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A psycho-educational intervention for people at high risk of developing another melanoma: A pilot randomised controlled trial

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TITLE: A psycho-educational intervention for people at high risk of developing another melanoma: A pilot randomised controlled trial

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ABSTRACT

Introduction: Information and psychological needs have been reported as ones of the greatest areas of unmet needs for melanoma patients. To respond to these needs, we developed the *Melanoma Care Intervention* a developed psycho-educational intervention for people at high risk of developing another melanoma comprising of a newly developed melanoma educational booklet and individually tailored telephone support sessions provided by trained psychologists. The purpose of this study was to investigate the acceptability, feasibility, and preliminary outcomes of the *Melanoma Care Intervention*.

Methods: Twenty-four adults (14 men, 10 women, mean age: 58 years, SD:12.2) at high risk of developing a subsequent primary melanoma were recruited and randomly assigned 1:1 to the intervention (a psycho-educational booklet, a Cancer Council booklet on melanoma, and up to five telephone-based sessions with a psychologist) or usual care (Cancer Council booklet only). Acceptability, feasibility, fear of cancer recurrence and secondary psychosocial outcomes were assessed at baseline, one and six months.

Results: Satisfaction and perceived benefits were rated highly for all intervention components, particularly the telephone-based psychology sessions (mean satisfaction and benefits: both 9.27 out of 10, SD=2.41). Preliminary outcome data suggested beneficial changes in fear of recurrence, depression, anxiety, stress, melanoma-related knowledge, and satisfaction with dermatological care.

Conclusions: The intervention was feasible, acceptable, and potentially effective in improving psychological adjustment. Timely access to effective, evidence-based, psychological care is a recognised need for people with melanoma. The intervention is designed to directly address this need in a way that is feasible in a clinical setting, acceptable to patients and health professionals.

Keywords: Melanoma; psycho-education; pilot study; supportive care; feasibility; cancer; psychological stress.

Trial registration number: The trial was registered with the Australian and New Zealand Clinical Trials Registry on 19/03/2013 (Registration Number: ACTRN12613000304730).

Strengths and limitations of this study

- This is the first completed pilot study to show that education and psychological support to patients before and after dermatological appointments in a high risk clinical setting was feasible, acceptable and well received.
- Documenting feasibility and identifying challenges encountered provides information that can be useful in the planning and implementation of innovative efforts to improve the psychological well-being of people with melanoma. The results of this trial highlight important processes in the development and delivery of psycho-educational interventions to melanoma patients.
- We used a mixed-methods design to demonstrate the feasibility, acceptability and to highlight the areas of improvement for the larger trial.
- As this was a small pilot study with a limited sample, our findings do not have statistical significance, but the positive feedback from participants and the direction of outcomes support wider testing of the intervention.

Background

Early detection and appropriate clinical management of melanoma ensures that most people with the disease have a good prognosis, with about 90% of patients still alive five years after diagnosis.[1] Despite this good prognosis, melanoma survivors have an ongoing threat of recurrence and are recommended to carry out regular skin self-examinations, have regular clinical skin examinations, and undertake behavioural changes to minimise excessive sun exposure;[2] all of which can add to the psychological burden of melanoma.[3] In addition, people with melanoma often experience intense fear that the disease could spread and become untreatable. Studies have reported that 30-50% of melanoma survivors experience heightened emotional distress,[2] and that many report unmet needs for information and psychological support.[4-6] Australian clinical practice guidelines for the management of melanoma highly recommended that psycho-educational support be made widely available to people with melanoma.[7] German guidelines extend this by recommending implementation of regular psycho-oncological screening to identify and offer psychological care to people with melanoma experiencing difficulties adjusting to their disease.[8] Several psycho-educational interventions for melanoma patients have been reported in the literature, with beneficial outcomes.[9] In a systematic review of 16 interventions, McLoone et al. concluded that participation in psychological interventions resulted in lower anxiety, health-related distress and melanoma recurrence rates, and positive changes in coping with illness.[9]

People at high-risk of a subsequent melanoma are particularly vulnerable to distress. Seventy-five percent of high-risk melanoma survivors report persistent fear and uncertainty about the possibility of developing new disease, cancer recurrence or metastases.[3,10] Despite this, psychological support is not currently offered in Australian high-risk clinics that provide a specialised clinical service for people at very high-risk of primary melanoma,[11] nor have specific interventions been designed for this high-risk sub-group. To address this gap, our

team developed a multifaceted psychological care program for people at high-risk of developing another primary melanoma (the *Melanoma Care Study*).[12] The intervention is comprised of up to five individual, telephone-based sessions with a psychologist, combined with an evidence-based psycho-educational booklet designed to respond to the unmet supportive care needs of people who have had melanoma.

This pilot study had three aims: (1) evaluate the acceptability of, and participant satisfaction with, the *Melanoma Care Study*; (2) determine the feasibility of delivering telephone-based psychology sessions scheduled in relation to dermatological appointments at melanoma high-risk clinics; and (3) collect preliminary outcome data for a range of health-related outcomes, including: fear of cancer recurrence, depression, anxiety, stress, unmet supportive care needs, satisfaction with clinical care, melanoma-related knowledge, behavioural adjustment to melanoma risk, and health-related quality of life.

Methods

Study design and participants

A randomised controlled trial design was used to pilot the *Melanoma Care Study*. Participants were recruited from three melanoma high-risk clinics in New South Wales, Australia; two situated in inner-city Sydney and one in a regional coastal city. These high-risk clinics provide a specialised clinical service for people at very high-risk of primary melanoma,[11] including people with a previous melanoma and either a strong family history of melanoma, many moles (i.e. dysplastic naevus syndrome), or a history of multiple primary melanomas. People aged 18 years or older with a history of stage 0, I or II melanoma were identified from the clinic databases and invited to participate. People were ineligible if they were identified as high-risk but had never had melanoma (e.g. people who carry a high penetrance genetic mutation); or had a known history of severe major depression, psychotic illness or other

serious psychiatric condition or cognitive deficit, or were unable to participate in English. Active stage III melanoma or metastatic melanoma (stage IV) were excluded as they have different psychosocial needs to stage 0/I/II patients, where the melanoma has been confined to a primary tumour only.

Ethics approval was obtained from all relevant ethics committees. Informed consent was obtained from all participants prior to study participation.

Intervention Arm

The *Melanoma Care Study* had three components: 1) a newly developed psycho-educational booklet in full colour hardcopy, 2) a freely available Cancer Council booklet, and 3) up to five telephone-based sessions with a psychologist specifically trained to deliver the intervention according to protocol. The psycho-educational booklet, *Melanoma: Questions and Answers* was developed by a multidisciplinary team and is comprised of seven modules and a series of tailored resources: (1) types of melanoma, melanoma diagnosis, and treatment; (2) factors that may contribute to melanoma risk; (3) information on skin self-examination, vitamin D and sun protection, as well as question prompts for communication with one's health care team; (4) emotional and social aspects of melanoma; (5) strategies to assist people in coping well with melanoma risk; (6) resources to assist people in keeping track of their melanoma care; and (7) sources for further information and support. The booklet content and format was pilot tested and revised on the basis of feedback from 19 people with melanoma and 10 health professionals.

The Cancer Council booklet, *Understanding Melanoma* is comprised of easy-to-read information about melanoma diagnosis, treatment, and emotional and practical issues. The Cancer Council booklet is heavily focused on diagnosis and treatment information while the psycho-educational booklet, *Melanoma Questions and Answers* provides more in-depth

information about emotional and behavioural aspects of coping with melanoma, communicating with one's family and health care team, and managing one's melanoma care.

Participants in the intervention group were also offered five telephone-based sessions with a psychologist, tailored to the needs of each individual participant and designed to provide *patient-specific* care to address identified difficulties, needs, concerns and goals. The first three sessions were in close connection to their next full dermatological consultation at the melanoma high-risk clinic and the next two sessions were in close connection with their subsequent high-risk clinic appointment approximately six months later. Participants who were not able to identify specific difficulties, needs or goals were offered the option of limiting their participation to the first three sessions. The telephone-based sessions were underpinned by the core principles of brief psychodynamically-oriented psychotherapy. [13-15] The goal of the sessions was to provide empathic, active listening at a deep level so as to try to understand participants and their experiences, and to assist participants in developing healthy emotional, cognitive and behavioural coping responses.[16] Psychosocial care planning and referrals for further information, support and clinical care were also provided, as appropriate. A manual was developed by a team of psycho-oncologists with extensive experience in the care of people with melanoma (NK, SM, PB), to guide the psychologists providing the intervention on a session-by-session basis (see Supplementary Table 1). The psychologists followed the general principles outlined in the manual, whilst tailoring the intervention to the specific circumstances, needs, goals and characteristics of individual participants. The psychologists were trained and did also received weekly supervision by one of the senior author (NK).

Control Arm

Participants in the control arm received usual care, which consisted of their usual melanoma high-risk clinic appointments and a copy of the Cancer Council booklet. A blank notepad was also included in the study package in order to keep the size of the package consistent with that received by the intervention group.

Procedures

Baseline data were collected using paper- or web-based questionnaires, as preferred by participants. Participants were then randomised to the intervention or control arm using minimisation and stratification by high-risk clinic, using an independent telephone randomisation service at the National Health and Medical Research Council Clinical Trials Centre, The University of Sydney.

Participants in the intervention arm received the intervention over a one-month period (if receiving three telephone-based psychology sessions) or a six-month period (if receiving five sessions). Both the psycho-educational and Cancer Council booklets were sent to participants two weeks before their usual six-monthly high-risk clinic appointment, at which a complete dermatological examination was undertaken. For people who received three sessions, these occurred one week before, one week after, and three weeks after this clinic appointment. People who received five sessions participated in two additional sessions; the fourth occurred one week before their subsequent high-risk clinic appointment and the fifth occurred the following week. Two psychologists received extensive training in intervention delivery prior to trial commencement.[12] With participants' permission, all sessions were audio-taped and early sessions were reviewed by the clinical psychology supervisor (NK), who also provided weekly supervision during which sessions were discussed in-depth. Participants randomised to the control arm received the Cancer Council booklet two weeks before their six-monthly high-risk clinic appointment.

