



PEARL

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Published in:
Radiography

Publication date:
2023

Link:
[Link to publication in PEARL](#)

Citation for published version (APA):

Goldsworthy, S., Latour, J., Palmer, S., McNair, H., & Cramp, M. (2023). Identifying core components of a radiotherapy comfort intervention package using nominal group technique Radiography. *Radiography*, 0(0). Advance online publication.

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Identifying core components of a radiotherapy comfort intervention package using nominal group technique

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Conflict of interest: None to declare

Funding: College of Radiographers Doctoral Fellowship (Reference number 008) & Macmillan Cancer Support (Reference number 008)

Key words: Comfort solutions, NGT, interventions, consensus, radiotherapy,

Conflict of interest: All authors declare that they have no conflicts of interest.

ABSTRACT

Introduction

A comfortable treatment position in radiotherapy may promote patient stability and improve outcomes such as accuracy. The aim of this study was to identify, prioritise and determine the feasibility of delivery of intervention components as part of a radiotherapy comfort intervention package.

Methods

Prior research, consisting of a systematic review and qualitative interviews with patient and therapeutic radiographers, was triangulated and 15 intervention components developed. An online nominal group technique consensus meeting with 7 patients who received radiotherapy exceeding 10 minutes for one of three anatomical cancer sites and 3 therapeutic radiographers (TRs) participated. Four activities were undertaken: 1) discussion of comfort intervention components; 2) initial vote; 3) prioritisation of intervention components; and 4) discussion of feasibility in radiotherapy and were analysed using established quantitative and qualitative methods.

Results

One intervention component was added from initial discussions to the 15 pre-determined components being discussed. 11 components were recommended as 'accepted' (n=5) or 'accepted with caution' (n=6) to proceed to development. The highest scoring intervention components were 'Compassionate & empathetic communication training for TRs' and 'Tailored information, e.g., TRs provide the required information only as part of preparation for treatment'. Another that followed closely was 'Adjustments & supports provided for arms or legs during treatment by TRs'. Those 'accepted with caution' included 'Soft pads/mattress under the body to alleviate body discomfort managed by TRs'. Qualitative analysis highlighted concerns over the radiation environment and emphasised the importance of resources such as equipment, training, and time.

Conclusion

The recommended comfort interventions have potential to improve patient comfort during radiotherapy and should be considered to incorporate into positioning and immobilisation guidelines. However, specific intervention strategies to address these components will need to be developed and robustly evaluated.

Implications for practice

Comfort interventions might help patients relax and stay still during treatment, which could improve treatment accuracy and efficacy. Introducing these comfort interventions in practice have potential to lead to a more positive patient experience and improved overall quality of care during radiotherapy.

INTRODUCTION

Patient comfort is increasingly considered a fundamental need to address stress, anxiety, pain and discomfort in healthcare (1). Patient comfort is multidimensional, and recognised to have physical, psychospiritual, sociocultural and environment aspects (2). In radiotherapy, patient comfort can be affected by the need to adopt rigid and uncomfortable positions to achieve accurate and safe treatment (3–5). Cancer treatment also affects psychological and social well-being (6). Yet, there has been limited attention on improving comfort during radiotherapy and evaluating its impact on clinical outcomes (7,8)

Five studies have explored patient comfort during radiotherapy (9–13), three of which were qualitative and gave useful insights into psychological interventions for paediatric patients (9–11). Improvements such as giving concrete and repeated age adjusted information, distractions (e.g. listening to a parent via earphones, video or augmented realities), well thought out procedures, routines, compassionate care, and a friendly environment were suggested (9–11). The remaining studies investigated interventions to improve comfort in adult patients undergoing radiotherapy and reported similar suggestions including distractions and compassionate care such as dignity (12,13).

To inform the development of comfort interventions for adults undergoing radiotherapy, a programme of work was undertaken that included a systematic literature review (SLR) and qualitative investigation of comfort experiences and suggested solutions (14–16). The SLR identified comfort interventions reported for clinical procedures that involved sustained inactivity and stability over time, similar to radiotherapy (14). Interventions were grouped into four categories including psychological, physical, audio-visual and other (aromatherapy and education/information). Medium to large effect sizes were reported in many intervention categories. Subsequently, 25 adult patients who had received radiotherapy to cancers in the head and neck, thorax and pelvic regions and 25 therapeutic radiographers (TRs) were interviewed. Five themes emerged; ‘modification or adjusting patient position’,

'support patients to maintain position', 'self & supported coping methods', 'individually tailored information', 'preparational approaches', and 'environmental modifications'(16). The interventions from both studies were prioritised as part of the current study (14–16).

