i) **Title:** Creating a teachable moment in community pharmacy for men with prostate cancer: a qualitative study of lifestyle changes.

ii) **Short Running Title:** Community pharmacy lifestyle intervention prostate cancer survivorship

iii) **Full names of authors:** Dr Karen Poole[1], Professor Jane Ogden[2], Sophie Gasson[1], Dr Agnieszka Lemanska[1], Fiona Archer[1], Professor Bruce Griffin[3], Professor John Saxton[4], Professor Karen Lyons[5], Professor Sara Faithfull[1]

iv) **Author's institutional affiliation:** University of Surrey, Faculty of Health & Medical Sciences, School of Health Sciences[1]; University of Surrey, Faculty of Health & Medical Sciences, School of Psychology[2], University of Surrey, Faculty of Health & Medical Sciences, School of Biosciences and Medicine[3], Northumbria University, Newcastle, Department of Sport, Exercise & Rehabilitation[4] Boston College Connell School of Nursing[5]

v) Abstract

Objective

It is well established that exercise and lifestyle behaviours improve men's health outcomes from prostate cancer. With 3.8 million men living with the disease worldwide, the challenge is creating accessible intervention approaches that lead to sustainable lifestyle changes. We carried out a phase II feasibility study of a lifestyle intervention delivered by nine community pharmacies in the UK to inform a larger efficacy study. Qualitative interviews explored how men experienced the intervention and these data are presented here.

Methods

Community pharmacies delivered a multi-component lifestyle intervention to 116 men with prostate cancer. The intervention included a health, strength and fitness assessment, immediate feedback, lifestyle prescription with telephone support and reassessment 12 weeks later. Three months after receiving the intervention, 33 participants took part in semi-structured telephone interviews.

Results

Our framework analysis identified how a teachable moment can be created by a community pharmacy intervention. There was evidence of this when men's self-perception was challenged and coupled to a positive interaction with a pharmacist. Our findings highlight the social context of behaviour change with men identifying how their lifestyle choices were negotiated within their household. There was a ripple effect as lifestyle behaviours made a positive impact on friends and family.

Conclusions

The teachable moment is not a serendipitous opportunity but can be created by an intervention. Our study adds insight into how community pharmacists can support cancer survivors to make positive lifestyle behaviour changes, and suggests a role for doing rather than just telling.

vi) Main text

Background

Over 1.1 million men worldwide are diagnosed with prostate cancer each year, with over 3.8 million living with the disease (1). Obesity and physical inactivity are associated with an increased risk of prostate cancer recurrence and aggressiveness (2, 3), and there is a substantial body of evidence supporting the benefits of exercise and lifestyle behaviour changes in improving men's health outcomes (4, 5).

Specific exercise recommendations for men with prostate cancer on androgen deprivation therapy exist in the UK (6). The US also have physical activity and nutrition guidelines for cancer survivors (7) and the Clinical Oncology Society of Australia recommend that exercise is embedded as an adjunct to therapy (8). Nevertheless, studies using self-reported (9) and accelerometry assessed physical activity (10) suggest that the majority of men living with prostate cancer remain inactive, with less than 23% reaching recommended levels (9, 10) and levels of obesity rising after treatment (11).

Recent systematic reviews and meta-analyses conclude short-term supervised exercise interventions improve fitness and other patient-reported outcomes, but activity declines significantly afterwards and long term adherence is often difficult (4, 12, 13). More research is needed into alternative approaches for this population and home based self-management initiatives such as tailored web-based applications (14, 15) and telephone peer-support (16) are being developed.

Community pharmacies have been recognised as one of the most frequented and accessible healthcare settings in UK communities (17, 18) and have been commissioned to deliver a range of public health interventions (19). Trying to support people to make lifestyle changes is difficult, and there has been interest in a cancer diagnosis as a "teachable moment" to promote positive health behaviours for patients (20) and those close to them (21-23). Others propose that the teachable moment is more complex and may not be opportunistic (24) or predictable (25), and can be created (26).