Measures

Perceptions of the newly developed intervention and usual care were evaluated using the following purposely-designed items:

1. *Intervention acceptability and perceived benefits*. Six months after study enrolment, intervention participants rated their satisfaction with, and perceived benefit of, the psychology sessions, the psycho-educational booklet and the Cancer Council booklet, while control participants rated the Cancer Council booklet only. Participants also indicated any behavioural changes they experienced following their participation in the study (e.g., find the emotional support to cope with melanoma, talk more openly with my doctor at the high-risk clinic), using a 5-point scale from "strongly agree" to "strongly disagree". Participants in both arms rated the overall quality of the information and support received, and if they would recommend the intervention to other melanoma patients. Participants were also provided space to provide qualitative feedback if they wishes.
2. *Participants' preferences*. Participants were offered a choice in the number of sessions (between three and five) they would engage in. Data on participants' preferences, as well as the duration and timing of sessions were collected to inform the most feasible model upon which to design a larger trial.
3. *Adherence to intervention guidelines*. The proportion of participants who attended the telephone-based psychology sessions was recorded, as well as the number of sessions attended.
4. *Feasibility issues.* Difficulties, barriers, and resources associated with intervention implementation were also systematically recorded by the psychologists and the research team throughout the pilot.

Preliminary outcome measures: Outcomes relating to potential intervention efficacy were also assessed by self-report questionnaire at baseline, 1- and 6-month follow-up. The primary outcome was fear of cancer recurrence, measured using the Fear of Cancer Recurrence Inventory (FCRI)[17] severity subscale. Secondary outcomes were depression, anxiety, stress, satisfaction with melanoma care, behavioural adjustment to melanoma risk (skin self-examination, sun exposure, sun protection), unmet supportive care needs, melanoma-related knowledge, and health-related quality of life (see Supplementary Table 2).

Demographic and medical characteristics: At baseline, age, gender, education level, marital status, number of children were assessed. Health literacy was also assessed using two validated items.[18,19] Medical characteristics (e.g. number of melanomas, stage of each melanoma at diagnosis, time since first and last melanoma, melanoma treatment) were collected from medical records.

Statistical analysis

Descriptive statistics were used to summarise sample characteristics, feasibility, and preliminary outcomes. Being a pilot study, the small sample precluded use of inferential statistics; thus, mean scores and standard deviations (including the standardised mean difference at each time point as a measure of effect size) were used to compare groups. Questionnaires were scored according to standard published procedures and all analyses were performed using SAS v9.3 (SAS Institute, Cary, North Carolina, USA).

Results

Sample characteristics

Twelve participants were randomly assigned to the treatment arm and 12 to the control (Table 1). One intervention participant withdrew from the study after one psychology session, as he felt the intervention would not benefit him. The intervention group comprised eight men and four women, with a mean age of 57 years (*SD*=14), and a median melanoma Breslow thickness of 0.78mm (range 0.3-2.95mm). The control group comprised six men and six women, with a mean age of 61 years (*SD*=14), and a median Breslow thickness of 1.3mm (range 0.3-3.5mm). For both groups, superficial spreading melanoma was the most common histopathological subtype.

Acceptability

Four out of eleven participants in the intervention group reported reading the psycho-educational booklet, *Melanoma: Questions and Answers,* from 'cover to cover', 1/11'quite thoroughly', 4/11 'only for parts they found relevant', and 1/11 'briefly'. The Cancer Council booklet was read from 'cover to cover' by 3/11 intervention participants versus 2/12 control participants; 'quite thoroughly' (2/11 versus 4/12); only for parts they found relevant (4/11 versus 3/12) and 'briefly' (2/11 versus 3/12). Ratings for different components of the intervention are shown in Table 2.

Satisfaction

Intervention participants rated the intervention highly in terms of perceived satisfaction and benefits, particularly the psychology sessions (perceived satisfaction and benefits both mean= 9.3 out of a possible 10, SD=2.4) and the psycho-educational booklet (both mean=8.8,

SD=1.0). Intervention participants rated the difficulty of reading both booklets as not at all difficult (mean =1.7, SD=3.2 for both). The control arm rated the Cancer Council booklet for perceived satisfaction (mean = 7.2, SD=2.1), perceived benefit (mean = 6.7, SD=2.2), and perceived difficulty (mean = 2.0, SD=2.7). Most intervention participants (7/11) provided qualitative feedback on the benefits they experienced through taking part in the intervention. These included: having an opportunity to share one's fears and discuss issues in depth, feeling understood by the psychologist, having positive experiences acknowledged, and improved communication with their doctor. Table 3 summarises all themes and provides sample quotes from participants.

Ratings of the psycho-educational booklet, Melanoma: Questions and Answers

All participants in the intervention group found the information in the psycho-educational booklet on different types of melanoma, risk of developing melanoma (presented as pictographs), skin self-examination, and sun protection 'quite' or 'very helpful'. Nine of the 11 participants) found the information on genetics and family history, vitamin D, how melanoma can affect the way people feel, coping strategies, and living with the fear that melanoma may come back 'quite' or 'very helpful'.

Participants also rated the tools provided in the booklet highly. The tool on how to perform a skin self-examination was perceived as most helpful (9/11), followed by the tool about the UV index (8/11). The least helpful tool was the SunSmart telephone application designed to provide sun protection and exposure information across Australia (3/11). The majority of participants (9/11) agreed or strongly agreed that participation in the study had helped them to learn more about the recommended frequency of skin examinations, and how to find the information to assist in coping with melanoma. Most participants (8/11) reported

that participation in the intervention helped them talk more openly with their doctor at their high-risk clinic appointment.

Ratings of the Cancer Council booklet, Understanding Melanoma

The Cancer Council booklet was perceived as a good source of medical information and reassurance that supplemented information from their doctors (Table 2). One participant in the intervention group (woman, MS353) stated that she *"had read the [Cancer Council] book before."* Nine participants in the control group commented on the benefits they gained from reading the booklet.

Difficulties

When asked about difficulties or challenges associated with the intervention, four intervention participants identified difficulties discussing their concerns with a psychologist; one participant [man, MS282] reported "*I've usually tried to avoid thinking about melanoma rather than being prepared to discuss the subject so initially at least, the study was a little uncomfortable.*" Another participant [woman, MS155] found "*the telephone session a little intense. Found the questions that were asked/discussed during the session raised issues/concerns that I had not really thought of before the session.*" In the control group, one participant [man, MS223] described the information provided in the Cancer Council booklet as "*confronting".*

Quality of information and support provided throughout the trial

The mean score for the quality of information as rated by the intervention group was 4.6 out of a possible 5 (SD=0.9) and 4.2 (SD=1.2) for the control group. The mean score for the support given was 4.7 (SD=0.9) by the intervention arm and 4.2 (SD=1.4) by the controls.

Ten out of 11 participants in the intervention group reported that they would recommend the program to other melanoma patients and nine out of 12 participants in the control group would recommend the Cancer Council booklet.

Participants' preferences for three or five telephone-based sessions with a psychologist

Of the 11 participants who completed the intervention, six preferred to receive three psychology sessions and five preferred five sessions. Mean perceived satisfaction and benefits were very high irrespective of session number; for participants who received three sessions, mean satisfaction was10/10 (*SD*=0) and mean perceived benefits was 9.4/10 (SD=0.6) and for participants who received five sessions, mean satisfaction was 8.7 (SD=3.3) and mean perceived benefits was 8.7 (SD=3.3). On average, participants engaged in three hours of telephone-based psychological support (mean = 3.0, SD=1.4), with a mean session duration of 50 minutes (range: 9 to 95 minutes).

Cooperation with and retention in the intervention

All but one intervention participant completed the intervention, and 96% (23/24) of all study participants completed one- and 6-month questionnaires. Of the five participants who received all five telephone-based psychology sessions, four had sessions timed around their high-risk clinic appointments as per protocol, and one participant missed her subsequent high-risk clinic appointment but still took part in her last psychology session. For the six participants who received three psychology sessions, five received them as planned and one participant had this final last session delayed by a week.

Preliminary outcomes

Table 4 summarises within group changes for primary and secondary outcomes and between-group effect sizes. Preliminary results suggest a reduction in mean fear of cancer recurrence severity scores for both intervention and control groups at 1-month follow-up, with a mean difference of -1.82 (SD=3.8) in the intervention group and -1.17 (SD=2.6) in the control group. The 6-month follow-up showed the reduction in fear of cancer recurrence severity was maintained in the intervention group (mean difference = -1.64, SD = 4.4) but not in the control group, which reverted to the baseline score (mean difference=0.08, SD=6.92).

Although the mean depression, anxiety, and stress scores were in the 'normal' range for both groups, at 1-month follow-up mean depression, anxiety and stress scores increased in the intervention arm and decreased in the control arm. At 6-months follow-up there was a decrease in mean depression scores in the intervention group and an increase in the control group. Mean anxiety and stress scores decreased in both groups at 6 months.

For the intervention group, melanoma knowledge scores increased at 1-month but were not maintained at 6-months. There was improvement in satisfaction with clinical care at both 1- and 6-month follow-up.

For health-related quality of life there was no change in overall mean quality of life scores, as measured by the AQoL-8D; however, an increase in the mean Functional Assessment of Cancer Therapy (FACT-M) total score, suggesting improved quality of life, was found for both intervention and control groups at 6-months follow-up. The utility-based quality of life score from the AQoL-8D is low in this group compared to the general Australian population[20] – although our sample is small and we will need to investigate this in a larger trial.

