
11
12 445 *getting charged for every 5 minutes I'm sitting here.'* (P9)
13
14

15
16 446 *And when you go to the GP, it's very transactional. Like, it's just like you're in, out.*

17
18 447 *They're really busy to the point that you don't feel confident that they really listen.*

19
20 448 (P7)
21
22

23
24 449

25 26 450 **Discussion**

27 28 29 451 *Summary of main findings*

30
31
32 452 Our study explored perspectives of CVD patients on their experiences with medication
33
34 453 management and pharmacist-led medication review services during their ToC, including
35
36 454 attitudes towards having access to PDMRs. Cardiology patients' ToC following a hospital
37
38 455 admission is often associated with a period of vulnerability that may be ameliorated through
39
40 456 pharmacist medication reconciliation [34]. Our findings identified that the hospital
41
42 457 environment presented several challenges which impacted the effective delivery of education
43
44 458 for inpatients. Participants detailed difficulties understanding and retaining medication-
45
46 459 related information during admission for a significant health event. Feelings of anxiety and
47
48 460 being overwhelmed contributed to poor information retention and meant participants
49
50 461 returning home lacking confidence in managing their medications. Despite these feelings,
51
52 462 many participants received minimal support through pharmacist-led medication management
53
54 463 services across their ToC. Overall, while participants took time to establish a routine back
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1
2
3 464 home, many gradually became confident and expressed value in a medication review to
4
5 465 monitor and provide support upon their return to a community setting.
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10
11 467 *Comparison with existing literature*
12

13
14 468 Existing literature highlights the impact of time pressures on the quality and efficacy of
15
16 469 hospital-delivered education for inpatients has been extensively covered in the available
17
18 470 evidence base [35-38]. In response patients may be less equipped to manage their
19
20 471 medications on discharge to a community setting, thus affecting their quality use of
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22 472 medicines (QUM) — the safe, effective, and appropriate use of medicines — and increasing
23
24 473 the risks of future hospitalisations.
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32 475 Obtaining the patient perspective is a critically important phase of implementing new health
33
34 476 services. Our results provide the perspectives of CVD patients, thus building on existing
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36 477 literature [39]. For example, White et al (2012) [40] conducted a qualitative study that
37
38 478 identified four key benefits of medication reviews as perceived by patients eligible for these
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40 479 reviews: (i) acquisition of personalised medication information and advice; (ii) reassurance
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42 480 regarding medications and coordination of their care; (iii) feeling valued and cared for by a
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44 481 health care provider; (iv) enhancing the patient-provider and pharmacist-GP relationships.
45
46 482 Our study mirrors these observations concerning the perceived benefits of PDMRs,
47
48 483 particularly the need for post-discharge follow-up and the reassurance that patients
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50 484 experience when receiving pharmacist input into their care.
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3 486 However, the White et al study identified patient concerns around the potential for
4
5 487 pharmacist medication reviews to be perceived as undermining the authority of the GP, thus
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7 488 having a negative impact on the patient's relationship with their GP [40]. Participants in our
8
9 489 study did not share these same perspectives, and instead felt that PDMRs would have
10
11 490 potential to improve access to primary care post-discharge through pharmacists due to
12
13 491 difficulties experienced with accessing their GPs. Our study demonstrated PDMRs were
14
15 492 considered an opportunity to ask questions and more actively engage in education within the
16
17 493 security of their own home. We posit that PDMRs have the potential to bridge education
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19 494 deficits that emerge on discharge home and promote communication between hospital and
20
21 495 community-based medical practitioners.
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29 497 The timing of service provision is crucial to ensure that QUM is maintained, and the risk of
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31 498 medication-related problems is minimised. Evidence detailing the incidence of medication-
32
33 499 related problems ranges from 18.4% two-weeks post-discharge through to 37.5% four weeks
34
35 500 post-discharge [41]. Recently, Daliri et al demonstrated that pharmacy-led transitional care
36
37 501 education programs reduced the proportion of patients experiencing self-reported
38
39 502 medication-related problems four-weeks post discharge [42]. Participants in our study
40
41 503 highlighted their desire for early pharmacist follow-up, within the first seven days post-
42
43 504 discharge being the most common request. This demonstrates the importance of early post-
44
45 505 discharge follow-up to promote the safe and effective use of medicines for ToC patients.
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54 507 Participants in the study experienced issues engaging with primary care once discharged
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56 508 from hospital, with potential role for pharmacists to bridge this gap. GP access for
57
58 509 prescription resupply was the most common challenge experienced by participants when
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3 510 returning home. The limited quantities of tablets provided to participants at the time of
4
5 511 discharge was sometimes insufficient to sustain them until their GP appointment. The
6
7 512 HNELHD is part of the New South Wales (NSW) public health system which stipulates that
8
9 513 take home supplies of regular medications must not exceed 7 days' supply when discharged
10
11 514 from hospital [43]. Unfortunately, this restriction imposes significant challenges for patients
12
13 515 discharged from NSW public hospitals. This varies considerably to other states within
14
15 516 Australia — for example, both Queensland and Victorian public hospital networks allow a
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17 517 one-month supply of regular medications under the Pharmaceutical Benefits Scheme [44,
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19 518 45]. Given that access to a GP may be difficult on discharge due to lengthy wait times, we
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21 519 advocate that pharmacists may in fact play an important role in ensuring the continuity of
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23 520 care and appropriate access to medications through the incorporation of a PDMR as standard
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25 521 of care for ToC patients.
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34 523 *Strengths, Limitations, and Implications on future research and practice*

