



ORIGINAL ARTICLE

A rural-urban comparison of self-management in people living with cancer following primary treatment: A mixed methods study

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Abstract

Objective: To investigate and compare self-management in people living with cancer following treatment, from rural and urban areas in the United Kingdom where there is a significant evidence gap.

Methods: A cross-sectional explanatory sequential mixed methods design. This involved a self-completion questionnaire that collected data on demographics, self-management using the PAM-13 and rural-urban residence and 34 in-depth interviews that aimed to explore and compare the barriers and facilitators to self-management in rural and urban settings.

Results: 227 participants completed the questionnaire: mean age 66.86 (± 11.22). Fifty-two percent ($n = 119$) were female and 48% ($n = 108$) were male. Fifty-three percent ($n = 120$) resided in urban areas and 45% ($n = 103$) in rural areas. Participants had a range of different types of cancer but the three most common were breast ($n = 73$), urological ($n = 53$), upper and lower gastrointestinal ($n = 41$). Rural respondents (63.31 ± 13.66) were significantly ($p < 0.05$) more activated than those in urban areas (59.59 ± 12.75). The barriers and facilitators to self-management identified in the interviews were prevalent in both rural and urban settings but some barriers were more explicit in rural settings. For example, there was a lack of bespoke support in rural areas and participants acknowledged how travelling long distances to urban centres for support groups was problematic. Equally, there were barriers and facilitators that were not necessarily unique to either geographic setting.

Conclusion: Whilst the active treatment phase can present considerable challenges for people living with cancer in rural areas the findings suggest that the rural environment has the potential to increase engagement with self-management in the transition to survivorship. The rigorous mixed methods design has led to different and complementary conclusions that would not have been possible had either quantitative or qualitative methods been used in isolation.

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KEYWORDS

cancer, cancer survivors, cancer survivorship, living with cancer, mixed methods, oncology, patient activation, rural health, self-management, United Kingdom

1 | BACKGROUND

Globally, it has been widely acknowledged that disparities exist between people living with cancer from rural versus urban settings.¹⁻⁶ People living in rural areas have been shown to have higher cancer mortality in addition to an increased risk of experiencing worse health outcomes, poorer long-term survival and unique unmet psychosocial needs compared to urban counterparts.^{3,7-10} This can be exacerbated by additional challenges such as greater travel distances to acute centres for treatment and follow up care, limited access to health and care facilities and bespoke support.¹¹

Despite most of the extant literature highlighting the negative aspects of rural living it is important to remember that there are a range of characteristics in rural areas and communities that can positively influence the lives of people living with cancer who reside there.^{12,13} For example, rural communities sometimes have greater levels of community support and readily available access to green spaces which can improve physical and mental health.^{10,14} Research has shown that people living with cancer in rural areas can have unique values and different attitudes to help-seeking as well as a stronger degree of stoicism.^{11,15} Furthermore, they have been shown to have significantly greater cancer-related self-efficacy when compared to their urban counterparts and less likely to report higher levels of distress.^{16,17}

Over the last decade, there has been an international drive towards promoting and supporting self-management with people living with cancer.¹⁸⁻²¹ Self-management means managing the physical, psychological, social and practical consequences of cancer and its treatment as well as understanding how and when to seek support, recognising signs of disease progression and making lifestyle changes to promote health and wellbeing.²² Prominent psycho-social oncology researchers Foster and Fenlon consider engagement with self-management crucial when it comes to the recovery of health and wellbeing following cancer treatment.¹⁹ Patient activation is an important aspect of self-management and has been defined as the knowledge, skills and confidence a person has to self-manage.²³ People can be supported to self-manage in several ways including by healthcare professionals, peers, employers, friends and family as well as with online resources.¹⁹ Despite patient activation being widely advocated for as a routine self-management assessment measure within the UK National Health Service (NHS),²⁴ to the best of our knowledge, there are no existing published studies in the UK or internationally that have compared patient activation between people living with cancer from rural and urban areas.

