



**AUTHOR(S):**

**TITLE:**

**YEAR:**

**Publisher citation:**

**OpenAIR citation:**

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**‘When you are homeless, you are not thinking about your medication but your food, shelter or heat for the night’: behavioural determinants of the homeless population adherence to prescribed medicines**

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Conflict of interest: There are no conflicts of interests to declare.

### **Acknowledgements**

We would like to acknowledge staff at Marywell Healthcare Centre and researchers Andy Maguire, Karis McKibbin, Louise Summers and Morium Uddin for undertaking the interviews. This work was supported by Robert Gordon University.

1 **‘When you are homeless, you are not thinking about your medication, but your**  
2 **food, shelter or heat for the night’: behavioural determinants of homeless**  
3 **patients’ adherence to prescribed medicines**

4

5 **Abstract**

6 Objectives: This study aimed to explore behavioural determinants of homeless  
7 patients’ adherence to prescribed medicines using Theoretical Domains Framework  
8 (TDF).

9

10 Study design: A qualitative study using semi-structured, face-to-face interviews.

11

12 Methods: Participants were recruited from a homelessness primary healthcare centre  
13 in Aberdeen, United Kingdom (UK). Face-to-face interviews were audio-recorded  
14 and transcribed verbatim. Thematic analysis of the interview data was conducted  
15 using the Framework Approach based on the Theoretical Domains Framework (TDF).  
16 National Health Service (NHS) ethical and Research and Development (R&D)  
17 approval was obtained.

18

19 Results: Twenty-five patients were interviewed, at which point data saturation was  
20 achieved. A total of 13 out of 14 TDF domains were identified that explained the  
21 determinants of adherence or non-adherence to prescribed medicines. These included:  
22 ‘beliefs about consequences (e.g. non-adherence leading to poor health); ‘goals’ of  
23 therapy (e.g. being a ‘normal’ person with particular reference to methadone  
24 adherence); and ‘environmental context and resources’ (e.g. stolen medicines and the

25 lack of secure storage). Obtaining food and shelter were higher priority than access  
26 and adherence to prescribed medicines while being homeless.

27

28 Conclusions: Behavioural determinants of non-adherence identified in this study were  
29 mostly related to participants' homelessness and associated lifestyle. Results are  
30 relevant to developing behaviour change interventions targeting non-adherent  
31 homeless patients and to the education of healthcare professionals serving this  
32 vulnerable population.

33

34 **Keywords: Adherence, behaviours, homeless, prescription medicines, theoretical**  
35 **domains framework (TDF), vulnerable patients**

36

37 **‘When you are homeless, you are not thinking about your medication, but your**  
38 **food, shelter or heat for the night’: behavioural determinants of homeless**  
39 **patients’ adherence to prescribed medicines**

40

#### 41 **Introduction**

42 Homelessness takes many forms including sleeping rough, living in derelict buildings,  
43 residing in temporary shelters offered by local authorities as well as living in squats or  
44 sofa surfing.<sup>1</sup> In the United Kingdom (UK), individuals are considered homeless if  
45 they no longer have a legal right to occupy their accommodation or if it would no  
46 longer be reasonable (e.g. due to safety concerns) to continue to live there.<sup>2</sup>

47 Homelessness is a widespread problem across the globe. In Scotland over 35,000  
48 individuals made applications to Scottish local authorities in 2014-15 requesting  
49 accommodation on the basis of homelessness.<sup>3</sup>

50

51 Reducing health inequalities remains a key health policy priority in the UK.<sup>4-6</sup>  
52 Healthcare policies emphasise that addressing health inequality requires specific focus  
53 on disadvantaged populations at highest risks of health problems, at the level of both  
54 healthcare services delivery and research.<sup>4</sup> Evidence suggests that the health status of  
55 people who are homeless is lower than the rest of the population, with higher  
56 mortality rates, mainly arising from opioid overdose, psychoactive substance use and  
57 heart failure.<sup>7</sup> Prevalence of tuberculosis, HIV, hepatitis C are also higher<sup>8,9</sup> with  
58 street dwellers often vulnerable to injuries, assault, exposure and skin problems.<sup>9</sup> Poor  
59 health status is associated with a longer length of time registered as homeless.<sup>10</sup>