Generation of comfort intervention components

The findings of the SLR of comfort interventions applicable to radiotherapy (14) were triangulated with the findings of qualitative interviews with patients and TRs of how comfort was best managed in radiotherapy (16). During triangulation (Supplementary material 1.) the data was combined for real world meaning in radiotherapy (Supplementary material 2.).

A package of comfort interventions is likely to be required to address the complex and multidimensional needs of patients receiving radiotherapy. Therefore, the present study aimed to identify, prioritise and determine the feasibility of delivery of intervention components as part of a radiotherapy comfort intervention package.

METHODS

A modified Nominal Group Technique (NGT) consensus meeting with patients and TRs was used to identify and prioritise recommendations of components for a comfort intervention package in radiotherapy (17). An online NGT consensus meeting was chosen because patients and TRs did not have to attend in person which provided safety during the COVID 19 pandemic, especially for immunocompromised patients. Also, participants have previously felt more open to speak up in an online environment (verbally or using text) (18–21). This technique has also been used successfully within a similar population group to develop interventions (22). Ethical approval was granted by Southwest - Frenchay Research Ethics Committee on October 2021 and the protocol was prospectively registered [www.clinicaltrials.gov NCT03984435]. Patients and TRs gave written informed consent, and the consensus study was conducted on the 18th of January 2022. This study is reported in accordance in accordance Consolidated criteria for Reporting Qualitative research (COREQ) checklist (23).

Recruitment

Patient and TR panel members were initially identified if they had indicated agreement on the consent form as part of involvement in previous qualitative interviews (15,16). Further patient participants were recruited via a radiotherapy department in the Southwest of England.

Patients were included if they were deemed well via their electronic medical record, were 18 years or older, diagnosed with cancer at one of three major anatomical sites (head and neck, thoracic/breast or pelvis) and received radiotherapy with delivery time exceeding ten minutes. Therapeutic radiographer panel members were included if they were practising TRs (HCPC register check) and delivering radiotherapy techniques with times exceeding 10 minutes. No TRs from the host radiotherapy clinic or more than two TRs from the same radiotherapy clinic were recruited to ensure heterogeneity of views and practices. Patient and TRs needed to be able to use a computer and perform the required tasks to participate in the study. A training session was provided to facilitate participation.

The proposal was to recruit up to 12 panel members; up to 9 patients and 3 TRs. Recruitment was unevenly weighted towards patients to amplify the patient's voice amongst potential vocal TRs and patients. Patients were purposively recruited to include at least two patients with either cancer in the head and neck, thoracic/breast or pelvis regions.

Nominal group technique procedure

Following expression of interest, potential panel members were contacted by Chief Investigator (CI), sent the Participant Information Sheet by email and subsequently issued with a formal written confirmation letter, joining instructions, schedule for the day (supplementary material 3.). The CI ensured panel members could access Microsoft TEAMS. After 3-7 days, the CI provided a compulsory one to one training session. Potential panel members

were guided through Microsoft TEAMS and asked to complete a couple of tasks required for the consensus study before giving electronic informed consent via JotForm[®]Inc (www.Jotform.com).

The NGT consensus meeting consisted of a facilitator and session moderators. The NGT consensus meeting convened for 4.5 hours (Supplementary material 3). The four activities of the modified NGT consensus meeting are outlined in Figure 1. Panel members having difficulties during any of the activities were placed in break out rooms with a moderator to support them. Activities 2 and 3 were deployed real-time with JotForm[®]Inc questionnaires (www.Jotform.com). A summary was presented back to panel members after activities 1-3.

Activity 1 Idea generation & round robin

(Convened for 30 minutes)

In three break-out groups panel members discussed the intervention component list and were asked by the researchers if any interventions were missing and needed inclusion.

Activity 2 Clarification of important intervention components

(Convened for 30 minutes)

Panel members were asked to choose which interventions they felt were important by answering “yes” or “no” on an electronic questionnaire. After the activity, the results were shared and discussed.

Activity 3 Ranking of important intervention components

(Convened for 45 minutes)

Panel members were asked to rate intervention components on scale of 1-9, with 9 being high priority showing that it's important to them or could be to others based on the RAND/UCLA appropriateness method (24). After the activity, the results were shared and discussed.

Activity 4 Feasibility intervention components

(Convened for 45 minutes)

Panel members had a group discussion of whether it is important and feasible to deliver the included intervention components based on the RAND/UCLA appropriate method (24). The NGT consensus meeting exceeded the scheduled time by 30 minutes, so panel members were emailed post-hoc asking them to rate whether interventions were important and feasible

answering “Yes” or “No” and to provide comments. All panel members responded to the email.