It is important to note that, that much of the existing academic literature that explicitly explores the impact of geography on living with cancer tends to come from North America and Australia.^{1,2,4,5,9,11,17,25-27} That said, it should not be assumed that

existing evidence of rural disparities internationally would translate directly to the UK setting. What constitutes as 'rural' in the UK could be conceptually different when compared to much larger North American or Australian settings and definitions of rurality have changed considerably over time as well as becoming more complex.²⁸ A recently published scoping review identified that there is limited UK based research that looks at how residing in a rural or urban area influences self-management following primary cancer treatment.¹² This mixed methods research was designed to generate original evidence to address this knowledge gap and aimed to investigate and compare self-management in people living with cancer following treatment from rural and urban areas in the East Midlands region of the UK. The region has an estimated population of 4.8 million and includes the densely populated urban centres of Derby, Leicester, Lincoln, Northampton and Nottingham.²⁹ In addition, it is one of the most rural regions in the UK with both affluent and deprived rural areas and the large rural county of Lincolnshire hosts many coastal communities that are characteristic of poor mental and physical health, heavy smoking and drug and alcohol misuse.³⁰ These areas present significant issues when it comes to accessing cancer treatment and survivorship care.¹¹ There has recently been an urgent call for action from UK policy makers to improve health outcomes and reduce health inequalities in rural and coastal areas.³¹ The setting of the East Midlands has been described by other rural health researchers as a microcosm of the UK in terms of the demographic characteristics, urban-rural dynamics and deprivation making it a suitable setting for this research.³²

2 | METHODS

An explanatory sequential mixed methods design was utilised. Firstly, this involved a self-completion postal questionnaire that collected quantitative data on demographics, self-management, and rural-urban residence. The questionnaire along with the other study documents (letter of invitation, information sheet and consent form) were piloted with five volunteers who had lived experience of cancer; one of these additionally had experience as a carer. Overall, there was a positive response to the study documents and the research project in general. Some of the suggested changes from the lived experience volunteers involved improving the readability and accessibility of the documents to suit people with mixed literacy skills as well as reinforcing anonymity on the consent form. The questionnaire was then followed by 34 in-depth qualitative interviews that aimed to identify and compare the barriers and facilitators to self-management in people living with cancer from rural and urban settings in the East Midlands. Both datasets were integrated to further explain the quantitative differences that were identified between rural and urban participants.

Research question: *What are the differences in self-management in people living with cancer from rural areas when compared to those from urban areas?*

Prominent mixed methods scholars, Cresswell and Cresswell consider it best practice for researchers who use mixed methods designs to incorporate a mixed methods question into their studies to convey the importance of integrating or combining the quantitative and qualitative components.³³ This is the question that will be answered based on the mixing of both types of data. In this research, the mixed methods research question was: *How does the qualitative interview data further explain any quantitative differences identified with rural and urban populations?*

2.1 | Participants and procedures

2.1.1 | Eligibility

Participants were eligible to take part if they were over 18 years of age, had a confirmed cancer diagnosis and had completed primary cancer treatment in the last 5 years. They were excluded if they had evidence of cancer recurrence or metastasis, had started active oncology treatment within the last 12 months or were currently being treated for palliative or end of life care.

2.1.2 | Recruitment

Access to participants was sought via two Cancer Centres at the collaborating NHS acute trusts in the East Midlands of England. Both Cancer Centre Managers and Lead Cancer Nurse Specialists were briefed on participant eligibility criteria and confirmed that they could identify and recruit potential participants via their patient database on behalf of the research team.

Printed research packs (NHS cover letter, information sheet, questionnaire, further contact slip, freepost return envelope) were passed on to each cancer centre who posted these to eligible participants. So the participants could understand what we meant by 'self-management' the participant information sheet used the now widely cited definition ('awareness and active participation by an individual in their recovery, recuperation, and rehabilitation to minimise the consequences of treatment and promote survival, health and well-being') of cancer self-management that was developed by the Department of Health, Macmillan Cancer Support and NHS Improvement.³⁴ An information analyst at each cancer centre identified potential participants using their patient database. Of all the participants who met the criteria, a random sample of 834 (417 at each trust) were selected. This number was decided by a sample size calculation that allowed for a 20% difference between scores, assumed a statistical significance level of 0.05 and a test with 95% power giving a required sample of 417. A statistician at the University of Lincoln was consulted and they also provided a letter of support to the ethics committee. In line with similar research in the

West Midlands of England that used a self-completion postal questionnaire with people living with cancer, the sample size was doubled, and the survey was sent to 834 people as it was anticipated that 50% would respond.^{35,36} Participants were assigned a unique ID number for the purposes of the study.