60

61 Given the higher morbidity and mortality rates amongst the homeless population,  
62 adherence to prescribed medicines is imperative in achieving optimum health  
63 benefits. Limited evidence suggests that homeless patients are less adherent to their  
64 prescribed regimen and demonstrate poorer therapy outcomes than the rest of the  
65 population.<sup>11-12</sup> A systematic review of the international literature suggested that  
66 socio-economic status of patients may impact patient adherence to their medicines.<sup>13</sup>  
67 Further evidence from this specific vulnerable population and clinical groups has been  
68 recommended. There is also a dearth of theoretically informed investigation around  
69 medicines adherence research with the homeless population. This is despite growing  
70 emphasis on the use of theory in research designed to inform behaviour change  
71 interventions.<sup>14</sup>

72

73 This study aimed to explore behavioural determinants of homeless patients' adherence  
74 to prescribed medicines using Theoretical Domains Framework (TDF).

75

## 76 **Method**

77 Semi-structured, face-to-face interviews were conducted with patients registered at  
78 Marywell Healthcare Centre for the homeless in Aberdeen, North East of Scotland,  
79 UK. This centre provides services to a patient population of approximately 380, of  
80 whom approximately 50% are on methadone therapy (source: personal  
81 communication with lead clinician).

82

83 Patients aged 18 years and over, prescribed at least one medicine; and assessed by  
84 their general practitioners (GP) as having a good relationship with practice staff were  
85 included. This was important to ensure that interviews were conducted in a conducive

86 and safe environment for both participants and researchers. Those without the  
87 capacity to provide informed consent or unable to communicate in English language  
88 were excluded. GPs and practice nurses followed a screening procedure to identify  
89 suitable participants during routine clinical consultations. Those patients who  
90 expressed an interest were referred to the researchers on site. Further information  
91 about the research was provided before informed consent was obtained. Participants  
92 were offered soft drinks and biscuits for refreshment. No other incentives were  
93 provided.

94  
95 An interview schedule (Box 1) was developed based on the limited available  
96 literature. The interview schedule was reviewed for credibility by an expert panel  
97 including a GP, a nurse practitioner (involved in the healthcare of homeless people), a  
98 GP practice support pharmacist, a community pharmacist and three academic health  
99 services researchers. The schedule was then piloted amongst four participants who  
100 met the inclusion criteria. Based on the pilot results, no changes in the interview  
101 schedule were needed hence the pilot transcripts were analysed together with the main  
102 study interview transcripts. Interviews were planned to take no more than 30 minutes,  
103 were audio-recorded with participant permission, and transcribed verbatim. Interviews  
104 were conducted until data saturation was achieved as deemed by the researchers when  
105 no additional themes were emerging. Duplicate, independent checking of the  
106 transcripts against audio-recordings and subsequent analysis was undertaken.  
107 Quantitative, demographic information was collected from participants prior to each  
108 interview as part of the consent process.

109

110 Researchers (VP, KM and DS) met to discuss initial coding after analysing the first  
111 four transcripts. Thematic analysis was undertaken using the framework technique<sup>15</sup>  
112 based on the Theoretical Domains Framework (TDF) adapted to behavioural  
113 determinants of adherence to prescribed medicines.<sup>16</sup> TDF is a theoretical framework  
114 of determinants of behaviour which combines 33 theories of behaviour into 14  
115 domains (including knowledge, skills, capabilities, beliefs, emotions, roles and social  
116 influences).<sup>16</sup> The TDF has been used by researchers to investigate determinants of  
117 behaviours or to explore issues around implementation of behaviour change  
118 interventions. In exploratory research, the framework can be applied to either all or  
119 part of a research study including formulation of a research instrument, such as a  
120 survey or topic guide or interview schedule for a qualitative study; as a basis for a  
121 framework for undertaking qualitative data analysis; or to interpret the results.

122

123 This research was reviewed and approved by West of Scotland NHS Ethics Service  
124 (14/WS/1094) and NHS Grampian Research and Development Committee  
125 (2014RG003).