At baseline, of the 52 items in the melanoma survivor unmet needs instrument, the mean proportion of unmet needs was 16% (SD=0.21) for the intervention group and 14% (SD=0.15) for the usual care group. At 1-month follow the proportion of unmet needs

decreased for the intervention (mean=11%, SD=0.15) and remained unchanged for the control arm. At 6 month there was decrease for the proportion of unmet needs in both groups with 8% (SD=0.11) for the intervention and 9% (SD+0.11) for the control group.

Discussion

This pilot randomised controlled trial examined the acceptability, feasibility and preliminary outcomes of a psycho-educational intervention for people at high-risk of developing another primary melanoma. Participants in the intervention group reported very high levels of satisfaction with the intervention, perceived the intervention as highly beneficial, and did not associate it with many difficulties. Melanoma patients in this study highly valued the access to individual psychological support, particularly in terms of having a health professional with whom to explore their fears and concerns. This finding is consistent with the results from a recent qualitative study with melanoma patients that found the most expressed needs were to be given time to ask questions, and to express melanoma-related concerns and fears.[21]

Satisfaction with the newly developed psycho-educational booklet, *Melanoma: Questions and Answers* was also very high. Participants described receiving information about diagnosis, staging, and prognosis as highly valuable and as providing a sense of comfort and confidence. Another Australian study that analysed 29 in-depth interviews with patients undergoing long-term follow-up after surgical treatment of stage I/II melanoma found patients highly valued the opportunity to learn about their ongoing prognosis and the changing risk of recurrence over time.[22] Other patient-reported benefits of our intervention were positive experiences (such as a sense of comfort, confidence, and feeling 'worthwhile'), and improved doctor-patient communication. Nevertheless, participants expressed the need for ongoing support and were also aware of the future challenges in accessing support when the study was completed. As to be expected, a small proportion of participants did experience difficulties related to opening up and discussing personal issues with a psychologist. The timing of the intervention in relation to high-risk clinic appointments was found to be feasible, and there was very high study retention (96%).

Pilot studies are not designed to evaluate the efficacy of an intervention; the primary purpose of a pilot is to optimise intervention delivery and to identify the barriers and facilitators to its implementation.[23] Nevertheless, pilot studies can provide preliminary empirical evidence of intervention efficacy. Our preliminary results were suggestive of the intervention group having greater reductions in the severity of fear of cancer recurrence, improved knowledge, and satisfaction with clinical care, fewer unmet needs, compared to the control group. The highly positive feedback from participants and the direction of outcomes support wider testing of the intervention.

Based on our experience with this pilot study, minor modifications were made to the protocol for the larger trial. First, we considered it to be more practical and feasible to limit the number of psychology sessions to three. This decision was made to best meet participants' needs as well as ensure the trial was feasible in terms of study management, budget and timelines. Participants in our study who received three sessions still gave high ratings, and evidence from other studies has showed that brief interventions can be beneficial for cancer patients.[24,25]

Conclusions

This pilot study suggests that tailored psycho-education and psychological support for people at high-risk of developing another melanoma provided both before and after dermatological appointments by a highly trained and well supported psychology team was perceived by participants as needed and highly beneficial.

The implementation of a telephone-based psycho-educational program scheduled around high-risk clinic appointments was highly feasible and acceptable to patients. These findings inform the possible implementation of this model of psychological support in melanoma patients' clinical care. We are currently carrying out a larger randomised controlled trial to

evaluate the efficacy and cost-effectiveness of this intervention, comprising the full colour psycho-educational booklet and three telephone-based sessions with a psychologist, compared to usual care.[12] These findings will further inform the implementation of this model of psychological support in melanoma patients' clinical care.

List of abbreviations

AQOL-8D: Assessment of quality of life -8 dimensions

CSQ: Consultation Satisfaction Questionnaire

DASS Depression Anxiety and Stress Scales

FACT-M: Functional Assessment of Cancer Therapy

FCRI: Fear of Cancer Recurrence Inventory

HRC: High Risk Clinic

Declarations

Ethics approval and consent to participate

Approval to conduct the study was granted by the Sydney Local Health District (RPAH zone) Ethics Review Committee (X13-0065 & HREC/13/RPAH/86), the Department of Health and Ageing Human Research Ethics Committee (21/2013), the University of Sydney Human Research Ethics Committee (2013/595), and the Australian Institute of Health and Welfare Ethics Committee (EO 2013/4/58).

Consent for publication

Not applicable.

Availability of data and materials

Available on request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Conception and design: Kasparian NA, Dieng M, Cust AE, Butow P, Mann GJ, Morton RL, Menzies S, Costa DSJ.
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Manuscript writing: All authors.
Final approval of manuscript: All authors.

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Table 1: Demographic and clinical characteristics of the sample.

Characteristics	Intervention N = 12	Control N = 12
	N (%) or Mean (SD)	
Gender		
Male	8 (67%)	6 (50%)
Female	4 (33%)	6 (50%)
Age at baseline		
Mean, SD	56.7 (14.0)	61.0 (10.5)
Area		
Metropolitan	7 (58%)	7 (58%)
Regional	4 (33%)	5 (42%)
Rural	1 (8%)	0 (0%)
Country of birth		
Australia	11 (92%)	11 (92%)
Other	1 (8%)	1 (8%)
Marital status		
Married	11 (92%)	8 (72.7%)
Other	1 (8%)	3 (27.3%)
Children		
Yes	11 (92%)	8 (67%)
No	1 (8%)	4 (33%)
Highest level of education		
No tertiary education	9 (75%)	8 (67%)
University	3 (25%)	3 (25%)
Other	0	1 (8%)
Number of previous melanomas	3.3 (2.9)	2.3 (1.9)
Most recent melanoma subtype		
Superficial spreading melanoma	9 (75%)	4 (40%)
In situ	2 (17%)	2 (20%)
Nodular	0	2 (20%)
Melanoma not classified	1 (8%)	2 (20%)
Breslow thickness (mm)	0.78 (0.3 to 2.9)	1.3 (0.3 to 3.5)

Table 2: Acceptability ratings for different components of the *Melanoma Care Study*

	Response options	Intervention (N=11) Mean (SD)	Control (N=12) Mean (SD)
Satisfaction with:			
- Booklet. *Melanoma: Questions and Answers*	*From 0 "Not at all satisfied"*	8.8 (1.0)	
- Booklet, *Understanding Melanoma*	*to 10 "Extremely satisfied"*	9.0 (1.1)	7.2 (2.1) *
- Telephone-based psychology sessions		9.3 (2.4)	
- Overall program		8.7 (2.2)	
Benefit of:			
- Booklet, *Melanoma: Questions and Answers*	*From 0 "Not at all beneficial"*	8.9 (1.2)	
Booklet, *Understanding Melanoma*	*to 10 "Extremely beneficial"*	8.8 (1.2)	6.7 (2.2) *
- Telephone-based psychology sessions		9.3 (2.4)	
- Overall program		8.6 (2.1)	
-			
Difficulty of:			
- Booklet, *Melanoma: Questions and Answers*	*From 0 "Not at all difficult"*	1.7 (3.2)	
Booklet, *Understanding Melanoma*	*to 10 "Extremely difficult"*	1.7 (3.2)	2.0 (2.7) *
- Telephone-based psychology sessions		1.1 (2.4)	
- Overall program		1.1 (2.1)	
Quality of:			
- Information	*From 1 "Poor" to 5 "Excellent"*	4.6 (0.9)	4..17 (1.2)
- Support		4.7 (0.9)	3.83 (1.4)
Recommend to other melanoma patients			
- Yes		10 (91%)	9 (75%)
- No		0	0
- Unsure		1 (9%)	3 (25%)

* For the control group, these questions only applied to the Cancer Council booklet.

Table 3: Summary of participants' views on the perceived benefits of the *Melanoma Care Study*.

Major themes	*Participant's ID*[#]	*Participant quotations*
An opportunity to share one's fears and feel understood	WP1	*Cancer can be lonely and frightening and this allowed me to express all of those fears before and after appointments and about the impact on my life. This had never happened before. Other patients may not have anyone to talk to either. This was the best opportunity and I was in a dark place - you feel so much more alive.*
	MP1	*I feel sharing private fears helped me deal with these issues.*
	WP2	*It helps to talk to someone who understands when you get your first melanoma.*
An opportunity to explore one's experiences in depth	WP3	*Engaging in a conversation with the psychologist made me realise that I still needed to address particular issues which I thought I had dealt with but obviously had not.*
	MP1	*I felt that the sessions with my psychologist were the first real extended discussions I've had in relation to my melanoma risk in over 20 years of melanoma care. I was very satisfied at the end of the sessions because I felt I'd been able to share a burden and get some sensible advice.*
Positive experiences	*MP2*	*Education gives understanding and comfort.*
	WP1	*I feel happier for having someone to talk to about it. My psychologist made me think about taking control of my life and I feel I have been given the skills to understand and manage my fear and to feel worthwhile.*
	MP3	*Reinforced my confidence*
	MP4	*The psychologist assisted greatly with dealing with emotional feelings.*
Improved doctor-patient communication	MP1	*I was given suggested strategies for dealing with negative thoughts about my melanoma risk. I was encouraged to discuss longstanding and new concerns with the high-risk clinic doctor. I felt that the psychologist was genuinely interested in helping me address concerns.*
Good source of medical information	WP4	*Understand what happens after diagnosis, what to expect and support options available.*
	WP5	*A clearer understanding of the different stages of melanoma.*
Supplement information from the doctors	WP4	*I would recommend the booklet because it answers a lot of questions that you would sometimes forget to ask medical staff and you can also refer to it at any time to clarify any areas of confusion.*
	MP6	*If various things are not explained by your GP, the booklet fills that void.*
Reassurance	WP6	*Statistics on recurrence that helped me feel calmer.*
Requests for continued psychological support	MP5	*I wish the support was ongoing and not just a study and I hope that the study will result in this service eventually being a part of patients' treatment.*
	MP1	*Provide an annual 'catch-up' counselling call.*
Challenge for future support	WP1	*The study and help came at the right time and the challenge for me will be to seek the help I may need in the future*
	WP3	*I suggest at the beginning of the sessions that patients might find they'd like help and support beyond the study and help them to find a suitable psychologist… I'm not sure how to find someone who might be better for cancer patients.*
	WP1	*Feeling withdrawn and empty for a few weeks after the counselling stopped for a few months. Knowing it's only a study, even though I've been strongly encouraged to seek support after the study.*

WP: Woman participant; MP: male participant.