We developed a community pharmacy lifestyle intervention to improve the physical activity and cardiovascular health of men after prostate cancer treatment (under review). The intervention was based upon the NHS Health Check (27) with additional fitness and strength assessments, immediate personalised feedback, lifestyle prescription with pharmacist support and a reassessment 12 weeks later (Appendix 1). We carried out a phase II feasibility study (UKCRN ID 20874) of the intervention delivered by nine community pharmacies to men with prostate cancer to confirm the viability of a larger efficacy trial (under review). Qualitative interviews aimed to explore how men experienced the intervention and these data are presented here.

Methods

Design

The lifestyle intervention was delivered by nine community pharmacies in Portsmouth, UK (June 2016 to April 2017) to 116 men with prostate cancer. The intervention development and feasibility results are reported elsewhere (under review). This paper reports qualitative data from semi-structured interviews with 33 participants at the end of the study.

Recruitment and Procedure

The hospital records of 1173 men were screened and 403 men were sent an invitation letter from an NHS Hospital Trust. Respondents (n=172) were assessed against eligibility criteria (Table 1), 125 men returned signed consent forms, and 116 took part (see CONSORT diagram, Figure 1). As participants completed their final evaluations, they were consecutively approached to take part in a telephone interview. Of the 44 approached, 33 men were interviewed (five declined without providing a reason, six declined due to the interview timing).

Telephone interviews took place between February and April 2017 and were conducted by a researcher experienced in interviewing cancer patients (SG) who had been involved in the recruitment phase. The topic guide was pilot tested with two patient representatives on the project team. Questions were asked about the value of the assessments, the impact of personalised advice, decision making about lifestyle choices, and factors influencing behaviours. Interviews were audio-recorded with field notes and lasted for a median of 26 minutes (range 13 to 64 minutes).

Ethics and Regulatory Approval

This project received ethical approval from the Health Research Authority (REC 16/SC/0069). Research governance assurance was obtained (IRAS ID 193263) with permission from each community pharmacy contractor. These qualitative results are reported according to the consolidated criteria for reporting qualitative research (COREQ)(28).

Analysis

We adopted a framework analysis approach (29) to explore both the contextual (how men experienced the intervention) and the evaluative perspective (how men made sense of the intervention). This allowed us to explore a priori issues and emergent data in during the analysis. All recorded interviews were transcribed verbatim, prepared for analysis using Microsoft Excel and Word (30). Line-by-line coding was conducted by the Research Fellow (KP). The resultant coding manual was refined by the Principal Investigator (SF) and updated iteratively. The data reached saturation when the interviews did not generate new insights. Final codes and themes were agreed between authors KP, SF and SG.

Results

Two themes were identified which explained how men experienced the community pharmacy intervention as a teachable moment, and the social process of making lifestyle changes. The demographic and clinical characteristics of the 116 participants and the 33 interviewees are presented in Table 2. Quotations to illustrate themes and subthemes are linked to the anonymised participant and transcript line (e.g. P64_70 refers to Participant ID 64, line 70).

1. Experiential realisation

This theme described how the community pharmacy intervention could contribute to creating a teachable moment and identified three subthemes; the sensory dimension, self-perception and interaction with pharmacy staff.

1.1 The sensory dimension

The fitness and strength assessments were conducted in the pharmacy consultation room. The Siconolfi Step test involves stepping up and down on a 25cm step at a predefined rate for three minutes for a maximum of three stages (at incremental speeds). The upper body strength test required men to squeeze a grip strength dynamometer as hard as they could for three seconds for three attempts. Participants were surprised when they found the tests more difficult to complete than they had anticipated;

"I suppose in my mind I still thought I was as fit as I was when I was in the army and I used to do […] almost the same sort of tests in the army […] and then I realised, the step-ups, there's three sets you do and I don't think I got past the first set because my knees went because being overweight, I just couldn't manage any of it and I thought, flippin 'eck." (P13_15)

The experience of feeling unfit and weak were unexpected and unpleasant, but forced some men to realise the extent of their physical decline and recognise the need for lifestyle change.

1.2 Self-perception

The pharmacists provided men with their assessment results during the consultation. These results were compared against age standardised values. Some men were visibly surprised or shocked by their results, which challenged their self-perception creating a teachable moment;

"… it really focuses your mind that not only do you think things have changed, here was somebody telling me that things had significantly changed, and that was quite a, you know, quite an eye-opener really." (P02_41)

In contrast, there was no evidence of a teachable moment where the results confirmed men's perception of their own health. Men who described themselves has having a healthy lifestyle described the results as "interesting", "informative", and "educational" but the assessment did not stimulate them to make further lifestyle changes.