The discussion about whether intervention components were important and feasible were audio recorded and transcribed verbatim. The data derived from Microsoft TEAM audio recordings and chat, field notes and comments sent by email to the facilitator and were collected for analysis.

Analysis

The purpose of the study NGT consensus meeting was to reach agreement over priorities for comfort intervention components through the application of an NGT technique. The consultation groups generated two forms of data: a ranked list of comfort intervention components and qualitative narrative of panel members’ discussions about the feasibility of interventions in practice. The RAND/UCLA Appropriateness Method (24) was used to evaluate the quantitative data arising from the NGT consensus meeting. This method is used to combine scientific evidence with the collective judgement of experts (e.g. patients and TRs) to achieve a consensus opinion from the group. Patients were considered experts in their experience of comfort receiving radiotherapy and how comfort interventions may help them and others. TRs were considered experts in treating multiple patients with radiotherapy and comforting patients in their care. The analysis of activities was conducted in real-time at the online consensus meeting and downloaded using Jotform[®]Inc (www.Jotform.com) and Microsoft Excel.

Activity 1 Idea generation & round robin

Intervention components, including those suggested by the group were added to Activity 2 after discussion and clarification with research team.

Activity 2 Clarification of important intervention components

Intervention components with >50% votes continued to Activity 3.

Activities 3 Ranking of important intervention components

Median Likert scores were recorded for prioritisation of individual intervention components. The mean absolute deviation of the median was calculated for inter-rater agreement between panel members, and rated as low (>1.41), moderate (1.08–1.41) or high (<1.08) (24).

Activity 4 Feasibility intervention components

Intervention component feasibility scores $\geq 75\%$ were judged feasible in radiotherapy, scores $\geq 50\%$ were judged feasible with caution and $< 50\%$ were judged not feasible in radiotherapy.

Recommendations for inclusion in a comfort intervention package

Intervention components with a median Likert priority score ≥ 6 , a 'moderate' to 'high' inter-rater agreement and judged as feasible by $\geq 75\%$ of participants (8) were recommended as 'Included' for development in a radiotherapy comfort intervention package. A median priority score > 6 , a 'low' inter-rater agreement and/ or a feasibility percentage between 50% and 74% were recommended as 'Included with caution' indicating further investigation required. A median priority < 6 with a low inter-rater agreement and a high or low feasibility score were 'excluded' from consideration for a comfort intervention package or further investigation.

Qualitative analysis of feasibility

Qualitative analysis of the transcripts was undertaken using NVivo software package (25). Due to the structured format of the modified NGT groups, a deductive analysis approach was taken (26,27). That is, comfort intervention components, rated as 'Included', and those recommended 'Included with caution' and 'excluded' were used as a predetermined framework for the thematic analysis. Key terms used by participants to describe intervention components were coded according to the intervention component they were describing. This process identified themes and contextual considerations associated with the intervention component, and also helped identify interactions or themes across multiple intervention components. These themes were used to determine the salient categories for the feasible implementation of a radiotherapy comfort intervention package. For trustworthiness and rigour, two panel members (one patient and one RT) were asked to complete a member check of the NGT consensus meeting findings.

FINDINGS

Patient characteristics

Seven patients consented to participate - five new patients and two from the previous interviews (15,16). Panel members were aged 35-72 years and five were male. Two patients had received radiotherapy for head and neck cancer, three for lung cancer and two for pelvic cancers.

TR characteristics

Three TRs consented to participate, all from the previous interviews (15,16) . All were female and in advanced practice roles (Years of experience ranged from 8-28 years) and were aged 32-51 years.

Prioritisation and feasibility of comfort intervention components

Fifteen intervention components were considered by panel members in Activity 1 (Supplementary material 2.) to suggest modifications or additions. After discussion by the panel members and consideration by the research team, one further intervention component 'Visible or audio countdown clock of treatment length' was included for sifting at activity 2. During activity 2, sixteen intervention components were therefore considered for importance by panel members. The panel voted to exclude 'Aromatherapy provided at patient request' but voted favourably for the other fifteen intervention components. During activity 3, five intervention components were recommended as 'Include' as moderate to high priority and feasible for development in a radiotherapy comfort intervention package. Six intervention components were 'Included with caution' indicating further investigation required based on a moderate to high priority and/ or low inter-rater agreement and low feasibility percentage. Four intervention components were 'excluded' from consideration in a comfort intervention package or further investigation with low priority scores. In total, eleven intervention components were recommended for inclusion in a comfort intervention package consisting of those recommended as 'included' and 'included with caution' (Table 2.).