Table 4: Preliminary outcomes, presented separately for the intervention and control groups.

Outcomes	Assessment	Mean (SD)		Between-Group mean difference[1] (95% CI)	Effect size[5]
		Intervention group	*Control group*		
FCR[6] severity[2] *(Score range 0-36)*	Baseline	17.92 (6.29)	14.00 (5.53)	-3.92 (-8.93, 1.10)	- 0.66
	Change at 1 month	-1.82 (3.79)	-1.17 (2.59)	0.65 (-2.14, 3.44)	- 0.51
	Change at 6 months	-1.64 (4.37)	0.08 (6.92)	1.72 (-3.35, 6.79)	- 0.33
DASS[7] Depression *(Score range 0-42)*	Baseline	3.33 (5.28)	2.50 (3.09)	-0.83 (-4.50, 2.83)	- 0.19
	Change at 1 month	2.00 (7.54)	-0.17 (2.76)	-2.17 (-7.00, 2.67)	- 0.51
	Change at 6 months	-2.00 (4.73)	0.67 (2.31)	2.67 (-0.52, 5.85)	+ 0.46
DASS[7] Anxiety[2] *(Score range 0-42)*	Baseline	2.67 (5.42)	1.17 (1.99)	-1.50 (-4.95, 1.95)	- 0.37
	Change at 1 month	0.36 (5.71)	-0.50 (2.11)	-0.86 (-4.53, 2.81)	- 0.61
	Change at 6 months	0.36 (5.71)	-0.67 (1.78)	0.06 (-2.25, 2.37)	- 0.48
DASS[7] Stress[2] *(Score range 0-42)*	Baseline	6.00 (9.91)	5.17 (4.86)	-0.83 (-7.44, 5.77)	- 0.11
	Change at 1 month	0.36 (8.52)	-1.17 (5.01)	-1.53 (-7.53, 4.47)	- 0.35
	Change at 6 months	-2.36 (8.29)	-1.33 (6.95)	1.03 (-5.58, 7.64)	- 0.07
Melanoma knowledge[3] *(Score range 0-35)*	Baseline	22.83 (2.04)	23.17 (2.62)	0.33 (-1.65, 2.32)	+0.14
	Change at 1 month	1.64 (2.34)	0.33 (3.50)	-1.30 (-3.91, 1.30)	- 0.30
	Change at 6 months	1.40 (2.63)	-0.33 (3.65)	-1.73 (-4.62, 1.15)	- 0.32
Satisfaction with melanoma care[3] *(Score range 0-90)*	Baseline	59.92 (11.85)	59.58 (12.37)	-0.33 (-10.59, 9.92)	- 0.03
	Change at 1 month	14.27 (11.94)	8.42 (14.22)	-5.86 (-17.30, 5.59)	- 0.84
	Change at 6 months	-11.60 (11.49)	-1.73 (17.98)	9.87 (-4.08, 23.82)	+ 0.50
FACT- M[9] total[4] score *(Score range 0-172)*	Baseline	143.83 (18.35)	146.50 (12.64)	2.67 (-10.67, 16.01)	+ 0.17
	Change at 6 months	1.90 (7.20)	3.83 (16.70)	1.93 (-9.94, 13.81)	+ 0.13

1 Between-Group mean difference = mean control-mean intervention

2 For FCR severity and DASS a lower score means a better outcome

3 For Knowledge and Satisfaction with clinical care scores a higher score represents a better outcome

5 Cohen d effect size 6 FCR Fear of cancer recurrence; 7 Depression anxiety stress scale; FACT-M Functional Assessment cancer therapy-Melanoma FACT-M were not collected at 1-month as we wanted to minimise participant burden at this intermediate time point.

CONSORT checklist of information to include when reporting a pilot trial*

Section/topic and item No	Standard checklist item	Extension for pilot trials	Page No where item is reported
Title and abstract			
1a	Identification as a randomised trial in the title	Identification as a pilot or feasibility randomised trial in the title	Page 1
1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	Structured summary of pilot trial design, methods, results, and conclusions (for specific guidance see CONSORT abstract extension for pilot trials)	page 3
Introduction			
Background and objectives:			
2a	Scientific background and explanation of rationale	Scientific background and explanation of rationale for future definitive trial, and reasons for randomised pilot trial	Pages 5-6
2b	Specific objectives or hypotheses	Specific objectives or research questions for pilot trial	Page 6.
Methods			
Trial design:			
3a	Description of trial design (such as parallel, factorial) including allocation ratio	Description of pilot trial design (such as parallel, factorial) including allocation ratio	page 6
3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	Important changes to methods after pilot trial commencement (such as eligibility criteria), with reasons	page 6
Participants:			
4a	Eligibility criteria for participants		
4b	Settings and locations where the data were collected		
4c		How participants were identified and consented	page 6.
Interventions:			
5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered		pages 7-8
Outcomes:			
6a	Completely defined prespecified primary and secondary outcome measures, including how and when they were assessed	Completely defined prespecified assessments or measurements to address each pilot trial objective specified in 2b, including how and when they were assessed	pages 9-11
6b	Any changes to trial outcomes after the trial commenced, with reasons	Any changes to pilot trial assessments or measurements after the pilot trial commenced, with reasons	
6c		If applicable, prespecified criteria used to judge whether, or how, to proceed with future definitive trial	

Sample size:			
7a	How sample size was determined	Rationale for numbers in the pilot trial	page 6.
7b	When applicable, explanation of any interim analyses and stopping guidelines		(convenient sample)
Randomisation:			
Sequence generation:			
8a	Method used to generate the random allocation sequence		Page 9
8b	Type of randomisation; details of any restriction (such as blocking and block size)	Type of randomisation(s); details of any restriction (such as blocking and block size)	
Allocation concealment mechanism:			
9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned		Page 9.
Implementation:			
10	Who generated the random allocation sequence, enrolled participants, and assigned participants to interventions		Page 9.
Blinding:			
11a	If done, who was blinded after assignment to interventions (eg, participants, care providers, those assessing outcomes) and how		No blinding
11b	If relevant, description of the similarity of interventions		
Analytical methods:			
12a	Statistical methods used to compare groups for primary and secondary outcomes	Methods used to address each pilot trial objective whether qualitative or quantitative	Page 11
12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	Not applicable	
Results			
Participant flow (a diagram is strongly recommended):			
13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	For each group, the numbers of participants who were approached and/or assessed for eligibility, randomly assigned, received intended treatment, and were assessed for each objective	Page 12
13b	For each group, losses and exclusions after randomisation, together with reasons		
Recruitment:			

14a	Dates defining the periods of recruitment and follow-up		
14b	Why the trial ended or was stopped	Why the pilot trial ended or was stopped	
Baseline data:			
15	A table showing baseline demographic and clinical characteristics for each group		Table 1
Numbers analysed:			
16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	For each objective, number of participants (denominator) included in each analysis. If relevant, these numbers should be by randomised group	Table 1
Outcomes and estimation:			
17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	For each objective, results including expressions of uncertainty (such as 95% confidence interval) for any estimates. If relevant, these results should be by randomised group	Table 4
17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	Not applicable	
Ancillary analyses:			
18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing prespecified from exploratory	Results of any other analyses performed that could be used to inform the future definitive trial	Table 2 Table 3
Harms:			
19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)		
19a		If relevant, other important unintended consequences	
Discussion			
Limitations:			
20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	Pilot trial limitations, addressing sources of potential bias and remaining uncertainty about feasibility	Paige 18
Generalisability:			
21	Generalisability (external validity, applicability) of the trial findings	Generalisability (applicability) of pilot trial methods and findings to future definitive trial and other studies	Paige 18
Interpretation:			
22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	Interpretation consistent with pilot trial objectives and findings, balancing potential benefits and harms, and considering other relevant evidence	Page 18
22a		Implications for progression from pilot to future definitive trial, including any proposed amendments	
Other information			

Registration:			
23	Registration number and name of trial registry	Registration number for pilot trial and name of trial registry	Page 4
Protocol:			
24	Where the full trial protocol can be accessed, if available	Where the pilot trial protocol can be accessed, if available	Page 22
Funding:			
25	Sources of funding and other support (such as supply of drugs), role of funders		Page 22
26		Ethical approval or approval by research review committee, confirmed with reference number	Page 7

*Here a pilot trial means any randomised study conducted in preparation for a future definitive RCT, where the main objective of the pilot trial is to assess feasibility.

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A psycho-educational intervention for people at high risk of developing another melanoma: A pilot randomised controlled trial

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ABSTRACT

Introduction: Information and psychological needs have been reported as ones of the greatest areas of unmet needs for melanoma patients. To respond to these needs, we developed the *Melanoma Care Intervention* a developed psycho-educational intervention for people at high risk of developing another melanoma comprising of a newly developed melanoma educational booklet and individually tailored telephone support sessions provided by trained psychologists. The purpose of this study was to investigate the acceptability and feasibility of the *Melanoma Care Intervention*.

Methods: Twenty-four adults (14 men, 10 women, mean age: 58 years, SD:12.2) at high risk of developing a subsequent primary melanoma were recruited and randomly assigned 1:1 to the intervention (a psycho-educational booklet, a Cancer Council booklet on melanoma, and up to five telephone-based sessions with a psychologist) or usual care (Cancer Council booklet only). Acceptability, feasibility, fear of cancer recurrence and secondary psychosocial outcomes were assessed at baseline, one and six months.