126

## 127 **Results**

### 128 **Demographic characteristics**

129 Twenty-five patients were interviewed, the majority of whom were male (n=15)  
130 (Table 1) with a mean (SD) age of 40.7 (6.7) years (range: 28-54 years). Most  
131 participants rated their health as either fair (n=10) or bad/very bad (n=10) and were  
132 unemployed but not currently looking for work (n=19). Participants had been  
133 homeless for periods of less than six months (n=4) to over five years (n=3). Several  
134 manifestations of homelessness were noted during the interviews that shed further

135 light into participants' demographic characteristics and their lifestyle. Incidence of  
136 rough sleeping, consumption of a poor diet, drug misuse, violence and imprisonment  
137 were all noted. Drug or alcohol misuse were the most common reasons cited as  
138 leading to homelessness. Participants reported being prescribed medicines for the  
139 management of wide range of conditions including mental health issues, asthma,  
140 epilepsy, pain and dental issues including co-morbidities.

141

142 Table 1 to appear here

143

#### 144 **Key themes**

145 A total of 13 (out of 14) TDF domains that reflected behavioural determinants of  
146 adherence were identified from the data of which goals, environmental context and  
147 resources, beliefs about consequences, knowledge, social influence and behavioural  
148 regulation were the six most frequently cited domains. These are described in this  
149 section with quotes corresponding to each of the 13 identified domains presented in  
150 Table 2. The final TDF domain not identified in the data was 'professional/social role  
151 and identity.

152

#### 153 **Goals**

154 Several participants emphasised the benefits of their prescribed medicines, especially  
155 methadone. They believed that methadone was helping them to lead a 'normal' life,  
156 enabling them to feel 'stable', 'confident' and keeping them away from illicit drug use  
157 and its consequences including crime.

158

159 'Now I'm on methadone script, and I'm stable and that, and I've not been back to jail and that it's kept  
160 me stable, and it's managed to keep me and my girlfriend together. If it wasn't for that then we wouldn't  
161 be together.' 31 years old, male

162

163 Some participants demonstrated clear 'goals' with regards to their therapy outcomes  
164 in contextualising the importance of adherence. One participant described the goal as  
165 to 'fight the devil' referring to her addiction with illicit substances.

166

167 '...it's like fighting the devil. So you've got the good one and the bad one [gestures to each  
168 shoulder] so you're trying to eradicate -the bad one to keep the good one. So aye they do work,  
169 they work really quite well.' 47 year old, female

170

### 171 **Environmental contexts and resources**

172 The importance of 'environmental contexts and resources' was noted as a key  
173 determinant in all stages of the medicines taking process, namely access to medicines,  
174 retention of medicines and following prescribed regimens. Barriers of access to  
175 medicines often related to visiting a community pharmacy for timely collection of  
176 dispensed prescriptions. Lack of means to commute to the community pharmacy, or  
177 ill health, often prevented timely collection.

178

179 'Sometimes it was a lot of (problems) getting there (to a chemist), like sometimes people would say I'll  
180 give you a lift and then they wouldn't turn up. Never had money for bus fares and sometimes I wasn't  
181 actually fit to walk up to my chemist.' 38 years old, male

182

183 Lack of stable accommodation and chaotic lifestyle meant that adherence to  
184 prescribed medicines was not always the participants' main priority.

185

186 'When you are homeless, you are not thinking about your medication; but your food, shelter or heat for  
187 the night' 28 years old, female

188

189 One participant described sleeping rough in the area where the pharmacy was located  
190 so as to enable convenient access to prescribed medicines. This demonstrates a strong  
191 sense of ‘motivation’ and ‘behavioural regulation’ with regards to the importance of  
192 timely access to prescribed medicines.

193

194 ‘Just getting to the chemist was a problem with me being homeless because I didn’t know which end of  
195 the town I was going to be in every night. I didn’t know...I could have nowhere to go. I was just walking  
196 about the streets normally. I used to walk up to the general area where my chemist is and just end up  
197 lying and sleeping there or somewhere.’ 38 years old, male

198

199 Lack of secure space to store prescribed medicines was a common issue for  
200 participants. Some participants made reference to medicines with special storage  
201 requirements.

202

203 ‘Methadone is supposed to be stored in the fridge as well so if you don’t have a home you haven’t got a  
204 fridge...’ 35 years old, female

205

### 206 **Belief about consequences**

207 ‘Beliefs about consequences’ of non-adherence was a key determinant of adherence to  
208 prescribed medicines. For example, with particular reference to methadone, the  
209 prospect of reverting back to past habits of drug misuse was perceived as one such  
210 consequence. References were also made to other prescribed medicines.