Based on the comfort interventions components, categories of feasible implementation emerged (Table 2.) from panel member narratives (Supplementary material 4.). These categories arose from the consideration of TR time, resources, training, practicalities and online or video approaches to utilising a toolbox approach for patients to select from. An example of an

excluded intervention component was 'Human touch in person (hand holding) or having something to remind them of human contact (e.g., holding a soft item like a blanket) provided at patient request'. Panel members were divided over their views, some disappointed that human touch was excluded with a category 'Human Touch Essential' with comments like this:

"I'm just surprised that the human touch didn't make it through.." [P2]

While others could see that human touch was not practical during radiotherapy with the category 'Holding Something During treatment Not Feasible'

"For obvious reasons handholding during treatment is impossible, but if someone wanted to hold an object of comfort I don't see why not." [R2].

Although human touch is an important aspect of care, it is not possible during the delivery of radiotherapy although touch could be facilitated using remote technology (28).

An example of an intervention component that was included with caution was 'Stretching and exercises coaching before and after positioning for radiotherapy treatment' with the category; 'TR Time & Training'. Panel members felt that this component had the potential to be a time burden for TRs, stating:

"Staff time is required to specifically discuss this. Training required for staff, so they are up to date with most recent research/ practice in exercise e.g., pelvic floor exercises". [R1]

Others suggested that there may be opportunities to make these interventions possible with the category; 'Self-Direction (Video) In Stretching To Save Time'. Panel members suggested that time could be saved by using a pre-recorded video with a patient stating:

"This could be covered fairly easily face to face and save time with video" [P5].

An example of an 'Included' intervention component was 'Compassionate & empathetic communication training for TR' with the category; 'Natural Compassion From Staff Appreciated' with a patient saying;

"Personal interaction +++++, You can't beat personal interaction" [P1].

A second category summed it all up - 'Don't Over Medicalise' - with another patient saying;

"Don't over medicalise that bit of informality, that bit of humanity...."[P2].

'Resource Considerations' was an outlier and deemed applicable to all interventions and this included the following categories: 'Do we actually need an intervention?', 'Financial considerations', 'Logistics, staffing, equipment, training & access', 'Online or video', and 'Radiation environment considerations'. The following patient quote summarises this category;

"Feasible as a very good idea and would be fantastic in a perfect world but I recognise this could be unworkable or severely restricted by departmental budgets, staffing levels, workloads and space" [P3]

DISCUSSION

The objectives of this NGT consensus meeting were to identify and prioritise intervention components for inclusion in recommendations for a radiotherapy comfort intervention package and explore feasibility. Eleven intervention components were recommended for development in a radiotherapy comfort intervention package and five components were excluded. Aromatherapy was the only intervention component 'excluded' at Activity 2. The panel considered aromas to be person dependant and that smells could linger impacting on patients who really do not want it. This is a serious concern because patients receiving cancer therapies can suffer hyperosmia causing nausea (29). At Activity 3, four more intervention components were 'excluded' because the panel members felt that TRs were not skilled to coach patients in meditation and a countdown clock being logistically difficult with fluctuating treatment delivery times. Intervention components 'accepted with caution' arose from panel members who considered there was potential for extra training, increased treatment session times, an effect on positional reproducibility, radiation attenuation, availability of devices in all departments and cost. Intervention components 'accepted' were considered feasible for practice however the panel had similar concerns to intervention components accepted with caution although highlighted some categories that enabled

implementation. These included choosing intervention components and format, providing information when required and in groups (for efficiency), and assessing position.

For many intervention components, there was concern about the impact on the efficiency of radiotherapy services. This led to the emergence of the overall implementation category 'Resources', which in the real-world is highlighting for example that extra time maybe required from TRs, including training, extra facilities, extra equipment and extra time during treatment or after the treatment session. However, how an intervention component is implemented and delivered will determine the overall impact on services. For example, if a thorough process of implementation is undertaken where observation (Gemba walking – a walk through to refine the process) and refinements are made, then it is possible to create efficiencies and negate the concerns in this category (30). Furthermore, some studies have found that taking step to improve comfort during radiotherapy produces similar or improved reproducibility and reduces patient set up times (31,32). Therefore the recommended comfort intervention components should be carefully considered in practice.

Although there is a justified concern about resources, many of the intervention components exist within the current infrastructure of many radiotherapy services. The recommended list of intervention components has the potential to improve patient outcomes through improving comfort as radiotherapy treatment times increase with more advanced techniques (33). Supporting patients to complete their radiotherapy treatment using a comfort intervention package is likely to improve stability and accuracy of radiotherapy. Previous work in this area, including a systematic literature review of effective interventions, provides the required details to develop interventions specifically for radiotherapy (14). A comfort intervention package needs to be developed for cancer patients receiving radiotherapy, which is adaptable to age and deployed at the patient's choosing.