Similarly, the assessment did not create a teachable moment when interviewees attributed their underperformance to ageing (despite their results being adjusted for age normative values), or a consequence of comorbid conditions (e.g. arthritis). These men had a more fatalistic outlook and regarded their results as inevitable or inconsequential. They often gave examples from their daily life to illustrate their lack of problems that rendered change unnecessary;

"I'm not sure that it motivated me doing it, because as I say I don't have any difficulties getting around and doing stuff, and living in a bungalow I don't encounter steps that often." (P012_40)

Men with this outlook who experienced sensory discomfort during the assessment attributed this to an artefact of the test rather than being indicative of their own health, strength and fitness.

1.3 Interaction with pharmacy staff

The interaction with the pharmacy staff contributed to the potency of the teachable moment in some men. Some interviewees described how staff had listened carefully, were knowledgeable and confident with lifestyle advice and clear about expected progress;

"They let me know, excuse me, in no uncertain terms what I'd got to do to keep myself up and going…and the sort of improvement that they would expect to see on the second assessment." (P022_129)

This positive interaction kept some men motivated between assessments to sustain lifestyle changes. Equipment malfunction (e.g. computer failures) and perceived staff incompetence (e.g. failed finger prick tests) undermined some men's confidence in the quality and accuracy of the assessment leading them to undervalue results and be less receptive to advice. This was illustrated in the case of interviewee (P026) where the interaction with different pharmacists altered his experience of the assessment as a teachable moment;

"…the last pharmacy [appointment] that I had, the pharmacist was very, very good, the first one was rubbish, and went through all the reasons for it, but, which I sort of knew, but I, to be honest, I couldn't really get into it too much… I think if I had been to the lady [second pharmacist] initially, I think that would have helped me a little bit more, because when I came back from her (…) I got started." (P026_188)

2. Social process of change

This theme identified the social process of change when initiating new lifestyle behaviours and identified four subthemes; the impact of a household on lifestyle choices, being monitored, social support to sustain changes, and the ripple effect on others.

2.1 Impact of a household on lifestyle choices

Interviewees described how their lifestyle choices were part of a social context. Many men explained that the food that they ate at home was largely determined by the choices of others in the household (often their partner). Typically those in the same household ate the same food, and so the dietary changes that one individual made, affected the food eaten by others. Any modifications to men's usual eating behaviours (both in terms of food consumed and meal timings) needed to be discussed and negotiated with those in control of shopping and food preparation;

"Yeah well I went through that you know but I passed it over to my wife really because she's quite keen on that sort of thing you know […] I didn't before but I've started having 3 pieces of fruit a day, an orange, an apple and a banana you know…" (P051_130)

For some, their enjoyment of physical activity was associated with the social aspects of walking with family (including grandchildren) or friends. This affected their decisions about their choice of exercise, for example;

"…you need to try and find something that both of you can do and enjoy doing, so my wife doesn't like or isn't a particularly good swimmer and therefore swimming's not an ideal one for us […] but we do like walking and we have to walk the dogs… so we upped it to three times a day from two." (P016_44)

This interviewee went further to propose that future programmes should be designed to include partners. He reflected that prostate cancer treatment is necessarily focused on the patient, but lifestyle changes was something a couple could discuss and do together.

2.2 Being monitored

The intervention support pack included a basic pedometer device and advice to record daily step count. None of the interviewees had previously done this and many men described how the pedometer helped them to recognise the need to increase their activity levels;

"Well, a normal day, if I was just walking the dogs in the morning and just messing around, it was about eight thousand, I suppose, and if I played golf it was fifteen, sixteen thousand. […] you know, it made a hell of a lot of difference that machine." (P126_53]

Many interviewees became extremely vigilant in recording their activities (e.g. daily step count, strength exercises completed, food consumed). They described how the records helped them to visualise their progress and reinforced their commitment. Although these were intended to be private records, many men voluntarily shared copies of their trackers with their pharmacy team, seeking recognition and affirmation of their effort and achievements.