211

212

213 ‘I would be a high risk again with blood clots (if I don’t take my warfarin)...if you come off the  
214 trazodone it can kind of make you paranoid. And I know by getting an endoscopy I know that if I don’t  
215 take the omeprazole I can suffer.’ 47 years old, female

216

217

218 **‘Knowledge’ of prescribed medicines**

219 Most participants identified themselves as being aware to the importance of adherent  
220 behaviour. Participants demonstrated their knowledge with regards to why specific  
221 medicines had been prescribed to them by their GPs.

222

223 ‘I’m on methadone, salbutamol, Seretide, something for my chest, Epilim for my epilepsy. Only got  
224 diagnosed with epilepsy last year and I’ve been asthmatic all my life. Probably got made a lot worse  
225 when I was homeless.’ 40 years old, male

226

227 Some reported having conversations with their prescribers demonstrating involvement  
228 in shared decision-making in prescribing of medicines.

229 “I say what’s wrong, they [the prescriber] say what’s maybe good and then we sort of like, try and work  
230 it that way.” 40 year old, female

231

232 **Social influence**

233 Some participants gave accounts of willingly sharing their medicines in their social  
234 circle. Theft was often a barrier to retention of medicines as indicated by participants  
235 sleeping rough as well as in temporary accommodation such as hostels.

236 ‘You are keeping (medicines) in your socks, down your trousers, bra even. Because if you fall asleep and  
237 it’s in your socks it could be quite easily stolen.’ 28 years old, female

238

239 Participants mentioned their apprehension of encountering individuals in pharmacy  
240 premises with whom they had strained or violent relationships in the past. Such  
241 apprehension was also related to potentially encountering strangers asking  
242 participants to illegally sell their prescribed methadone.

243 'I've come out of pharmacies heaps of times and folk have been like oi you on meth, have you got meth  
244 for sale? And I'm like nah sorry ... Some of them persist and try and get you... and I'm not selling any.'  
245 38 years old, male  
246

## 247 **Behavioural regulation**

248 Examples of adherent practices related to setting up phone reminders to take their  
249 medicines as well as prioritising the collection of prescriptions as their first activity in  
250 the morning.

251

252 '..even now when I'm not daily dispense it's quite easy [to take medicines as prescribed]. I take it every  
253 morning at the same time so I don't forget...I take it at the same time every day for the simple reason it's  
254 routine. A lot easier.' 41 years old, male  
255

256 Examples of non-adherent practices were also cited by participants. Forgetfulness was  
257 often a key issue. Accounts of doubling up the dosage to make up for the missed  
258 doses and finding their own way of adjusting the dosage and medicines regimen were  
259 some examples of non-adherent practices.

260

## 261 **Discussion and conclusion**

### 262 **Discussion of key findings**

263 Results from this study have provided a unique perspective on this vulnerable and  
264 under-researched population with regards to the behavioural determinants in relation  
265 to their adherence to prescribed medicines.

266

267 While adherent practices were noted amongst some participants, both intentional and  
268 unintentional non-adherence were apparent in the data. Participants' beliefs about  
269 consequences, perceived goals of therapy and environmental contexts and resources

270 were amongst the behavioural determinants associated with adherence to prescribed  
271 medicines. Socio-economic factors such as unstable housing, family conflict, being  
272 alone have been shown to negatively impact on adherence to prescribed medicines in  
273 research studies undertaken with the general population.<sup>13</sup> Participants in this study  
274 have demonstrated the importance of these factors in adhering to prescribed  
275 medicines in the context of their homelessness. Interventions to improve adherence of  
276 medicines amongst the homeless population can benefit from focusing on the  
277 behavioural determinants identified in this study. Use of behaviour change technique  
278 taxonomy (BCTT version 1)<sup>17</sup> provides a methodology for identifying content of any  
279 complex behaviour change interventions that are to be designed, implemented and  
280 evaluated. A recent systematic review of the international literature around  
281 interventions to improve adherent behaviour has shown that even the most effective  
282 interventions did not lead to large improvements in adherence or clinical outcomes.<sup>18</sup>  
283 Novel use of theoretical frameworks are essential in designing complex interventions  
284 of behaviour changes more likely to succeed.