Results: Satisfaction and perceived benefits were rated highly for all intervention components, particularly the telephone-based psychology sessions (mean satisfaction and benefits: both 9.27 out of 10, SD=2.41). The quality of information and support provided throughout the trial was rated as 'high' by the intervention group, with a mean score of 4.6 out of a possible 5 (SD=0.9) and 4.2 (SD=1.2) for the control group.

Conclusions: The intervention was feasible and acceptable for improving psychological adjustment. Timely access to effective, evidence-based, psychological care is a recognised need for people with melanoma. The intervention is designed to directly address this need in a way that is feasible in a clinical setting, acceptable to patients and health professionals.

Keywords: Melanoma; psycho-education; pilot study; supportive care; feasibility; cancer; psychological stress.

Trial registration number: The trial was registered with the Australian and New Zealand Clinical Trials Registry on 19/03/2013 (Registration Number: ACTRN12613000304730).

Strengths and limitations of this study

- The results are generalisable to people who have had early stage melanoma, and further research is needed to know if people with advanced melanoma have a similar response to the intervention.
- Although recommended in the Australian clinical practice guidelines, psychological support (provided by a psychologist) is not currently part of routine care for people diagnosed with melanoma.
- Further research to demonstrate a sustained feasibility when the intervention is delivered by trained nurses or health educators could perhaps facilitate implementation.

Background

Early detection and appropriate clinical management of melanoma ensures that most people with the disease have a good prognosis, with about 90% of patients still alive five years after diagnosis.[1] Despite this good prognosis, melanoma survivors have an ongoing threat of recurrence and are recommended to carry out regular skin self-examinations, have regular

clinical skin examinations, and undertake behavioural changes to minimise excessive sun exposure;[2] all of which can add to the psychological burden of melanoma.[3] In addition, people with melanoma often experience intense fear that the disease could spread and become untreatable. Studies have reported that 30-50% of melanoma survivors experience heightened emotional distress,[2] and that many report unmet needs for information and psychological support.[4-6] Australian clinical practice guidelines for the management of melanoma highly recommended that psycho-educational support be made widely available to people with melanoma.[7] German guidelines extend this by recommending implementation of regular psycho-oncological screening to identify and offer psychological care to people with melanoma experiencing difficulties adjusting to their disease.[8] Several psycho-educational interventions for melanoma patients have been reported in the literature, with beneficial outcomes.[9] In a systematic review of 16 interventions, McLoone et al. concluded that participation in psychological interventions resulted in lower anxiety, health-related distress and melanoma recurrence rates, and positive changes in coping with illness.[9]

People at high-risk of a subsequent melanoma are particularly vulnerable to distress. Seventy-five percent of high-risk melanoma survivors report persistent fear and uncertainty about the possibility of developing new disease, cancer recurrence or metastases.[3,10] Despite this, psychological support is not currently offered in Australian high-risk clinics that provide a specialised clinical service for people at very high-risk of primary melanoma,[11] nor have specific interventions been designed for this high-risk sub-group. To address this gap, our team developed a multifaceted psychological care program for people at high-risk of developing another primary melanoma (the *Melanoma Care Study*).[12] The intervention is comprised of up to five individual, telephone-based sessions with a psychologist, combined with an evidence-based psycho-educational booklet designed to respond to the unmet supportive care needs of people who have had melanoma.

This pilot study had two aims: (1) evaluate the acceptability of, and participant satisfaction with, the *Melanoma Care Study*; (2) determine the feasibility of delivering telephone-based psychology sessions scheduled in relation to dermatological appointments at melanoma high-risk clinics.

Methods

Study design and participants

A randomised controlled trial design was used to pilot the *Melanoma Care Study*. Participants were recruited from three melanoma high-risk clinics in New South Wales, Australia; two situated in inner-city Sydney and one in a regional coastal city. These high-risk clinics provide a specialised clinical service for people at very high-risk of primary melanoma,[11] including people with a previous melanoma and either a strong family history of melanoma, many moles (i.e. dysplastic naevus syndrome), or a history of multiple primary melanomas. People aged 18 years or older with a history of stage 0, I or II melanoma were identified from the clinic databases and invited to participate. People were ineligible if they were identified as high-risk but had never had melanoma (e.g. people who carry a high penetrance genetic mutation); or had a known history of severe major depression, psychotic illness or other serious psychiatric condition or cognitive deficit, or were unable to participate in English. Active stage III melanoma or metastatic melanoma (stage IV) patients were excluded as they have different psychosocial needs to stage 0/I/II patients, where the melanoma has been confined to a primary tumour only.

Ethics approval was obtained from all relevant ethics committees. Informed consent was obtained from all participants prior to study participation.

Intervention Arm

The *Melanoma Care Study* had three components: 1) a newly developed psycho-educational booklet in full colour hardcopy, 2) a freely available Cancer Council booklet, and 3) up to five telephone-based sessions with a psychologist specifically trained to deliver the intervention according to protocol. The psycho-educational booklet, *Melanoma: Questions and Answers* was developed by a multidisciplinary team and is comprised of seven modules and a series of tailored resources: (1) types of melanoma, melanoma diagnosis, and treatment; (2) factors that may contribute to melanoma risk; (3) information on skin self-examination, vitamin D and sun protection, as well as question prompts for communication with one's health care team; (4) emotional and social aspects of melanoma; (5) strategies to assist people in coping well with melanoma risk; (6) resources to assist people in keeping track of their melanoma care; and (7) sources for further information and support. The booklet content and format was pilot tested and revised on the basis of feedback from 19 people with melanoma and 10 health professionals.

The Cancer Council booklet, *Understanding Melanoma* is comprised of easy-to-read information about melanoma diagnosis, treatment, and emotional and practical issues. The Cancer Council booklet is heavily focused on diagnosis and treatment information while the psycho-educational booklet, *Melanoma Questions and Answers* provides more in-depth information about emotional and behavioural aspects of coping with melanoma, communicating with one's family and health care team, and managing one's melanoma care.

Participants in the intervention group were also offered five telephone-based sessions with a psychologist, tailored to the needs of each individual participant and designed to provide *patient-specific* care to address identified difficulties, needs, concerns and goals. The first three sessions were in close connection to their next full dermatological consultation at the melanoma high-risk clinic and the next two sessions were in close connection with their subsequent high-risk clinic appointment approximately six months later. Participants who

were not able to identify specific difficulties, needs or goals were offered the option of limiting their participation to the first three sessions. The telephone-based sessions were underpinned by the core principles of brief psychodynamically-oriented psychotherapy. [13-15] The goal of the sessions was to provide empathic, active listening at a deep level so as to try to understand participants and their experiences, and to assist participants in developing healthy emotional, cognitive and behavioural coping responses.[16] Psychosocial care planning and referrals for further information, support and clinical care were also provided, as appropriate. A manual was developed by a team of psycho-oncologists with extensive experience in the care of people with melanoma (NK, SM, PB), to guide the psychologists providing the intervention on a session-by-session basis (see Table 1). The psychologists followed the general principles outlined in the manual, whilst tailoring the intervention to the specific circumstances, needs, goals and characteristics of individual participants. The psychologists were trained and did also received weekly supervision by one of the senior author (NK).

Control Arm

Participants in the control arm received usual care, which consisted of their usual melanoma high-risk clinic appointments and a copy of the Cancer Council booklet. A blank notepad was also included in the study package in order to keep the size of the package consistent with that received by the intervention group.

Procedures

Baseline data were collected using paper- or web-based questionnaires, as preferred by participants. Randomisation was performed by a statistician at the NHMRC Clinical Trials Centre, The University of Sydney, and the statistician was blind to the identity of participants. Once randomisation had occurred, the research coordinator sent study packs to

participants and as such was not blinded. The research coordinator analysed the data; however, she was not involved in patient care, intervention delivery, or assessment of participant outcomes (which were self-reported). Clinicians at the High Risk Melanoma Clinics were not informed of which patients were participating in the study, nor the group to which participants had been randomised; however, it is possible that clinicians became aware because participants were encouraged to take the psycho-educational booklet to their dermatological appointment for discussion and to use the various tools provided within the booklet.

Participants in the intervention arm received the intervention over a one-month period (if receiving three telephone-based psychology sessions) or a six-month period (if receiving five sessions). Both the psycho-educational and Cancer Council booklets were sent to participants two weeks before their usual six-monthly high-risk clinic appointment, at which a complete dermatological examination was undertaken. For people who received three sessions, these occurred one week before, one week after, and three weeks after this clinic appointment. People who received five sessions participated in two additional sessions; the fourth occurred one week before their subsequent high-risk clinic appointment and the fifth occurred the following week. Two psychologists received extensive training in intervention delivery prior to trial commencement.[12] With participants' permission, all sessions were audio-taped and early sessions were reviewed by the clinical psychology supervisor (NK), who also provided weekly supervision during which sessions were discussed in-depth. Participants randomised to the control arm received the Cancer Council booklet two weeks before their six-monthly high-risk clinic appointment.

Measures

Perceptions of the newly developed intervention and usual care were evaluated using the following purposely-designed items:

1. *Intervention acceptability and perceived benefits*. Six months after study enrolment, intervention participants rated their satisfaction with, and perceived benefit of, the psychology sessions, the psycho-educational booklet and the Cancer Council booklet, while control participants rated the Cancer Council booklet only. Participants also indicated any behavioural changes they experienced following their participation in the study (e.g., find the emotional support to cope with melanoma, talk more openly with my doctor at the high-risk clinic), using a 5-point scale from "strongly agree" to "strongly disagree". Participants in both arms rated the overall quality of the information and support received, and if they would recommend the intervention to other melanoma patients. Participants were also provided space to provide qualitative feedback if they wishes.
2. *Participants' preferences*. Participants were offered a choice in the number of sessions (between three and five) they would engage in. Data on participants' preferences, as well as the duration and timing of sessions were collected to inform the most feasible model upon which to design a larger trial.
3. *Adherence to intervention guidelines*. The proportion of participants who attended the telephone-based psychology sessions was recorded, as well as the number of sessions attended.
4. *Feasibility issues.* Difficulties, barriers, and resources associated with intervention implementation were also systematically recorded by the psychologists and the research team throughout the pilot.