For those men who made lifestyle changes, the second appointment was an important opportunity to assess improvements. Men who improved their results were able to recall quantifiable progress in specific clinical parameters, as well as enhanced performance on the tests. They described a sense of achievement and motivation for continuing the lifestyle changes. For those men who had not made any changes to their lifestyle, the second assessment was regarded as a surveillance opportunity or a requirement of the research project but was not regarded negatively.

2.3 Social support to sustain changes

Men also commented on how others had encouraged them in their lifestyle changes. Interviewees often talked about the importance of being "steered" or "nudged" in the right direction;

"… she keeps me on the straight and narrow and I think that's important because I think if she wasn't there I would probably... Yeah, I think I probably would fail" (P013_77)

In some cases, family members set-up "step count" challenges between themselves to increase their activity. Family banter and competition was described as great fun, motivational and effective. Others commented that they would have liked to be linked to other local men with prostate cancer. Many were curious to know how others were getting on and talked about a gap in peer support following completion of treatment. They wanted to offer support to men in a similar situation, as well as gain benefit from the discipline and motivation of exercising with others. The support of others, be that actual support from others or the sense of support being available if needed, appeared to be important in sustaining lifestyle changes.

2.4 Ripple effect upon family and friends

In some cases, the changes that men had made to their lifestyle had a positive ripple effect upon their family and friends who also decided to make improvements. There were examples of partners and adult children using the stretch bands, purchasing activity monitoring devices and joining walking groups. One man described how he had involved his friend;

"…my mate has to walk 10,000 steps a day […] because I make him.[Laughter]. Once I started the study we went out and had a beer and I explained to him what it was all about and since then instead of getting the

buses or that, we walk now.[…] Yeah, well he's got slight heart problems, he had […] a stent or whatever it is they put in, so he has to be a bit careful, so exercise for him is good as well, so it wasn't difficult to get him to do it with me." (P045_173)

Where couples had made lifestyle changes together, men commented that their partners had also lost weight and felt fitter.

Discussion and Conclusions

This study has advanced understanding of how the experience of receiving a lifestyle intervention, supported by a community pharmacist, created benefits for the individual. The results indicate that this became a teachable moment when psychological and social interactional components resulted in individuals being more receptive for behaviour change (23, 24, 31). A teachable moment is considered to be an event or set of circumstances which lead individuals to positively alter their health behaviours (31). Our findings confirm that the teachable moment is not simply a serendipitous or spontaneous opportunity (24, 32), but can be created by an intervention that provides immediate symptomatic feedback regarding the need for change. Although others have recognised the significance of the teachable moment in cancer survivorship (33) , our study provides new insight into the underpinning mechanisms and identifies how health care professionals can shape an encounter to promote patient readiness to consider lifestyle changes.

Men in this study were on average 1.5 years from initial diagnosis and this highlights the longevity of the treatment phase in those with prostate cancer. Recovery pathway recommendations propose that lifestyle interventions are provided from diagnosis and at multiple stages through the treatment trajectory (34). Developing the assessment as a sensory experience was found to be critical to how men perceived their fitness and need for behaviour change. Many lifestyle interventions use self-report questionnaires and this study highlights the power of a functional assessment experience and feedback in influencing men's beliefs.

The heuristic developed by McBride and colleagues (35) identified three domains that underpin whether an event is sufficiently significant to be a teachable moment. These include the extent to which a health event 1) increases perceptions of vulnerability and belief that behaviour change can overcome the threat; 2) evokes a strong affective response and 3) challenges an individual's self-concept. Our data support this model and explain how the community pharmacy lifestyle intervention led to a teachable moment for some men (Figure 2).

Many routine clinical tests in the NHS Health Check require patients to play a passive role in the process of the measurement (e.g. blood pressure, BMI). Simple fitness and strength assessments require patients to take an active role by performing to the best of their ability. The experience of doing physically demanding tests was uncomfortable and made men conscious of their health, strength and fitness status. For some, their performance and results were unexpectedly poor and challenged their expectations. As per McBride's heuristic (35), the assessment became a trigger event when it exposed men's vulnerability, challenged their self-concept and evoked shock or disappointment. However, if the assessment experience did not disrupt men's perception of vulnerability or challenge their self-concept (either because they performed as anticipated, or they attributed their poor results as an artefact to the test) there was no evidence of a teachable moment (Figure 2).