Those who completed the questionnaire could indicate interest in taking part in a subsequent qualitative interview via the further contact slip. The first author (David Nelson) contacted participants to arrange a qualitative interview several months after the questionnaire had been sent. Across both NHS trusts, a total of 112 further contact slips (49% of all questionnaire respondents) were received indicating that the participant would be happy to be contacted about the possibility of taking part in a qualitative interview. People were purposively sampled to get a good spread between urban and rural participants in order to answer the research question as well as sampling across a range of demographics and cancer types, so the qualitative sample would not be deemed too homogenous. Before making contact, the first author (David Nelson) liaised with trust staff to ensure that participants still met the eligibility criteria. This also minimised the risk of causing distress to friends or families by contacting participants who were now deceased as well as those now in receipt of palliative care. Interview participants were allowed to choose whether they would like to be interviewed face-to-face or via telephone. Prior to each interview, the interviewer (David Nelson) orally went through the information sheet as well as the previously mentioned definition of self-management with the participants to ensure that they understood the focal point of the research. A pre-determined topic guide was used to guide the interviews and probing was used where appropriate. The questions focused on what supported or prevented participants in their recovery as well as from engaging (or not) with self-management. Twenty-five interviews were conducted face-to-face either in the participants home with their consent or on the university campus and nine were conducted via telephone. All were recorded and transcribed verbatim. Interviewees were free to talk for as long as they felt comfortable and this ranged from approximately 30 to 100min which generated extremely rich qualitative data.

2.2 | Measures

2.2.1 | Self-management

To assess self-management, we used the validated short form of the Patient Activation Measure (PAM-13).²³ This is a thirteen-item instrument that measures knowledge, skills and confidence to self-manage. It has been widely used internationally to measure self-management in people living with cancer.³⁷⁻³⁹

Based on the responses to the 13 items each participant receives a PAM-13 score that can range from 0 to 100 with higher scores indicative of higher activation. The individual PAM-13 scores can be categorised into one of four levels of activation which represent a developmental progression from being passive with regard to one's health to being highly proactive about self-management.²³

Firstly, level 1 (0.0–47.0) suggests that the participant may not yet understand that the patient's role is important in the care process, they tend to be passive and feel overwhelmed by managing their health. Level 2 (47.1–55.1) indicates that the respondent lacks the confidence and knowledge to take action and manage their health. Level 3 (55.2–72.4) suggests that the participant is beginning to engage in recommended health behaviours but may still lack the confidence and skill to support these behaviours. Finally, level 4 (72.5–100) indicates that the respondent is proactive about their health and engages in several recommended health behaviours. People living with cancer who are less activated are more vulnerable to poor experiences and outcomes.³⁸

2.2.2 | Rural-urban residence

Rural-urban residence was measured using the UK Office for National Statistics (ONS) RUC2011 Rural-Urban Classifications.⁴⁰ Respondents were asked for their postcode within the questionnaire and the online ONS postcode directory lookup tool (<https://onsdigital.github.io/postcode-lookup/>) was used to ascertain whether they resided in a rural or urban area. The use of postcode to define rural-urban residence in cancer research has been adopted internationally elsewhere.^{1,4,5}

2.3 | Data analyses

2.3.1 | Quantitative analyses

Data were analysed using SPSS (Statistical Package for the Social Sciences) software (Ver. 22). Firstly, descriptive statistics were used to characterise the data on demographics and patient activation. Dependent on the distribution of the data parametric (Independent Samples *t* test) and non-parametric tests (Mann Whitney *U* test) were used to assess whether there was a statistically significant difference between rural and urban responses in relation to the mean values on the individual items on the PAM-13 as well as the overall activation score. To provide consistency with reporting and to aid interpretation, comparative results are reported with mean differences and 95% confidence intervals. Results were considered statistically significant if $p < 0.05$.

2.3.2 | Qualitative analyses

Qualitative data were systematically and independently coded and managed using NVivo (Ver. 11) software. Braun and Clarke's six step approach to thematic analysis was utilised. This was led by the first author (David Nelson) and last author (Ros Kane) with ongoing input and verification provided from Ian McGonagle and Christine Jackson. The team adopted a hybrid approach using both inductive and deductive reasoning to analyse the interview transcripts.^{41,42} This

allowed for the integration of data-driven codes with theory driven ones in relation to the tenets of self-management. This flexible approach allowed themes to emerge naturally from the data as well as being informed by the extant literature. Furthermore, the use of several researchers allowed for periods of reflexivity as well as the opportunity for the findings to be verified or challenged. The codes were eventually grouped together as to whether they represented barriers or facilitators to self-management in line with the initial aim of the qualitative interviews.