Demographic and medical characteristics: At baseline, age, gender, education level, marital status, number of children were assessed. Health literacy was also assessed using two validated items.[17,18] Medical characteristics (e.g. number of melanomas, stage of each melanoma at diagnosis, time since first and last melanoma, melanoma treatment) were collected from medical records.

Statistical analysis

A total sample size of 24 participants was deemed sufficient for refining the study protocol and assessing feasibility of the psycho-educational intervention, to inform the larger randomised controlled trial. Guidelines[19] suggest that small sample sizes may be appropriate for demonstrating the ability to execute a specific research protocol, or for testing acceptability and engagement with a new intervention, and these were the objectives of the present pilot study. Descriptive statistics were used to summarise sample characteristics and feasibility outcomes. Being a pilot study, the small sample precluded use of inferential statistics; thus, mean scores and standard deviations (including the standardised mean difference at each time point as a measure of effect size) were used to compare groups. A priori feasibility objectives were based on our previous experience: >30% consent, <15% lost to follow-up per group, 80% engagement rate (i.e., participation in all scheduled telephone sessions). Acceptability objectives were: average satisfaction scores ≥7/10, <15% negative qualitative responses within the questionnaire. All analyses were performed using SAS v9.3 (SAS Institute, Cary, North Carolina, USA).

Results

Sample characteristics

Twelve participants were randomly assigned to the treatment arm and 12 to the control (Table 2). One intervention participant withdrew from the study after one psychology session, as he felt the intervention would not benefit him. The intervention group comprised eight men and four women, with a mean age of 57 years (*SD*=14), and a median melanoma Breslow thickness of 0.78mm (range 0.3-2.95mm). The control group comprised six men and six women, with a mean age of 61 years (*SD*=14), and a median Breslow thickness of 1.3mm (range 0.3-3.5mm). For both groups, superficial spreading melanoma was the most common histopathological subtype.

Acceptability

Four out of eleven participants in the intervention group reported reading the psycho-educational booklet, *Melanoma: Questions and Answers,* from 'cover to cover', 1/11'quite thoroughly', 4/11 'only for parts they found relevant', and 1/11 'briefly'. The Cancer Council booklet was read from 'cover to cover' by 3/11 intervention participants versus 2/12 control participants; 'quite thoroughly' (2/11 versus 4/12); only for parts they found relevant (4/11 versus 3/12) and 'briefly' (2/11 versus 3/12). Ratings for different components of the intervention are shown in Table 3.

Satisfaction

Intervention participants rated the intervention highly in terms of perceived satisfaction and benefits, particularly the psychology sessions (perceived satisfaction and benefits both mean= 9.3 out of a possible 10, SD=2.4) and the psycho-educational booklet (both mean=8.8, SD=1.0). Intervention participants rated the difficulty of reading both booklets as not at all difficult (mean =1.7, SD=3.2 for both). The control arm rated the Cancer Council booklet for

perceived satisfaction (mean = 7.2, SD=2.1), perceived benefit (mean = 6.7, SD=2.2), and perceived difficulty (mean = 2.0, SD=2.7). Most intervention participants (7/11) provided qualitative feedback on the benefits they experienced through taking part in the intervention. These included: having an opportunity to share one's fears and discuss issues in depth, feeling understood by the psychologist, having positive experiences acknowledged, and improved communication with their doctor. Table 4 summarises all themes and provides sample quotes from participants.

Ratings of the psycho-educational booklet, Melanoma: Questions and Answers

All participants in the intervention group found the information in the psycho-educational booklet on different types of melanoma, risk of developing melanoma (presented as pictographs), skin self-examination, and sun protection 'quite' or 'very helpful'. Nine of the 11 participants) found the information on genetics and family history, vitamin D, how melanoma can affect the way people feel, coping strategies, and living with the fear that melanoma may come back 'quite' or 'very helpful'.

Participants also rated the tools provided in the booklet highly. The tool on how to perform a skin self-examination was perceived as most helpful (9/11), followed by the tool about the UV index (8/11). The least helpful tool was the SunSmart telephone application designed to provide sun protection and exposure information across Australia (3/11). The majority of participants (9/11) agreed or strongly agreed that participation in the study had helped them to learn more about the recommended frequency of skin examinations, and how to find the information to assist in coping with melanoma. Most participants (8/11) reported that participation in the intervention helped them talk more openly with their doctor at their high-risk clinic appointment.

Ratings of the Cancer Council booklet, Understanding Melanoma

The Cancer Council booklet was perceived as a good source of medical information and reassurance that supplemented information from their doctors (Table 3). One participant in the intervention group (woman, MS353) stated that she *"had read the [Cancer Council] book before."* Nine participants in the control group commented on the benefits they gained from reading the booklet.

Difficulties

When asked about difficulties or challenges associated with the intervention, four intervention participants identified difficulties discussing their concerns with a psychologist; one participant [man, MS282] reported "*I've usually tried to avoid thinking about melanoma rather than being prepared to discuss the subject so initially at least, the study was a little uncomfortable.*" Another participant [woman, MS155] found "*the telephone session a little intense. Found the questions that were asked/discussed during the session raised issues/concerns that I had not really thought of before the session*." In the control group, one participant [man, MS223] described the information provided in the Cancer Council booklet as "*confronting"*.

Quality of information and support provided throughout the trial

The mean score for the quality of information as rated by the intervention group was 4.6 out of a possible 5 (SD=0.9) and 4.2 (SD=1.2) for the control group. The mean score for the support given was 4.7 (SD=0.9) by the intervention arm and 4.2 (SD=1.4) by the controls. Ten out of 11 participants in the intervention group reported that they would recommend the program to other melanoma patients and nine out of 12 participants in the control group would recommend the Cancer Council booklet.

Participants' preferences for three or five telephone-based sessions with a psychologist

Of the 11 participants who completed the intervention, six preferred to receive three psychology sessions and five preferred five sessions. Mean perceived satisfaction and benefits were very high irrespective of session number; for participants who received three sessions, mean satisfaction was10/10 (*SD*=0) and mean perceived benefits was 9.4/10 (SD=0.6) and for participants who received five sessions, mean satisfaction was 8.7 (SD=3.3) and mean perceived benefits was 8.7 (SD=3.3). On average, participants engaged in three hours of telephone-based psychological support (mean = 3.0, SD=1.4), with a mean session duration of 50 minutes (range: 9 to 95 minutes).

Cooperation with and retention in the intervention

All but one intervention participant completed the intervention, and 96% (23/24) of all study participants completed one- and 6-month questionnaires. Of the five participants who received all five telephone-based psychology sessions, four had sessions timed around their high-risk clinic appointments as per protocol, and one participant missed her subsequent high-risk clinic appointment but still took part in her last psychology session. For the six participants who received three psychology sessions, five received them as planned and one participant had this final last session delayed by a week.

Discussion

This pilot randomised controlled trial examined the acceptability and feasibility of a psycho-educational intervention for people at high-risk of developing another primary melanoma. Participants in the intervention group reported very high levels of satisfaction with the intervention, perceived the intervention as highly beneficial, and did not associate it with

many difficulties. Melanoma patients in this study highly valued the access to individual psychological support, particularly in terms of having a health professional with whom to explore their fears and concerns. This finding is consistent with the results from a recent qualitative study with melanoma patients that found the most expressed needs were to be given time to ask questions, and to express melanoma-related concerns and fears.[20]

Satisfaction with the newly developed psycho-educational booklet, *Melanoma: Questions and Answers* was also very high. Participants described receiving information about diagnosis, staging, and prognosis as highly valuable and as providing a sense of comfort and confidence. Another Australian study that analysed 29 in-depth interviews with patients undergoing long-term follow-up after surgical treatment of stage I/II melanoma found patients highly valued the opportunity to learn about their ongoing prognosis and the changing risk of recurrence over time.[21] Other patient-reported benefits of our intervention were positive experiences (such as a sense of comfort, confidence, and feeling 'worthwhile'), and improved doctor-patient communication. Nevertheless, participants expressed the need for ongoing support and were also aware of the future challenges in accessing support when the study was completed. As to be expected, a small proportion of participants did experience difficulties related to opening up and discussing personal issues with a psychologist. The timing of the intervention in relation to high-risk clinic appointments was found to be feasible, and there was very high study retention (96%).

The exclusive recruitment of people who have had early stage melanoma to this study limits generalisability to people with early-stage-disease and further research is needed to know if people with advanced melanoma have a similar response to the intervention. Nevertheless, pilot studies are not designed to evaluate the efficacy of an intervention; the primary purpose of a pilot is to optimise intervention delivery and to identify the barriers and facilitators to

intervention implementation.[22] The highly positive feedback from participants and the direction of outcomes support wider testing of the intervention.

Based on our experience with this pilot study, minor modifications were made to the protocol for the larger trial. First, we considered it to be more practical and feasible to limit the number of psychology sessions to three. This decision was made to best meet participants' needs as well as ensure the trial was feasible in terms of study management, budget and timelines. Participants in our study who received three sessions still gave high ratings, and evidence from other studies has showed that brief interventions can be beneficial for cancer patients.[23,24]

Conclusions

This pilot study suggests that tailored psycho-education and psychological support for people at high-risk of developing another melanoma provided both before and after dermatological appointments by a highly trained and well supported psychology team was perceived by participants as needed and highly beneficial.