Given the limited recommendations of how to manage patient comfort during radiotherapy from national and European guidelines (33–35), we suggest that

a comfort intervention package now needs to be developed and tested for fidelity in radiotherapy.

Methodological considerations

A limitation of the present study is there was only one NGT consensus meeting round. Furthermore, even after further recruitment initiatives, the panel was small consisting of seven patients and three TRs. This may have been due to the COVID pandemic. While including patients and TRs can be highlighted as one of the strengths of this NGT consensus meeting, there is a potential that different participants may have yielded different conclusions and one vote in a small panel could exclude an intervention component which warrants further investigation. Regarding this methodological consideration, we utilised a pragmatic approach to recommending interventions using a modified NGT endorsing an 'included with caution' criteria. Even with this dispensation, this potential limitation must be acknowledged.

CONCLUSION

This study determined the important components to include in a radiotherapy comfort intervention package, based on consensus from a panel of patients and TRs. As radiotherapy evolves to improve outcomes, so interventions must be developed to ensure patients can comfortably comply with the associated increased treatment times. Eleven components have been recommended for inclusion in a radiotherapy comfort intervention package. The clinical implications of our study are to encourage radiotherapy services to consider incorporating such intervention components into their existing infrastructure. Future research is recommended to develop specific intervention strategies to address the recommended components. The resultant radiotherapy comfort intervention package can then be evaluated robustly in terms of feasibility, fidelity, and clinical and cost-effectiveness.

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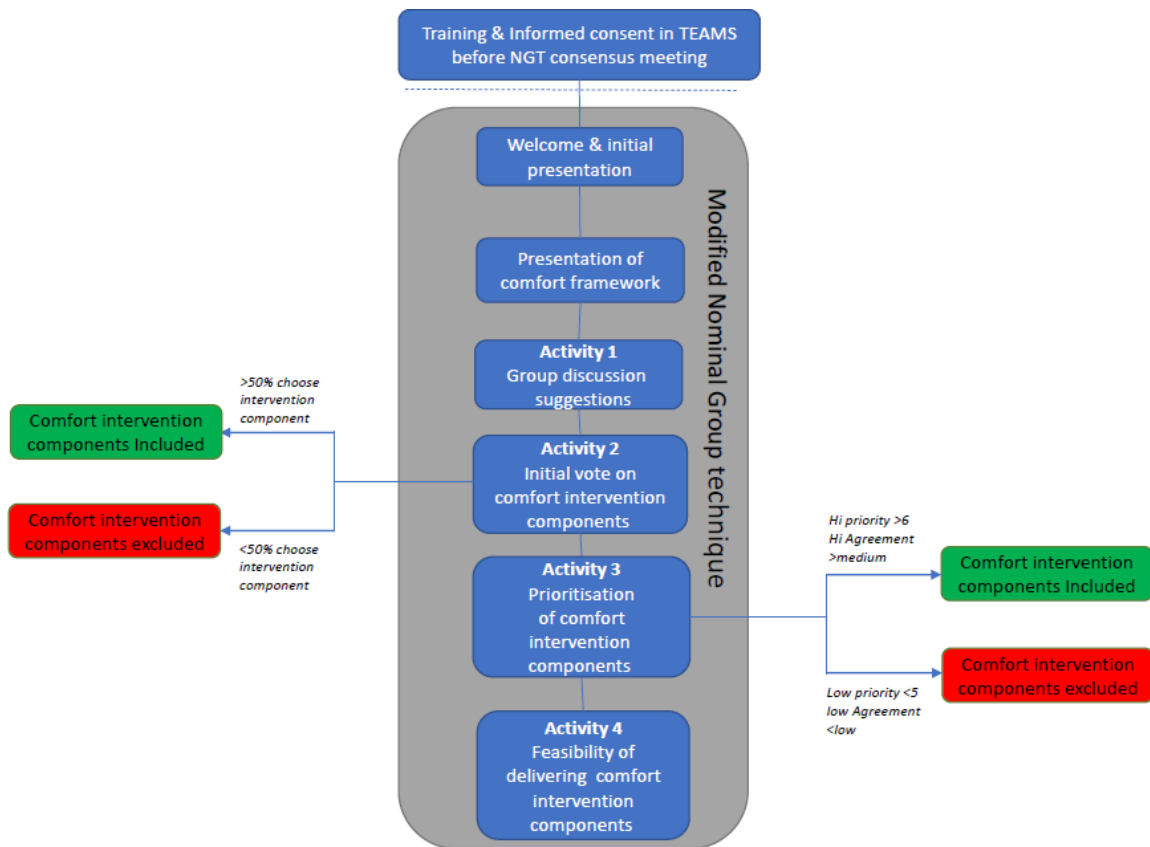