2.4 | Ethics

The research was approved by an NHS Research Ethics Committee (Ref: 17/WS/0054) and the Health Research Authority. It was made clear to participants on the information sheet that completing and returning a questionnaire implied informed consent. Interview participants were also asked to read and sign a consent form prior to taking part in a qualitative interview.

3 | RESULTS

3.1 | Quantitative results

3.1.1 | Participant characteristics

A total of 227 participants completed and returned a questionnaire (27% response rate). The mean age was 66.86 years ± 11.22 (range 26–90). Fifty-two percent ($n = 119$) of the respondents were female and 48% ($n = 108$) were male. In terms of the participants cancer type these were breast ($n = 73$), urological ($n = 53$), upper and lower gastrointestinal ($n = 41$), skin ($n = 18$), head and neck ($n = 13$), gynaecological ($n = 10$), haematological ($n = 10$), lung ($n = 6$), sarcoma ($n = 1$) and missing ($n = 2$). Fifty-three percent ($n = 120$) of the sample resided in urban areas and 45% ($n = 103$) in rural areas.

3.1.2 | Patient Activation Measure (PAM-13)

Firstly, in relation to the individual items on the PAM-13, there were some interesting findings across all of the participants that should be highlighted. The overwhelming majority (96.5%) of respondents agreed that they were responsible for taking care of their health. Nearly one fifth (19%) of participants disagreed that they were confident that they could help prevent or reduce problems associated with their health. One fifth (20.7%) of respondents disagreed that they could maintain lifestyle changes like healthy eating or exercising. Just over a quarter (26%) of participants disagreed that they were not confident that they could work out solutions when new problems arose with their health. Finally, one quarter (25.1%) of respondents disagreed that they were confident they could maintain lifestyle changes, like healthy eating and exercising, even during

times of stress. Full responses to the individual items on the PAM-13 can be found in the Table S1.

The overall mean score of the PAM-13 for all participants was 61.50 ± 13.51 (range 33.00–100). Females (62.57 ± 14.44) reported higher patient activation than males (60.36 ± 12.41), however, this was not statistically significant and there was also no significant association between age and patient activation ($r = -0.029$).

In this sample, half of respondents (49.8%) were categorised as PAM level 3 indicating that they were engaged in recommended health behaviours but may still lack the confidence and skill to support these behaviours. Twelve percent ($n = 26$) were PAM level 1 of patient activation indicating that they tend to feel overwhelmed by self-managing their health and may not understand their role in the care process. Nineteen percent ($n = 44$) were level 4 indicating that these individuals have adopted many of the behaviours needed to support their health but may not be able to maintain them in the face of life stressors. Full responses to the PAM-13 categorical levels are reported on in the Table S2.

3.1.3 | PAM-13 rural-urban comparison

Rural participants scored higher on all 13 of the individual statements on the PAM-13 although there were only statistically significant differences on four of the individual items. Participants who resided in rural areas scored significantly ($p < 0.05$) higher compared to urban participants on confidence to carry out medical treatments at home (MD = 0.18 [0.01,0.36]), knowing what treatments are available for their health problems (MD = 0.19 [0.02,0.37]), ability to maintain lifestyle changes, like healthy eating or exercising (MD = 0.26 [0.04,0.47]) and finally, knowing how to prevent problems with their health (MD = 0.17 [0.01,0.34]).

Of the urban residents, 14% ($n = 16$) were level four (maintaining behaviour) compared to 27% ($n = 26$) of rural respondents. Furthermore, 15% ($n = 17$) of urban respondents were categorised as level one (starting to take a role) compared to eight percent ($n = 8$) of rural

respondents. Eighteen percent ($n = 20$) of urban respondents were categorised as level two (building knowledge and confidence) compared to 12% ($n = 12$) of those residing in rural areas. Fifty-three percent ($n = 51$) of rural respondents and 53% ($n = 61$) of urban respondents were level three (taking action). Full rural-urban comparison between the levels of activation can be found in Figure 1 and a boxplot reporting on the differences between absolute individual PAM-13 scores with rural and urban respondents can be found in the Figure S1.