Our study confirmed findings of others that the potency of a teachable moment is affected by social interactional components (36). *How* the assessment was conducted was as important as *what* was done. All the teams delivering this intervention had completed competency assessed training. The quality of delivery may be a key indicator of intervention success, as highlighted in a recent systematic review of behaviour change techniques for men with prostate cancer (37). Our findings have informed the development of our community pharmacy training material and selection criteria for intervention sites.

The social context was also an important factor beyond the teachable moment. This study illustrates how an older man's lifestyle choices are nested within a household and wider social context. Our findings concur with those of others who emphasise the importance of family and friends (38), and go further to explore the social process of change when initiating new lifestyle behaviours. Men needed to negotiate changes whenever their choices impacted or relied upon others in the household. This was particularly evident when partners determined food choice and preparation, and where couples preferred to do physical activities together. Although unintended, in some cases, the intervention ripple effect appeared to have health benefits for those close to men. Additionally, many men that initiated lifestyle changes displayed a competitive curiosity about the progress of others and found the second assessment important for measuring benefits and sharing progress. Our findings reinforce the beneficial social context of behaviour change and highlights the importance of moving beyond individual-focused lifestyle interventions. Indeed dyadic approaches can be more effective (39), leading to health improvements for others (21) and additional benefits such as enhanced couple intimacy (40).

Study limitations

Men participating in the larger study may be more interested and receptive to lifestyle changes than those who did not respond to the study invitation. Our analysis of responders (n=172) to non-responders (n=231) (under review) indicates no significant difference in socio-economic status, with men citing altruistic reasons for participation (rather than lifestyle being a motivator or deterrent). Our interview sample was socio-economically, but not geographically, or ethnically diverse (98% white Caucasian origin) and did not include single men (Table 2). There was a high representation of interviewees from one pharmacy because of our consecutive sampling approach. However, the high proportional sample of interviewees (28%) and data saturation would suggest confidence in our findings.

Clinical implications

We explored how to identify or create the conditions in which men with prostate cancer are receptive to a lifestyle intervention in a primary care setting. To date, research has focused on identifying optimal moments for promoting lifestyle behaviour changes after a cancer diagnosis (25). We suggest that future research goes beyond the truism of the teachable moment as an opportunity that fortuitous healthcare professionals "catch" to promote positive health behaviours. Rather, it is a dynamic process where health care providers can use interventions and skilled interaction to create the conditions for a teachable moment.

Our findings are of potential relevance to other settings seeking to promote lifestyle behaviour change in high risk groups. For instance a recent systematic review of patient's experience of the NHS Health Check (a UK national cardiovascular risk assessment programme) identified that risk scores are not sufficiently motivational and participants wanted more proactive support from healthcare professionals when making lifestyle changes (27). Future developments could explore whether the NHS Health Check for higher risk populations could include simple fitness and strength assessments to create a cueing event for a teachable moment and subsequent re-assessment to reinforce positive lifestyle changes.

Our findings also highlight the importance of going beyond individually focused interventions when considering changes to dietary patterns and physical activity habits. Carefully targeted interventions to families affected by cancer may yield positive health benefits beyond the individual and have implications for defining the audience for teachable moments.

vii) Acknowledgements

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viii) Conflict of interest statement

SF is a trustee of Prostate Cancer UK. All other authors declare that they have no competing interests.