Figure 1. Overview of *Nominal group technique* consensus meeting

Table 1. Intervention component list

	Before consensus meeting	After consensus meeting
1	Adjustments & supports provided for arms or legs during treatment by TRs	Adjustments & supports provided for arms or legs during treatment by TRs
2	Aromatherapy provided at patient request	
3	Compassionate & empathetic communication training for TRs	Compassionate & empathetic communication training for TRs
4	Customized immobilization provided by TRs e.g., head moulds, vacuum bags, or mask modifications	Customized immobilization provided by TRs e.g., head moulds, vacuum bags, or mask modifications
5	Human touch in person (hand holding) or having something to remind them of human contact (e.g. holding a soft item like a blanket) provided at patient request	
6	Patient advice/training in meditation including talking to self, faith readings, chants, counting down or visualising going on holiday focusing on machine lights/lasers or noise	
7	Patient practice run of treatment position with RT	Patient practice run of treatment position with RT
8	Referral to talking therapies (e.g., counselling, hypnosis, or cognitive behavioural therapy) by TRs at patient request	
9	Soft pads/ mattress under the body to alleviate body discomfort managed by TRs	Soft pads/ mattress under the body to alleviate body discomfort managed by TRs
10	Sound & music interventions such as nature sounds, music audio books, relaxation, instructions, and updates during treatment delivered at patient request	Sound & music interventions such as nature sounds, music audio books, relaxation, instructions, and updates during treatment delivered at patient request

11	Stretching and exercises coaching before and after positioning for radiotherapy treatment	Stretching and exercises coaching before and after positioning for radiotherapy treatment
12	Tailored information e.g., TRs provide the required information only as part of preparation for treatment	Tailored information e.g., TRs provide the required information only as part of preparation for treatment
13	Tour of radiotherapy in person or video provided at patient request	Tour of radiotherapy in person or video provided at patient request
14	Visual interventions such pictures or projections of nature or similar on walls or screens delivered at patient request	Visual interventions such pictures or projections of nature or similar on walls or screens delivered at patient request
15	Workshop by TRs on what to expect e.g., position, mask, bladder/bowel preparation	Workshop by TRs on what to expect e.g., position, mask, bladder/bowel preparation

Table 2. Prioritisation and feasibility of comfort intervention components

Intervention Components <i>After Activity 1</i>	Activity 2 Initial vote	Activity 3 Prioritisation			Activity 4 Feasibility		
	Initial filter Is intervention important ≥50% 'Yes' proceeds to activity 3	Median Likert score	Mean absolute deviation from the Median (MADM)	Inter-rater agreement	Feasible & deliverable in radiotherapy - %Yes	Recommendation for inclusion in a radiotherapy comfort intervention package: include*, Include with caution† or Exclude‡	Qualitative analysis of participant discussion leading to Categories For Feasible Implementation (e.g. subthemes linking interventions to quotes)– full analysis can be found in <i>Supplementary material 4. Directed content analysis of prioritised interventions</i>
Compassionate & empathetic communication training for TRs	90%	9.0	0.7	High	90%	INCLUDE	Four categories emerged from the panel; 'Natural Compassion From Staff Appreciated' with one patient saying: <i>Personal interaction +++++, You can't beat personal interaction</i> [P1]. The second category was about retaining humanity: 'Don't Over Medicalise' with another patient saying; <i>Don't over medicalize that bit of informality, that bit of humanity....</i> [P2]. The third category was 'Education In Compassion & Empathy' embedded in TR comments such as; <i>I think any advanced communication skills (and/or clinical supervision) should be as available....</i> [R2]. The final category was about choice, 'Choosing From A Toolbox' of interventions' with an TR voicing their thoughts: <i>....It's good because then you can just select from them. Depending on the patient's needs</i> [R2]. Patients agreed there should be a choice; <i>Upon request is vital</i> [P2].
Tailored information e.g., TRs provide the required information only as part of preparation for treatment	100%	9.0	0.8	High	80%	INCLUDE	Three categories emerged from the panel; Although priority and feasibility were high, there was concern voiced by participants represented in the category; 'Time For TRs To Tailor Information' including this quote: <i>But time for TRs to do this is required</i> [R1]. Another category, 'Do Not Overload Patients', considered the information burden on patients demonstrated in this quote: <i>because it's quite hard to take everything in [amount of information], in one go</i> [P4]. The final category emphasised a focus on when to provide information 'Provide Information When Required During Radiotherapy (not all at #1)' with a patient suggesting; <i>It might be a good idea to have maybe have six or eight sessions, and then for someone just to say, right? You know we've been through some of it. Is there anything you're puzzled about? Or is there anything we can make clear</i> [P4].