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37 524 The strength of this study lies in the exploration of a heterogenous sample of cardiology
38
39 525 patients. A diverse cohort of participants was purposively selected to capture the broadest
40
41 526 range of perspectives possible. Furthermore, the inductive thematic analysis approach used in
42
43 527 this study enables the richness of the qualitative data to be captured through a more flexible
44
45 528 and reflective process. This method aims to remove a researcher's analytic preconceptions,
46
47 529 ensuring thematic analysis is data-driven rather than researcher-driven. We acknowledge that
48
49 530 many patients were reflecting on the prospect of a PDMR across their ToC rather than having
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51 531 received one. A limitation of this study includes the potential for reporting bias. It is possible
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53 532 that ToC CVD patients who engaged with the study may in fact have a differing experience
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55 533 with pharmacist-led medication management services compared to those who did not
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3 534 participate. The relatively young mean age of participants (57.5 years of age) may also not
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5 535 accurately reflect the views and experiences of ‘older’ adult patients (over the age of 65
6
7 536 years) surrounding their need for pharmacist-led medication management services. It is well-
8
9 537 documented that patients living outside major Australian capital cities have poorer health
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11 538 outcomes [46]. Our study recruited patients who predominantly live outside major capital city
12
13 539 area(s) of Australia. Hence, their inclusion may therefore represent unique health outcome
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15 540 challenges associated with their geographic location. Our results provide a baseline
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17 541 understanding of the perspectives of ToC CVD patients in terms of the implementation of
18
19 542 PDMRs. Future research is needed to evaluate the clinical benefit of routine PDMRs for
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21 543 CVD patients to investigate the acceptability of the service, but also its impact on key CVD
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23 544 outcome markers, including 30-day hospital readmission rates and the incidence of major
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25 545 adverse cardiovascular events. In addition, future research should explore the perspectives of
26
27 546 other population groups and their engagement with pharmacist-led medication management
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29 547 services. This may include the perspectives of patients who are not immediately engaged with
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31 548 the hospital system, along with cultural and linguistically diverse patients and those residing
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33 549 in regional, rural, and remote localities.
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551 **Conclusion**