ix) References

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x) Supplementary Table 1

Eligibility Criteria

Inclusion criteria • *Adult men with histologically diagnosed adenocarcinoma of the prostate (3-36 months post-diagnosis) and stable as defined by PSA values (surgical patients <0.4ng/ml; radiotherapy patients <0.4ng/ml, hormone therapy patients <10ng/ml) or PSA is continuing to fall if nadir not yet reached* • *Brachytherapy treatment must have been completed >6 months prior to entering the study. Surgical or radiotherapy treatment must have been completed >3 months prior to entering the study* • *Have one or more of the following risk factors: BMI of 25 or above; on active androgen deprivation therapy; diagnosed with hypertension* • *If the patient has diabetes, permission must be gained from the patient's GP prior to commencement of the intervention and the patient must agree to regular follow-up with their diabetes team* • *Adequate understanding of verbal explanations and written information in English* • *Able to give informed consent* • *Able to travel to one of the study designated community pharmacies offering the lifestyle intervention on three occasions; at baseline and then at 12 weeks and 3 months later*
Exclusion criteria • *Adult men meeting or exceeding the Chief Medical Officer guidelines for physical activity (> 150 minutes of moderate to vigorous physical activity in >10 minute bouts)* • *Receiving palliative care for metastatic disease* • *History of cardiovascular events including (but not limited to transient ischaemic attacks, cerebrovascular accident, myocardial infarction, unstable angina or a heart condition that requires medically supervised activity* • *History of dizziness or loss of consciousness in past month* • *Any other physical condition that would require medically supervised activity* • *Other medical condition (including musculoskeletal or neurological disorders, or type 1 or type 2 diabetes) that, in the opinion of a physician, would make lifestyle changes unreasonably hazardous for the patient*

x) Supplementary Table 2

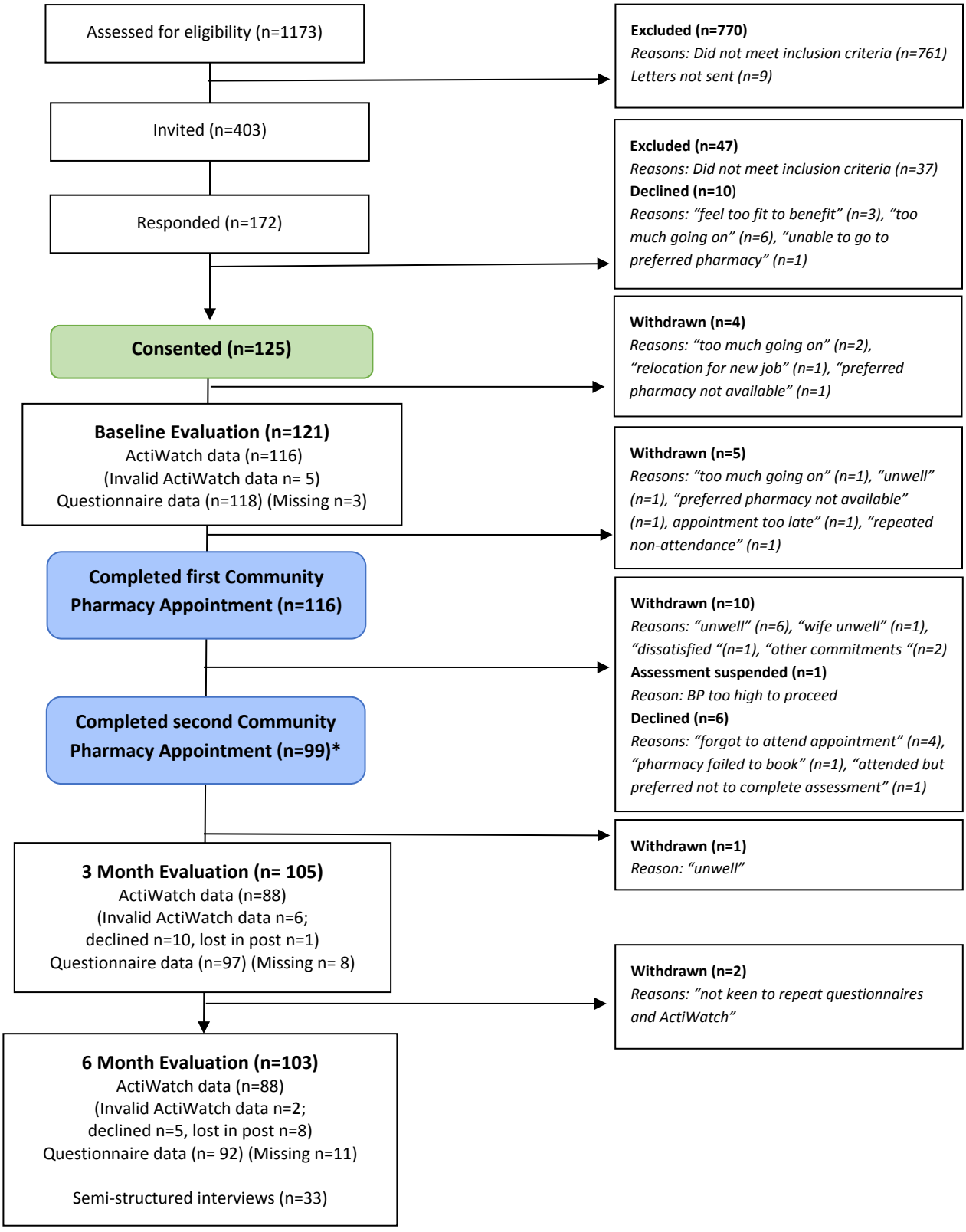
Demographic and clinical characteristics of Phase II study participants and interviewees