With regards to overall activation score, rural respondents (63.31 ± 13.66) were significantly ($p < 0.05$) more activated than those in urban areas (59.59 ± 12.75). Therefore, in response to the first research question, rural respondents have a greater level of knowledge, skills and confidence to manage their health compared to urban respondents. We can reject the null hypothesis in that the results are statistically significant, but we need to appreciate the modest mean difference and somewhat large 95% confidence interval (3.72, 0.13–7.30) meaning the extent to which these findings represent a clinically significant difference in patient activation is questionable. This should also be taken into account when interpreting the rural-urban comparison of the individual items on the PAM-13 reported earlier. Results from the independent samples t test are reported in Table 1.

TABLE 1 Patient activation measure: Rural-urban comparison

Residence	Mean (SD)	Range	N
Rural	63.31 (13.66)*	33.00–100.00	97
Urban	59.59 (12.75)	35.50–100.00	114
T value	2.042*		
MD	3.72		
95% CI	0.13, 7.30		

Note: Independent samples t -tests were conducted * $P < 0.05$.

Abbreviations: 95% CI, 95 % Confidence Interval, MD, mean difference between groups.

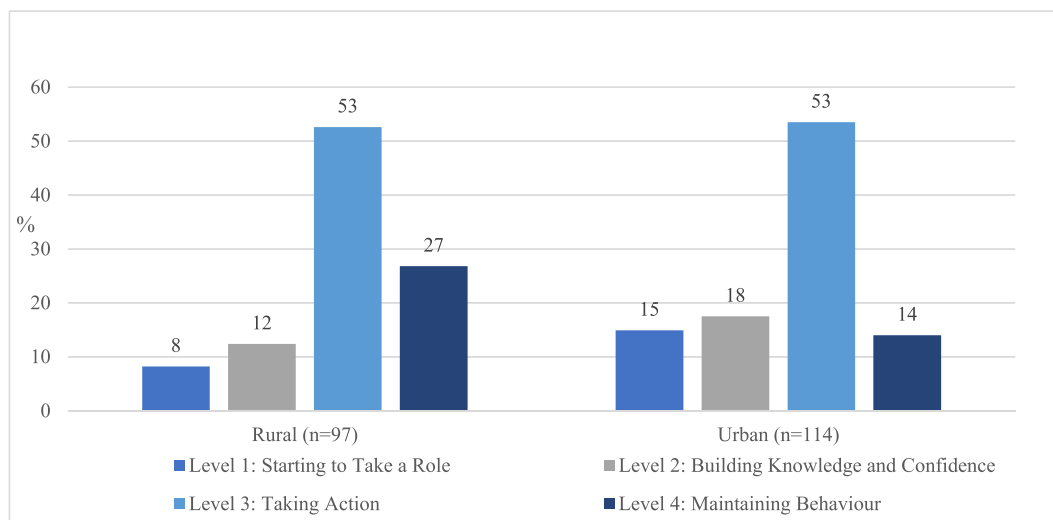


FIGURE 1 Level of patient activation: Rural-urban comparison

3.2 | Qualitative results

3.2.1 | Participant characteristics

Thirty-four participants took part in an interview. The mean age was 63.88 years \pm 11.19 (range 39–85), 56% ($N = 19$) of whom were female and 44% ($N = 15$) male. There was an even split in geography with 47% ($N = 16$) being from rural areas and 53% ($N = 18$) from urban areas.

3.2.2 | Barriers and facilitators to self-management

With regard to barriers that prevented participants engaging with self-management there were three themes: (1) location, access and a lack of support (2) non-supportive relationships with health professionals and family/friends (3) motivational and emotional. There were three themes from the interview data in relation to facilitators to self-management: (1) effective communication and information (2) informal and peer support and (3) motivation.

3.2.3 | Rural-urban comparison of barriers and facilitators

The barriers and facilitators to self-management were prevalent in both rural and urban settings, however, some were more explicit in either the rural or urban environment. For example, there was a lack of bespoke support in rural areas and participants acknowledged how travelling long distances to urban centres for support groups was problematic. Equally, there were barriers and facilitators that were not necessarily unique to either geography. Notably, when it came to relationship-based barriers, rural and urban both reported negative experiences with some health professionals and the breakdown of personal relationships as a consequence of cancer. Furthermore, lack of motivation to engage with self-management and psychological distress as a consequence of cancer was not necessarily unique to the rural/urban environment. At the same time, motivation to engage with self-management was not unique and both sets of participants were motivated by a desire to be healthy and take part in group activities and sports, although rural participants did have easier access to greenspaces and community activities which could have enhanced motivation even further. Table 2 reports on the comparison of the barriers and facilitators below.