The implementation of a telephone-based psycho-educational program scheduled around high-risk clinic appointments was highly feasible and acceptable to patients. These findings inform the possible implementation of this model of psychological support in melanoma patients' clinical care. We are currently carrying out a larger randomised controlled trial to evaluate the efficacy and cost-effectiveness of this intervention, comprising the full colour psycho-educational booklet and three telephone-based sessions with a psychologist, compared to usual care.[12] These findings will further inform the implementation of this model of psychological support in melanoma patients' clinical care.

List of abbreviations

NHMRC: National Health and Medical Research Council

FCRI: Fear of Cancer Recurrence Inventory

HRC: High Risk Clinic

Declarations

Ethics approval and consent to participate

Approval to conduct the study was granted by the Sydney Local Health District (RPAH zone) Ethics Review Committee (X13-0065 & HREC/13/RPAH/86), the Department of Health and Ageing Human Research Ethics Committee (21/2013), the University of Sydney Human Research Ethics Committee (2013/595), and the Australian Institute of Health and Welfare Ethics Committee (EO 2013/4/58).

Consent for publication

Not applicable.

Availability of data and materials

Available on request.

Competing interests

The authors declare that they have no competing interests.

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Conception and design: Kasparian NA, Dieng M, Cust AE, Butow P, Mann GJ, Morton RL, Menzies S, Costa DSJ.
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Collection and assembly of data: Dieng M, Cust AE.
Data analysis and interpretation: Dieng M, Costa DSJ, Cust AE, Kasparian NA, Morton RL.
Manuscript writing: All authors.
Final approval of manuscript: All authors. **FLICTS**

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Table 1: Description of the five telephone-based sessions with a psychologist.

Telephone Session	Session Goals	Schedule	Duration
Booking session	1. Psychologist introduction 2. Check that both booklets have been received 3. Check the person's understanding of the intervention and what is involved to ensure informed consent 4. Answer any questions the participant may have about the intervention and what can be offered 5. Discuss confidentiality and psychologists' duty of care 6. Discuss the audio-taping of sessions and request the person's permission 7. Schedule and assist the person in preparing for Session 1	One week before the first session	Up to 10 minutes
Session 1	8. Allow the participant an opportunity to begin the session 9. Begin to establish a therapeutic relationship 10. Carry out a psychological assessment, including an assessment of the person's supportive care needs in relation to melanoma 11. Assist the participant in setting goals for their involvement in the program 12. Assist the participant in using the booklets and tools provided 13. Explore the participant's thoughts and feelings about their upcoming high-risk clinic appointment, and assess and discuss any concerns regarding appointment 14. Check to see how the participant experienced the session and if any modifications need to be thought about together	One week before patients' 6 monthly dermatological appointment at the high-risk clinic	Up to 90 minutes
Session 2	1. Allow the participant an opportunity to begin the session 2. Explore the participant's experience of their dermatological appointment and whether they used	One week after patients' 6 monthly dermatological appointment at the	Up to 50 minutes

	the booklets in the consultation with their doctor 3. Continue to explore participant's goals, difficulties or concerns 4. Respond to any new difficulties or concerns 5. Check to see how the participant is experiencing the sessions and if any modifications need to be thought about together	high-risk clinic	
Session 3	1. Allow the participant an opportunity to begin the session 2. Continue to build on the relationship with the participant 3. Continue exploring the participant's identified goals, difficulties or concerns 4. Respond to any new difficulties or concerns	Three weeks after patients' 6 monthly dermatological appointment at the high-risk clinic	Up to 50 minutes
*Session 4**	1. Allow the participant an opportunity to begin the session 2. Continue to build on the relationship with the participant 3. Summarise what has been explored during the three previous sessions 4. Explore the participant's thoughts and feelings about their upcoming high-risk clinic appointment and, if appropriate, how they could use their booklets in the consultation 5. Continue exploring the participant's identified goals, difficulties or Respond to any new difficulties or concernsExplore the participant's feelings about coming to the end of the program and prepare for the final session	One week before patient's subsequent 6 monthly dermatological appointment at the high-risk clinic	Up to 50 minutes
*Session 5**	1. Allow the participant an opportunity to begin the session 2. Summarise what has been explored during the four previous sessions 3. Explore the participant's experience of their high-risk clinic appointment 4. Respond to any new difficulties or concerns 5. Explore the participant's feelings about coming to the end of the program and prepare for the	One week after patient's subsequent 6 monthly dermatological appointment at the high-risk clinic	Up to 50 minutes

	final session
	6. Provide referral pathways for psychological treatment or psychosocial support, as needed
	7.

* The 4th and 5th sessions were omitted for participants who chose 3 sessions.

Table 2: Demographic and clinical characteristics of the sample.

Characteristics	Intervention N = 12	Control N = 12
	N (%) or Mean (SD)	
Gender		
Male	8 (67%)	6 (50%)
Female	4 (33%)	6 (50%)
Age at baseline		
Mean, SD	56.7 (14.0)	61.0 (10.5)
Area		
Metropolitan	7 (58%)	7 (58%)
Regional	4 (33%)	5 (42%)
Rural	1 (8%)	0 (0%)
Country of birth		
Australia	11 (92%)	11 (92%)
Other	1 (8%)	1 (8%)
Marital status		
Married	11 (92%)	8 (72.7%)
Other	1 (8%)	3 (27.3%)
Children		
Yes	11 (92%)	8 (67%)
No	1 (8%)	4 (33%)
Highest level of education		
No tertiary education	9 (75%)	8 (67%)
University	3 (25%)	3 (25%)
Other	0	1 (8%)
Number of previous melanomas	3.3 (2.9)	2.3 (1.9)
Most recent melanoma subtype		
Superficial spreading melanoma	9 (75%)	4 (40%)
In situ	2 (17%)	2 (20%)
Nodular	0	2 (20%)
Melanoma not classified	1 (8%)	2 (20%)
Breslow thickness (mm)	0.78 (0.3 to 2.9)	1.3 (0.3 to 3.5)

Table 3: Acceptability ratings for different components of the *Melanoma Care Study*

	Response options	Intervention (N=11) Mean (SD)	Control (N=12) Mean (SD)
Satisfaction with:			
- Booklet. *Melanoma: Questions and Answers*	*From 0 "Not at all satisfied"*	8.8 (1.0)	
- Booklet, *Understanding Melanoma*	*to 10 "Extremely satisfied"*	9.0 (1.1)	7.2 (2.1) *
- Telephone-based psychology sessions		9.3 (2.4)	
- Overall program		8.7 (2.2)	
Benefit of:			
- Booklet, *Melanoma: Questions and Answers*	*From 0 "Not at all beneficial"*	8.9 (1.2)	
Booklet, *Understanding Melanoma*	*to 10 "Extremely beneficial"*	8.8 (1.2)	6.7 (2.2) *
- Telephone-based psychology sessions		9.3 (2.4)	
- Overall program		8.6 (2.1)	
-			
Difficulty of:			
- Booklet, *Melanoma: Questions and Answers*	*From 0 "Not at all difficult"*	1.7 (3.2)	
Booklet, *Understanding Melanoma*	*to 10 "Extremely difficult"*	1.7 (3.2)	2.0 (2.7) *
- Telephone-based psychology sessions		1.1 (2.4)	
- Overall program		1.1 (2.1)	
Quality of:			
- Information	*From 1 "Poor" to 5 "Excellent"*	4.6 (0.9)	4..17 (1.2)
- Support		4.7 (0.9)	3.83 (1.4)
Recommend to other melanoma patients			
- Yes		10 (91%)	9 (75%)
- No		0	0
- Unsure		1 (9%)	3 (25%)

* For the control group, these questions only applied to the Cancer Council booklet.

Table 4: Summary of participants' views on the perceived benefits of the *Melanoma Care Study*.

Major themes	*Participant's ID*[#]	*Participant quotations*
An opportunity to share one's fears and feel understood	WP1	*Cancer can be lonely and frightening and this allowed me to express all of those fears before and after appointments and about the impact on my life. This had never happened before. Other patients may not have anyone to talk to either. This was the best opportunity and I was in a dark place - you feel so much more alive.*
	MP1	*I feel sharing private fears helped me deal with these issues.*
	WP2	*It helps to talk to someone who understands when you get your first melanoma.*
An opportunity to explore one's experiences in depth	WP3	*Engaging in a conversation with the psychologist made me realise that I still needed to address particular issues which I thought I had dealt with but obviously had not.*
	MP1	*I felt that the sessions with my psychologist were the first real extended discussions I've had in relation to my melanoma risk in over 20 years of melanoma care. I was very satisfied at the end of the sessions because I felt I'd been able to share a burden and get some sensible advice.*
Positive experiences	*MP2*	*Education gives understanding and comfort.*
	WP1	*I feel happier for having someone to talk to about it. My psychologist made me think about taking control of my life and I feel I have been given the skills to understand and manage my fear and to feel worthwhile.*
	MP3	*Reinforced my confidence*
	MP4	*The psychologist assisted greatly with dealing with emotional feelings.*
Improved doctor-patient communication	MP1	*I was given suggested strategies for dealing with negative thoughts about my melanoma risk. I was encouraged to discuss longstanding and new concerns with the high-risk clinic doctor. I felt that the psychologist was genuinely interested in helping me address concerns.*
Good source of medical information	WP4	*Understand what happens after diagnosis, what to expect and support options available.*
	WP5	*A clearer understanding of the different stages of melanoma.*
Supplement information from the doctors	WP4	*I would recommend the booklet because it answers a lot of questions that you would sometimes forget to ask medical staff and you can also refer to it at any time to clarify any areas of confusion.*
	MP6	*If various things are not explained by your GP, the booklet fills that void.*
Reassurance	WP6	*Statistics on recurrence that helped me feel calmer.*
Requests for continued psychological support	MP5	*I wish the support was ongoing and not just a study and I hope that the study will result in this service eventually being a part of patients' treatment.*
	MP1	*Provide an annual 'catch-up' counselling call.*
Challenge for future support	WP1	*The study and help came at the right time and the challenge for me will be to seek the help I may need in the future*
	WP3	*I suggest at the beginning of the sessions that patients might find they'd like help and support beyond the study and help them to find a suitable psychologist… I'm not sure how to find someone who might be better for cancer patients.*
	WP1	*Feeling withdrawn and empty for a few weeks after the counselling stopped for a few months. Knowing it's only a study, even though I've been strongly encouraged to seek support after the study.*

WP: Woman participant; MP: male participant.