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Workshop by TRs on what to expect e.g., position, mask, bladder/bowel preparation	90%	7.5	0.9	Moderate	80%	INCLUDE	Three categories for feasible implementation were; 'Choice & Format Of Workshops' with patients voicing their view that choice is important: <i>I would like to attend a workshop upon request</i> [P2], and an RT stating <i>....I think these could be online too</i> [R1]. The second category was 'Efficiency Of Workshops' which derived from quotes such as <i>.....if patients are grouped together this is feasible</i> [R2]. And the third category 'Specificity of workshops' <i>What is quite big cause of discomfort can be having to maintain a full bladder so a specific workshop would help</i> [R3].
Adjustments & supports provided for arms or legs during treatment by TRs	80%	8.5	1.2	Moderate	80%	INCLUDE	Two categories for feasible implementation were: 'Adjustment, Consideration & Risk' derived from quotes such as: " Yes, we want to make someone comfortable on the couch, but how far do we go [R1] ?" The second category was 'Assessment Of Position For Individualisation' derived from the desire to assess a patient's ability to hold position; <i>Not just about exercising, but straight up assessing our movement beforehand if required</i> [P7].
Sound & music interventions such as nature sounds, music audio books, relaxation, instructions, and updates during treatment delivered at patient request	100%	6.5	1.4	Moderate	80%	INCLUDE	Two categories were created, the first was 'Choice And Selection' voiced by a patient who indicated it was straightforward: <i>Easy enough to provide or have patient bring their own iPod/mobile phone</i> [P1]. The second category was about using this intervention component as a 'Distraction & Coping' solution with an TR saying: <i>Uhm, a distraction with music or sounds are beneficial</i> [R3], and a patient stating: <i>Broad agreement with this as a coping strategy</i> [P5].
Tour of radiotherapy in person or video provided at patient request	90%	8.0	0.6	High	70%	INCLUDE WITH CAUTION	One category emerged; The potential challenge of tours in person were highlighted with a preference by participants for virtual approaches as per the category 'Online Or Video Tour Or Information Is Time Efficient', which was

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							voiced by participants: <i>Video definitely could be done. Difficult to do in the working day in a busy department</i> [R3].
Soft pads/ mattress under the body to alleviate body discomfort managed by TRs	90%	7.5	1.3	Moderate	60%	INCLUDE WITH CAUTION	Two categories emerged; The concern over this component maybe around ensuring reproducibility of treatment position. The category 'Caution In Using Soft Pads Due To Reproducibility' is highlighted by an TR: <i>Providing a balance is struck - i.e., a mattress which is too soft and thick may cause the patient to move more</i> [R1], and the second category suggested a focus was required 'Soft Wedges & 'Mattresses To Assist Position Of Limbs' as voiced by one patient: <i>All I said really, is that so long as you get the original position in right, and if you could add a perhaps some of these soft pads elsewhere</i> [P4].
Visual interventions such pictures or projections of nature or similar on walls or screens delivered at patient request	90%	6.0	1.5	Low	50%	INCLUDE WITH CAUTION	Two categories emerged; There was concern of cost implications observed in the first category; 'Cost Implication Of Visual Interventions' with a an TR saying: <i>There is a cost implication of visual interventions</i> [R2]. However, visual interventions may not have to be complex as illustrated by the second category: 'Simple & Calming Visualisation Possible' with a TR stating: <i>...simple visualisation techniques/ counting etc is reasonable</i> [R3]. And patients acknowledging potential benefits too; <i>Calming images or videos would have allowed me to put myself elsewhere</i> [P7].
Stretching and exercises coaching before and after positioning for radiotherapy treatment	90%	7.5	1.5	Low	80%	INCLUDE WITH CAUTION	Three categories emerged; There was concern about the time that may be 'TR Time & Training' with an TR saying: <i>Staff time is required to specifically discuss this. Training is required for staff...</i> [R1]. However, in another category, 'Self-Direction (Video) In Stretching To Save Time', it was suggested that time could be saved by using a pre-recorded video with a patient stating: <i>This could be covered fairly easily face to face and save time with video</i> [P5]. It was felt that specificity was required in the category 'Specific Anatomical Stretches' with a patient voicing; <i>I think it's a great idea, particularly for patients receiving treatment to the torso region</i> [P3]. An TR