3.2.4 | Integration of quantitative and qualitative results

The mixed methods research question was how does the qualitative interview data further explain any quantitative differences identified with rural and urban populations? As previously mentioned, rural participants scored significantly higher on the PAM-13 indicating

greater engagement with self-management. Turning to the interview data with a view to understanding why this might be the case, rural participants reported higher levels of community support, greater access to green spaces and more positive and closer relationships with their local GP which could account for some of the differences. Table 3 reports on the integration of the quantitative and qualitative data.

4 | DISCUSSION

This study was novel in that it offered insight into self-management, cancer survivorship and residence with a UK sample where there is a considerable evidence gap.¹² The quantitative findings revealed for the first time that patient activation differs significantly amongst rural and urban UK populations who have completed primary treatment for cancer. Given almost a fifth of the UK population reside in rural areas there is a need to understand the experiences of people living with cancer from both rural and urban settings.⁴³

In this research, rural respondents were more 'activated' than those in urban areas. There are a number of reasons identified within the international extant literature that might suggest why rural participants had greater knowledge, skills and confidence to manage their health.^{11,17,44–46} Firstly, Davis et al found that people from rural areas conceptualised their health in terms of autonomy and self-reliance, they feared problems with or a decline in their health because it could reduce autonomy and lead to being a burden on others.⁴⁴ Consequently, this mindset could act as a motivator to engage with self-management. The literature that has succeeded this maintains that people in rural areas tend to be more stoic with regards to their health.^{45,46} In addition, Butow et al suggest that rural populations have greater needs, as a result of limited access to resources, which influences a more self-sufficient lifestyle where they become less inclined to ask for support.¹¹ When compared to their urban counterparts they have been shown to be less likely to report high or very high distress.¹⁷ Indeed, 'self-management' and 'self-care' could be traits that rural people indirectly (or directly) develop throughout their life as they learn to live within the parameters of their environment. Put simply, if you live in an area with limited resources, there might be no alternative but to 'self-manage' and be proactive about your health. Other research found that people living with cancer in rural areas used 'active' coping strategies as opposed to 'passive' ones.⁴⁷ Therefore, skills of adaption, problem solving, resource seeking and utilisation⁴⁸ could potentially become normalised behaviours. However, the literature maintains that self-management is dependent on collaboration with health professionals^{19,48,49} and if people in rural areas have limited or no access to health professionals,¹⁰ the extent to which they can engage fully with the academic definition of self-management is questionable. It is also important to note that just because they score higher on self-management outcomes such as the PAM-13 does not necessarily mean that they are 'healthier'.