	Phase II Participants (116)	*Interviewees (33)*	*P value*
Age (years)			
Mean (SD)	70.4 (7.2)	71.9 (6.7)	0.280†
Median, Interquartile Range, IQR (Q1,Q3)	71, 10 (66, 76.0)	72, 8 (69, 77)	
Age Groups n (%)			
<60	9 (7.8)	1 (3.0)	0.712‡
60-69	40 (34.5)	10 (30.3)	
70-79	56 (48.3)	18 (54.6)	
≥80	11 (9.5)	4 (12.1)	
Marital Status n (%)			
Married/Partner	102 (87.9)	33 (100)	0.079‡
Employment Status n (%)			0.634‡
Working	22 (19.0)	4 (12.1)	
Semi-retired	4 (3.4)	1 (3)	
Retired	89 (76.7)	28 (84.8)	
Missing	1 (0.9)	0	
Index of Multiple Deprivation			0.532‡
1-3 (Most deprived)	16 (13.8)	3 (9.1)	
4-6	24 (20.7)	6 (18.2)	
7-8	37 (31.9)	15 (45.5)	
9-10 (Least deprived)	39 (33.6)	9 (27.3)	
Treatment (ever had)			0.045‡*
Surgery	49 (42.2)	5 (15.2)	
Radiotherapy	69 (59.5)	27 (81.8)	
Brachytherapy	4 (3.5)	1 (3)	
Hormone therapy	66 (56.9)	25 (75.6)	
Time since diagnosis (years)			
Mean (SD)	1.5 (0.7)	1.7 (0.7)	0.194†
Median, IQR (Q1,Q3)	1.5, 1.1 (0.9, 2.1)	1.7, 0.8 (1.3, 2.1)	0.189§
Pharmacy n (%)			0.131‡
A (independent, retail location)	21 (18.1)	5 (15.2)	
B1 (large nationwide chain, residential suburb)	9 (7.8)	3 (9.0)	
B2 (large nationwide chain, retail location)	8 (6.9)	0	
B3 (large nationwide chain, residential suburb)	9 (7.8)	5 (15.2)	
B4 (large nationwide chain, residential suburb)	18 (15.5)	0	
C1 (midsize nationwide chain, residential suburb)	30 (25.9)	15 (45.4)	
C2 (midsize nationwide chain, retail location)	8 (6.9)	2 (6)	
C3 (midsize nationwide chain, residential suburb)	4 (3.4)	1 (3)	
C4 (midsize nationwide chain, residential suburb)	9 (7.8)	2 (6)	

† Significance tested with t-test; ‡ Significance tested with chi-squared test; § Wilcoxon Rank test; *Significant