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							agreed saying that TRs need to be; <i>up to date with most recent research/ practice in exercise e.g., pelvic floor exercises</i> [R1].
Patient practice run of treatment position with TRs	80%	8.5	1.6	Low	70%	INCLUDE WITH CAUTION	One category emerged; There was concern about the extra time and resources required. The category 'Time & Resources For Practice Run Through Of Position' was expressed by an TR who highlighted key considerations for the service: <i>Time implications and machine availability implications</i> [R3]. Contrary to this concern, patients favoured the intervention component feeling that it could be accommodated: <i>This could happen during the planning appointment if not already achieved</i> [P1].
Customized immobilization provided by TRs e.g., head moulds, vacuum bags, or mask modifications	80%	7.5	1.5	Low	90%	INCLUDE WITH CAUTION	Two categories emerged; the potential lack of customisable immobilisation available in a radiotherapy department was a concern. The first category defines the challenge; 'Availability Of Customisation Devices' as per TR quote: <i>Providing the centres has customisable immobilisation available</i> [R1]. A second category suggests 'Customisation To Aid Overall Position' should be attempted with the following patient quote;..... <i>If this were expanded to include patients requiring help to remain in a position, then it is a very good idea</i> [P3].
Patient advice/training in meditation including talking to self, faith readings, chants, counting down or visualising going on holiday focusing on machine	60%	4.5	1.6	Low	30%	EXCLUDE	Three categories emerged; There was concern that specific training would be required for TRs. The first category 'Specialist Training Required' as per TR quote: A R2: <i>"I don't think that I am able. It's in my skill set to train people in meditation or chanting."</i> Similarly, a second category proposes that 'Not everyone can meditate' and a patient said: <i>Uncertain about this...not everyone goes on holiday?!</i> [P2]. However in a third category some patients find their own way without anything formal doing a 'Do It Yourself', with a patient stating: <i>And I think me and then you just find you just think. Well, it's I'm here now. It's not going to be too long and you find your own way through it, really.</i> [P4]

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lights/lasers or noise							
Aromatherapy provided at patient request	40%	-	-	-		EXCLUDE	Two categories emerged; although some panel members seemed positive about aromatherapy, they did state that smells are person dependant leading to the first category 'Smells are person dependant and can be like 'marmite' An TR said: <i>I thought aromatherapy was a nice option as some people find smells more comfortable than visual/audio. Aromatherapy I think is very person dependant? As X said some smells may not be great for other people [R1].</i> And the second category was 'Smells can linger' a patient said that : <i>Smells or aromas will linger which may have made me feel sick.[P6]</i>
Human touch in person (hand holding) or having something to remind them of human contact (e.g., holding a soft item like a blanket) provided at patient request	60%	4.0	1.7	Low	30%	EXCLUDE	Three categories emerged: the exclusion of this intervention component caused some controversy with there categories emerging; the first category was 'Human touch essential' a patient stating: <i>I'm just surprised that the human touch didn't make it through, given how technological and how clinical the whole system is and has to be. [P2].</i> The second category 'Holding something may help' suggested that touch maybe feasible in other formats: <i>Possibly feasible to hold a soft item, etc. should treatment allow but human contact during treatment unfeasible. [P3]</i> Then on balance an TR stated why some forms of touch may not be possible: <i>And things that people can hold to remind them. For obvious reasons handholding during treatment is impossible, but if someone wanted to hold an object of comfort I don't see</i>

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							<i>why not.</i> [R2] leading to the third category 'Holding something during treatment not feasible'
Referral to talking therapies (e.g., counselling, hypnosis, or cognitive behavioural therapy) by TRs at patient request	70%	5.5	2.2	Low	70%	EXCLUDE	Four categories emerged: panel members stated that some patients may have benefited from talking therapies and were surprised it was excluded with category one 'Some would benefit from talking therapies or coping strategies' and category two 'Surprised that Talking therapies were excluded'. A patient said that talking therapies; <i>Could be an extremely useful tool for worried patients.</i> [P2] And an TR surprised of the exclusion: <i>Yeah, I mean I'm a bit surprised about the referral to talking therapies as well?</i> [R2] However patients and TRs voiced that it should be standard with the third category 'Should be standard of care already' with a patient saying; Do this anyway and should be standard practice [P6] and a fourth category 'Elsewhere in the patient pathway' with an TR saying; <i>That is a really relevant point that some of the interventions may be better at different times in the radiotherapy pathway and in order to practically apply these could be useful to think about this.</i> [R1]
Visible or audio countdown clock of treatment length	90%	4.0	2.3	Low	70%	EXCLUDE	One category emerged: 'Challenging logistics of having a countdown clock at treatment delivery. Panel members suggested this wasn't really feasible considering treatment times vary day to day, an TR stating just that: <i>Our treatment delivery times change each day so a countdown will be challenging. We can tell patients when halfway through.</i> [R3]
Total interventions included or included with caution							11