552 Pharmacists are ideally positioned to assist CVD patients across their ToC journeys as part of
553 a broader MDT. PDMRs are viewed by ToC CVD patients as an acceptable means of
554 improving their health literacy and QUM when transitioning from hospital back home.
555 However, our study indicates that patients with CVD do not frequently engage with
556 pharmacist-led medication management services during their ToC. Routine service
557 implementation may address the patient’s desire for post-discharge follow-up and provision
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3 558 for education away from the busy hospital environment. Service implementation may benefit
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5 559 from an initial 'triage' to individualise the delivery by assessing the patient's own needs and
6
7 560 expectations of the service, whilst screening for those who may be at high-risk of medication
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9 561 misadventure.
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21
22 565 the interviews.
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28 567 **Author Contributions**

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31 568 Study design was conducted by JB, HC, JC, JW, and DN. Recruitment was conducted by JB,
32
33 569 DM, NE, and MA. Interviews and interview transcription was performed by JB. Data
34
35 570 analysis was completed by JB and JW. JB drafted the manuscript for publication and DN,
36
37 571 AS, HC, JW and JC contributed to the content and revision of the manuscript. Revisions,
38
39 572 literature, and manuscript checking was managed by JB. All authors read and approved the
40
41 573 final version.
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26 589 **Ethics approval and consent to participate**

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28
29 590 Ethics approval was received from Hunter New England Human Research Ethics Committee
30
31 591 of HNELHD (Reference – 2022/ETH00872). All participants provided written informed
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33 592 consent prior to conducting interviews.
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40 594 **Competing interests**

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42
43 595 JB is a credentialed pharmacist who can provide domiciliary medication management
44
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50 598 **Data Availability Statement**

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53 599 All data relevant to the study was included either in the manuscript or as supplementary
54
55 600 material. Selected anonymised qualitative interview data may be made available upon
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57 601 request.
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25 719 **Figure 1: Inclusion and Exclusion**

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29 721 **Figure 2: Demographics of Interviewed Cardiovascular Disease Patients.**

30 722 STEMI: ST-elevated myocardial infarction; NSTEMI: non-ST-elevated myocardial
31 723 infarction; HFrEF: heart failure with reduced ejection fraction; HFpEF: heart failure with
32 724 preserved ejection fraction.

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34 725 Regular Medications at Discharge denotes medications taken daily by patient (excludes
35 726 'when required' or 'pro re nata' (PRN) medications).

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37 727 Number of comorbidities according to patient's hospital discharge paperwork.
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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 [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		<i>n</i> , (%)
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.

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Patient Perspectives of Pharmacist-Provided Medication Reviews

Semi-Structured Interview Questions

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

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

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General Introduction to Commence Interview:

- 20 • Interviewer introduction and salutation
- 21 • Brief explanation of the purpose of the interviews and study
- 22 • Provide overview of interview format including the freedom to refuse response
- 23 provision and requesting breaks at any stage; advise that interview will be audio-
- 24 recorded
- 25 • Request verbal consent to proceed
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Current Medication Management of Patient

- 31 1. Can you describe to me how you currently manage your medicines at home?
- 32 2. How many medicines are you taking (including any complimentary and non-oral
- 33 formulations)?
- 34 3. After your recent visit to hospital, how comfortable do you feel managing your
- 35 medicines?
- 36 4. Since your visit to hospital, how has your need to visit a pharmacy or speak with a
- 37 pharmacist changed?
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Patient Perceptions of Pharmacist Medication Management

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

- 55 8. Have you ever sat down in a pharmacy to chat with the pharmacist about your
- 56 medicines?
- 57 9. Has a pharmacist ever come out to your home to review your medicines?
- 58 10. What medicines review services have been offered to you?
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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?
- For peer review only

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			
<i>Personal characteristics</i>			
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?	
<i>Relationship with participants</i>			
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 interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
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?	
<i>Setting</i>			
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	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews 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 interview or focus group?	
Duration	21	What was the duration of the interviews 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			
<i>Data analysis</i>			
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?	
<i>Reporting</i>			
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.