TABLE 2 Rural-urban comparison of barriers and facilitators

	Rural	Urban	Notes
Barriers			
Location, access and a lack of support	Lack of bespoke support in rural areas were reported as well as the negative impact of long travel distances to access tailored and specific support.	Urban environment perceived as having better access to healthcare, and tailored support for participants.	There was a lack of tailored and specific support in the rural environment. Although it could not always be assumed that urban meant close proximity to healthcare and amenities. Some people chose rural living as they enjoyed the isolated environment and access to greenspaces.
Non-supportive relationships with health professionals and family/friends	Rural participants reported negative relationships with consultants and medical staff. There was considerable strain on personal relationships, in some cases complete breakdown. Caring for children and older family members problematic.	Urban participants reported negative relationships with medical staff also. Again, cancer put strain on their personal relationships, in some cases complete breakdown. Caring for children and older family members was also problematic and acted as a barrier to their own self-management.	Rural and urban participants both reported negative relationships with health professionals and family/friends which were not supportive to their recovery. These data did not highlight any uniqueness with geography. However, 'community' links and engagement were stronger in rural participants which could support self-management.
Motivational and emotional	Some rural participants reported that motivation to engage with self-management and health behaviours was lacking. Emotional and psychological distress as a result of cancer prevalent.	Motivation to engage with self-management and health behaviours lacking with some urban participants. Again, emotional and psychological distress as a result of cancer was a salient concern.	Lack of motivation to engage with self-management and psychological distress as a consequence of cancer was not unique to the rural/urban environment.
Facilitators			
Effective communication and information	Rural participants adopted a proactive attitude about finding credible information in a range of formats.	Urban participants had a proactive attitude about finding good information in a range of formats.	Engagement with different types of information dependent on individual preferences as opposed to geography.
	Reports of good communication and relationships with health professionals to support self-management, particularly local GPs.	Also reports of good communication and relationships with health professionals to support self-management.	Rural and urban reported good communication and relationships with their local GPs but this was more prevalent in the rural data.
Informal and peer support	Community support and engagement with the local community was stronger in rural data. Informal and peers support was crucial to participants recovery.	Some participants moved to the urban areas to reduce social isolation. Informal and peer support from friends and family was equally important in this setting too.	Informal and peer support was important to both sets of participants regardless of geography.
Motivation	Playing team sports and being part of a group were motivators for physical activity. Participants had a desire to keep fit or lose weight which also motivated them. Digital apps were an incentive to engage with health behaviours. Many rural participants had dogs which acted as a facilitator to engage with physical activity.	Group activities and sports again were motivators for those from urban areas. Motivation was driven again by a desire to be healthy, keep fit and recover from cancer treatment. Digital apps were also used to engage with practices such as meditation.	Motivation tended to be individual and was not directly influenced by the rural/urban environment. However, easy access to greenspaces and community activities in the rural setting might act as a motivator to actively engage with certain health-behaviours, and subsequently self-management.

TABLE 3 Integration of quantitative and qualitative results

Quantitative findings	Qualitative findings	Integration—how does the qualitative data explain the quantitative data?
PAM-13—Rural participants (63.31 ± 13.66) had higher patient activation than those in urban areas (59.59 ± 12.75) this was significant at $p < 0.05$.	<i>Barriers</i>	Interview data showed that participants tended to engage more with the local community in rural areas which could account for some of the significant differences in the quantitative findings.
Individual items on PAM-13—significant differences ($p < 0.05$) where rural scored higher on the following four individual items on the PAM-13	(1) Location, access and a lack of support	Some people chose rural living as they preferred the isolated environment and access to greenspaces, and this could have enhanced engagement with health behaviours, and self-management.
<i>Confidence to carry out medical treatments at home.</i>	(2) Non-supportive relationships with health professionals and family/friends.	Qualitative data highlighted that formal engagement with the Church was stronger in rural areas which could support some of the quantitative differences highlighted with patient activation.
<i>Knowing what treatments are available for my own health problems.</i>	(3) Motivational and emotional	Positive relationships with local GPs were particularly prevalent in the rural interview data, which could account for rural participants being more activated.
<i>Ability to maintain lifestyle changes, like healthy eating or exercising.</i>	<i>Facilitators</i>	
<i>Knowing how to prevent problems with my health.</i>	(1) Effective communication and information (2) Informal and peer support (3) Motivation	
	<i>Comparison of Barriers/Facilitators</i>	
	The barriers and facilitators that were identified were prevalent in both rural/urban areas. However, some were more explicit in the rural/urban environment.	
	Participants reported both positive and negative experiences of rural/urban living and some felt indifferent about where they live and how it might impact upon their health and self-management.	

The research offers novel insight into the post-treatment experiences of rural and urban people living with cancer in a high-income setting. The robust explanatory sequential mixed methods design has led to different and complementary conclusions around rural-urban residency that would not have been possible had either quantitative or qualitative methods been used in isolation. For example, qualitative data on participants engagement with the Church and local community as well as preferences to choose rural living would not have emerged had the research used a solely quantitative patient activation questionnaire. Future quantitative and qualitative studies with people living with cancer should consider collecting data on rural-urban residency where appropriate. This can be utilised to inform interventions and support based on the needs of rural and urban populations. This would also allow us an opportunity to verify and/or challenge some of the positive and negative assumptions about rural and urban living. In

this study, this was done by asking participants for their post code and cross-referencing with official statistics. This meant that the amount of personal data that was requested was minimal. Indeed, consistency with how this is recorded would be welcomed. Researchers should aim to collect data from both deprived and non-deprived rural and urban communities as it is likely that deprivation can have a considerable influence on a person's ability to recover from cancer.¹⁶