xi) Supplementary Figure 1

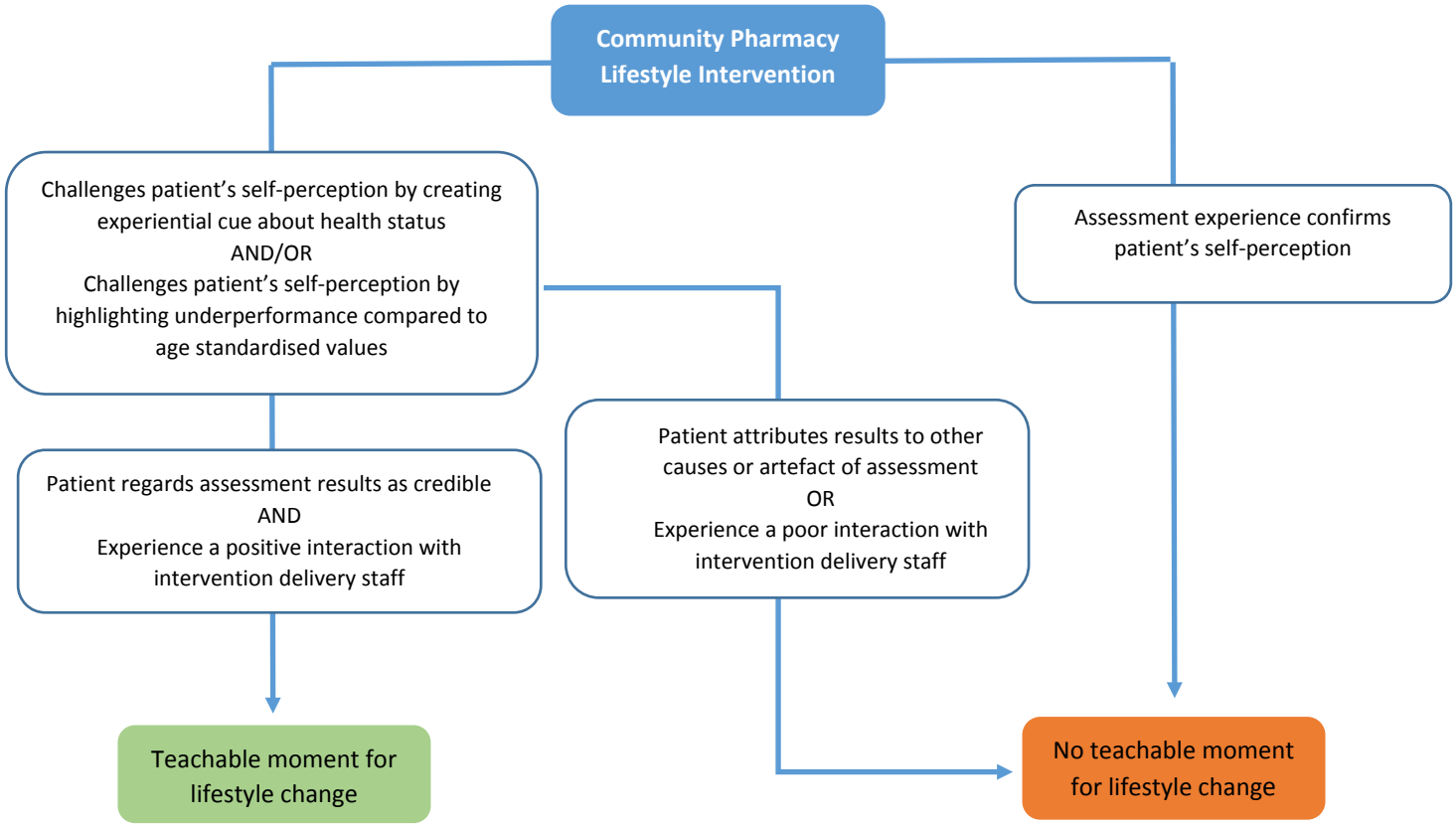
Community Pharmacy Lifestyle Intervention Project: CONSORT STATEMENT



*Some men did not attend the second Community Pharmacy Appointment, but continued to provide evaluation data

xi) Supplementary Figure 2

Conceptual framework to explain how a community pharmacy lifestyle intervention can create a teachable moment for behaviour change for men with prostate cancer.



xi) Appendix 1

Components of Community Pharmacy Lifestyle Intervention for men with prostate cancer

- Clinical measurements of weight, BMI, waist circumference, hip to waist ratio, blood glucose, cholesterol, blood pressure, QRISK2 score
- Fitness and strength assessment including:
  - Siconolfi Step Test to assess cardiovascular fitness,
  - Hand grip dynamometer to assess upper body strength
  - Sit to stand test to assess lower body strength
- Immediate personalised feedback of assessment results and printed prescription for lifestyle change (generated from intervention algorithm hosted by web-based community pharmacy service delivery system)
- Support pack (including a motivational DVD, Man-ual including physical activity and health eating advice and recipes, resistance bands for strength exercises and pedometer to measure step count)
- Community pharmacist support involving two telephone calls and a repeat assessment 12 weeks later.