285

286 Lack of secure storage was one of the key barriers faced in retaining the prescribed  
287 medicines. Some local authorities in the UK have developed medicines management  
288 policies for homeless individuals living in temporary accommodation, such as hostels,  
289 where locked facilities to store prescribed medicines have been made available.<sup>19</sup>

290 Results of this study suggests that while such provisions are likely to benefit the  
291 occupants, there is a potential need for such services to be extended to the wider  
292 homeless population, for example to those sleeping rough. Delivery of prescribed  
293 medicines to the temporary accommodation or a nominated social care professional  
294 collecting prescriptions on behalf of the homeless individual are also amongst the

295 recommended options.<sup>19</sup> With hindsight, such an approach could also mean missed  
296 opportunities for community pharmacy in providing opportunistic advice to this  
297 vulnerable population. Previous prospective evaluation conducted with homeless  
298 individuals has shown that access to temporary homeless shelters can lead to  
299 improvements in the health status and access to care during their time in such  
300 accommodation.<sup>20</sup> Similar improvement in outcomes has been shown across diverse  
301 areas, such as substance abstinence and reduction in risk taking behaviours, especially  
302 when supportive services are offered on site, for example for counselling or provision  
303 of regular meals.<sup>21</sup>

304

#### 305 **Study strengths and limitations**

306 This study has some limitations. Not every participant in this study was currently  
307 homeless as some participants had recently moved to temporary or more permanent  
308 housing but were still registered with the homeless healthcare practice. With such  
309 participants, the researchers enquired about their experiences while they were facing  
310 homelessness. In this research only the patients with a good relationship with the  
311 healthcare professionals were included. This approach was used to ensure the safety  
312 of both research participants and the researchers. In addition, participants were  
313 recruited through their primary healthcare centre, an environment where they were  
314 known to be comfortable. It is likely that the results may not be representative of all  
315 homeless populations nevertheless this exploratory research gives valuable insight  
316 into an under-researched population.

317

318 Duplicate checking of transcripts against audio-recordings and independent  
319 framework analysis of the confirmed transcripts maximised the trustworthiness of the

320 findings. Use of the TDF allowed key determinants of adherent and non-adherent  
321 behaviours with prescribed medicines to be explored.

322

### 323 **Practice and research implications**

324 The results of this study suggest that homeless patients face many unique barriers  
325 around adherence to prescribed medicines, mostly associated with homelessness and  
326 associated lifestyle. While health professionals based in specialist homelessness  
327 healthcare facilities might be more aware of the barriers, homeless patients who are  
328 using mainstream healthcare services such as community pharmacy will benefit from  
329 the wider healthcare professional sectors' greater awareness and understanding of  
330 these barriers. Patient counselling should be tailored to address the unmet needs of  
331 these patients.

332

333 There is scope for greater integration between health and social care services to  
334 enable homeless patients to retain, manage and derive optimal benefit from their  
335 medicines. Future research needs to consider wider aspects of self care including  
336 homeless individual's diet, injury prevention and management, sleep, health literacy,  
337 physical activity and hygiene. Scope of the current study should also be extended to  
338 the wider population using survey methodology to reach those who do not access  
339 healthcare centres. Exploration of the perspectives of the wider health and social care  
340 profession are also warranted. Such research will provide foundations to the  
341 development and implementation of theoretically based interventions for homeless  
342 individuals to optimally manage their medicines including provision of safe storage  
343 facilities and its impact on adherence and health outcomes.

344

345 **Conclusion**

346 Participants associated the behavioural determinants of non-adherence identified with  
347 homelessness and related lifestyle. Results are relevant to developing targeted  
348 behaviour change interventions for non-adherent homeless patients.  
349 Results suggest that there is scope for greater integration between health and social  
350 care services to enable homeless patients to retain, manage and derive most benefit  
351 from their prescribed medicines. While housing homeless individuals remains a  
352 government policy priority, in future policies should also address healthcare issues  
353 faced by homeless individuals as identified in this study. Homeless patients could  
354 benefit from healthcare professionals' understanding and recognition of the barriers  
355 associated with adherence to medicines.

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