4.1 | Clinical implications

The rural and urban environment can act as both a barrier and a facilitator to self-management depending on the individual and their circumstances. Working collaboratively with healthcare professionals people living with cancer can self-assess their environment so it can

be utilised to support their recovery. This can be done through identifying and setting self-management goals (short and longer term) that they wish to achieve. In areas where services are limited, people living with cancer and professionals should try and think creatively around self-management strategies and potential sources of support. The challenges of delivering healthcare in rural areas are well documented and the data in this research supports that to some extent. Whilst rural areas might lack physical resources commonly found in urban centres, the findings suggest that rural areas can have high levels of community and informal support. Health professionals can try to challenge some of the assumptions around rural living where the discourse is predominantly negative. The routine conversations that professionals have with people living with cancer should consider both the positive and negative environmental factors that a person encounters in order to identify solutions to support them.

The quantitative findings have indicated statistically significant differences between rural and urban people living with cancer with regard to patient activation. As previously mentioned, the effect size and large confidence intervals raise questions as to whether this difference could represent a clinically significant difference in patient activation. Therefore, further data collection with diverse samples in the UK and internationally is warranted before we can draw any definitive conclusions in relation to clinical significance.

4.2 | Study limitations

Our study had several limitations which we wish to acknowledge. Firstly, the findings offer a snapshot of people's lived cancer experience within the East Midlands region of England. Despite this notable contribution to the literature, the UK much like other regions elsewhere is geographically diverse and as such, more data from different types of rural-urban areas is merited for increased representation. This should include areas of high and low deprivation as well as coastal communities who can have significant issues around access. Unfortunately, we did not have access to treatment received and time since treatment began which prohibited our quantitative analysis in relation to these variables. These additional data items would have added useful context and enriched our analysis. A further limitation is that our required sample size of 417 was not reached, this could be a consequence of nonresponse bias when respondents differ significantly from those who did not respond as is sometimes the case with postal questionnaires. Unfortunately, the demographic and geographic data of non-responders was not available to the research team and as such, we cannot say anything definitively about the characteristics of non-responders. Finally, our comparison of the quantitative data was confined to bivariate analysis of the mean PAM-13 scores for rural and urban respondents which was in line with our initial research question although the research could have been developed further via the use of multivariate approaches to ascertain the effect of covariates such as deprivation and other socio-demographic factors on the PAM-13 whilst controlling for rural-urban residence.

5 | CONCLUSION

Rural participants scored significantly higher on patient activation, and it is posited that factors such as increased community engagement and support, active engagement with the church, access to green spaces and finally some of the traits (e.g. stoicism, self-autonomy) of rural communities that have been identified within the literature could explain these. However, at present, comparative data are non-existent therefore limited definitive conclusions can be made. The barriers and facilitators that were identified were not necessarily unique to the urban or rural environment. Certainly, the qualitative data show that place of residence is not as unequivocal as the quantitative results would suggest. The mixed methods design has therefore led to different and complementary conclusions that would not have been possible had either quantitative or qualitative methods been used on an individual basis. Engagement with the local community was greater in rural areas which could go some way to explaining the differences. Whilst the active treatment phase can present considerable challenges for people living with cancer in rural areas the findings suggest that the rural environment has the potential to increase engagement with self-management in the transition to survivorship. Further confirmatory studies with other populations in the UK and internationally are warranted before moving on to the development of self-management interventions. It is hoped that these results will instigate further research in the field of rural-urban residency and self-management in people living with cancer.

AUTHOR CONTRIBUTIONS

David Nelson designed the study with support from Ian McGonagle, Christine Jackson and Ros Kane. David Nelson led on the collection and analysis of the quantitative and qualitative data with support from Ian McGonagle, Christine Jackson and Ros Kane. All authors contributed to the interpretation of the findings and the drafting of the manuscript. The final manuscript was critically revised and approved by all authors.

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CONFLICT OF INTEREST

David Nelson is a registered Macmillan Professional and at the time of this research received funding from Macmillan to support his post at the University of Lincoln where the research was conducted. It should be noted that local Macmillan Cancer Support staff sat on the Project Steering Group in an advisory and supportive capacity, but it

was the research team listed above who led on the research design and overall conduct of the study.

DATA AVAILABILITY STATEMENT

The anonymised data are available upon reasonable request by contacting the first author.

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