CONSORT checklist of information to include when reporting a pilot trial*

Section/topic and item No	Standard checklist item	Extension for pilot trials	Page No where item is reported
Title and abstract			
1a	Identification as a randomised trial in the title	Identification as a pilot or feasibility randomised trial in the title	Page 1
1b	Structured summary of trial design, methods, results, and conclusions (for specific guidance see CONSORT for abstracts)	Structured summary of pilot trial design, methods, results, and conclusions (for specific guidance see CONSORT abstract extension for pilot trials)	page 3
Introduction			
Background and objectives:			
2a	Scientific background and explanation of rationale	Scientific background and explanation of rationale for future definitive trial, and reasons for randomised pilot trial	Pages 5-6
2b	Specific objectives or hypotheses	Specific objectives or research questions for pilot trial	Page 6.
Methods			
Trial design:			
3a	Description of trial design (such as parallel, factorial) including allocation ratio	Description of pilot trial design (such as parallel, factorial) including allocation ratio	page 6
3b	Important changes to methods after trial commencement (such as eligibility criteria), with reasons	Important changes to methods after pilot trial commencement (such as eligibility criteria), with reasons	page 6
Participants:			
4a	Eligibility criteria for participants		
4b	Settings and locations where the data were collected		
4c		How participants were identified and consented	page 6.
Interventions:			
5	The interventions for each group with sufficient details to allow replication, including how and when they were actually administered		pages 7-8
Outcomes:			
6a	Completely defined prespecified primary and secondary outcome measures, including how and when they were assessed	Completely defined prespecified assessments or measurements to address each pilot trial objective specified in 2b, including how and when they were assessed	pages 9-11
6b	Any changes to trial outcomes after the trial commenced, with reasons	Any changes to pilot trial assessments or measurements after the pilot trial commenced, with reasons	
6c		If applicable, prespecified criteria used to judge whether, or how, to proceed with future definitive trial	

Sample size:			
7a	How sample size was determined	Rationale for numbers in the pilot trial	Page 6. (convenient sample)
7b	When applicable, explanation of any interim analyses and stopping guidelines		
Randomisation:			
Sequence generation:			
8a	Method used to generate the random allocation sequence		Page 9
8b	Type of randomisation; details of any restriction (such as blocking and block size)	Type of randomisation(s); details of any restriction (such as blocking and block size)	
Allocation concealment mechanism:			
9	Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned		Page 9.
Implementation:			
10	Who generated the random allocation sequence, enrolled participants, and assigned participants to interventions		Page 9.
Blinding:			
11a	If done, who was blinded after assignment to interventions (eg, participants, care providers, those assessing outcomes) and how		No blinding
11b	If relevant, description of the similarity of interventions		
Analytical methods:			
12a	Statistical methods used to compare groups for primary and secondary outcomes	Methods used to address each pilot trial objective whether qualitative or quantitative	Page 11
12b	Methods for additional analyses, such as subgroup analyses and adjusted analyses	Not applicable	
Results			
Participant flow (a diagram is strongly recommended):			
13a	For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome	For each group, the numbers of participants who were approached and/or assessed for eligibility, randomly assigned, received intended treatment, and were assessed for each objective	Page 12
13b	For each group, losses and exclusions after randomisation, together with reasons		
Recruitment:			

14a	Dates defining the periods of recruitment and follow-up		
14b	Why the trial ended or was stopped	Why the pilot trial ended or was stopped	
Baseline data:			
15	A table showing baseline demographic and clinical characteristics for each group		Table 1
Numbers analysed:			
16	For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups	For each objective, number of participants (denominator) included in each analysis. If relevant, these numbers should be by randomised group	Table 1
Outcomes and estimation:			
17a	For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)	For each objective, results including expressions of uncertainty (such as 95% confidence interval) for any estimates. If relevant, these results should be by randomised group	Table 4
17b	For binary outcomes, presentation of both absolute and relative effect sizes is recommended	Not applicable	
Ancillary analyses:			
18	Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing prespecified from exploratory	Results of any other analyses performed that could be used to inform the future definitive trial	Table 2 Table 3
Harms:			
19	All important harms or unintended effects in each group (for specific guidance see CONSORT for harms)		
19a		If relevant, other important unintended consequences	
Discussion			
Limitations:			
20	Trial limitations, addressing sources of potential bias, imprecision, and, if relevant, multiplicity of analyses	Pilot trial limitations, addressing sources of potential bias and remaining uncertainty about feasibility	Paige 18
Generalisability:			
21	Generalisability (external validity, applicability) of the trial findings	Generalisability (applicability) of pilot trial methods and findings to future definitive trial and other studies	Paige 18
Interpretation:			
22	Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence	Interpretation consistent with pilot trial objectives and findings, balancing potential benefits and harms, and considering other relevant evidence	Page 18
22a		Implications for progression from pilot to future definitive trial, including any proposed amendments	
Other information			

Registration:			
23	Registration number and name of trial registry	Registration number for pilot trial and name of trial registry	Page 4
Protocol:			
24	Where the full trial protocol can be accessed, if available	Where the pilot trial protocol can be accessed, if available	Page 22
Funding:			
25	Sources of funding and other support (such as supply of drugs), role of funders		Page 22
26		Ethical approval or approval by research review committee, confirmed with reference number	Page 7

*Here a pilot trial means any randomised study conducted in preparation for a future definitive RCT, where the main objective of the pilot trial is to assess feasibility.

SPIRIT 2013 Checklist: Recommended items to address in a clinical trial protocol and related documents*

Section/item	Item No	Description	Addressed on page number
Administrative information			
Title	1	Descriptive title identifying the study design, population, interventions, and, if applicable, trial acronym	Page 1
Trial registration	2a	Trial identifier and registry name. If not yet registered, name of intended registry	Page 4
	2b	All items from the World Health Organization Trial Registration Data Set	Page 1
Protocol version	3	Date and version identifier	Page 2
Funding	4	Sources and types of financial, material, and other support	Page 3
Roles and responsibilities	5a	Names, affiliations, and roles of protocol contributors	Page 3
	5b	Name and contact information for the trial sponsor	Page 3
	5c	Role of study sponsor and funders, if any, in study design; collection, management, analysis, and interpretation of data; writing of the report; and the decision to submit the report for publication, including whether they will have ultimate authority over any of these activities	None
	5d	Composition, roles, and responsibilities of the coordinating centre, steering committee, endpoint adjudication committee, data management team, and other individuals or groups overseeing the trial, if applicable (see Item 21a for data monitoring committee)	NA

Introduction			
Background and rationale	6a	Description of research question and justification for undertaking the trial, including summary of relevant studies (published and unpublished) examining benefits and harms for each intervention	Page 4
	6b	Explanation for choice of comparators	Page 3
Objectives	7	Specific objectives or hypotheses	Page 5-6
Trial design	8	Description of trial design including type of trial (eg, parallel group, crossover, factorial, single group), allocation ratio, and framework (eg, superiority, equivalence, noninferiority, exploratory)	Page 6
Methods: Participants, interventions, and outcomes			
Study setting	9	Description of study settings (eg, community clinic, academic hospital) and list of countries where data will be collected. Reference to where list of study sites can be obtained	Page 6
Eligibility criteria	10	Inclusion and exclusion criteria for participants. If applicable, eligibility criteria for study centres and individuals who will perform the interventions (eg, surgeons, psychotherapists)	Page 7
Interventions	11a	Interventions for each group with sufficient detail to allow replication, including how and when they will be administered	Page 6
	11b	Criteria for discontinuing or modifying allocated interventions for a given trial participant (eg, drug dose change in response to harms, participant request, or improving/worsening disease)	Page 17
	11c	Strategies to improve adherence to intervention protocols, and any procedures for monitoring adherence (eg, drug tablet return, laboratory tests)	Page 14
	11d	Relevant concomitant care and interventions that are permitted or prohibited during the trial	Page 11
Outcomes	12	Primary, secondary, and other outcomes, including the specific measurement variable (eg, systolic blood pressure), analysis metric (eg, change from baseline, final value, time to event), method of aggregation (eg, median, proportion), and time point for each outcome. Explanation of the clinical relevance of chosen efficacy and harm outcomes is strongly recommended	Page 14
Participant timeline	13	Time schedule of enrolment, interventions (including any run-ins and washouts), assessments, and visits for participants. A schematic diagram is highly recommended (see Figure)	Page 9, 11, 12

Sample size	14	Estimated number of participants needed to achieve study objectives and how it was determined, including clinical and statistical assumptions supporting any sample size calculations	Page 17
Recruitment	15	Strategies for achieving adequate participant enrolment to reach target sample size	Page 17
Methods: Assignment of interventions (for controlled trials)			
Allocation:			
Sequence generation	16a	Method of generating the allocation sequence (eg, computer-generated random numbers), and list of any factors for stratification. To reduce predictability of a random sequence, details of any planned restriction (eg, blocking) should be provided in a separate document that is unavailable to those who enrol participants or assign interventions	Page 10
Allocation concealment mechanism	16b	Mechanism of implementing the allocation sequence (eg, central telephone; sequentially numbered, opaque, sealed envelopes), describing any steps to conceal the sequence until interventions are assigned	Page 10
Implementation	16c	Who will generate the allocation sequence, who will enrol participants, and who will assign participants to interventions	Page 10
Blinding (masking)	17a	Who will be blinded after assignment to interventions (eg, trial participants, care providers, outcome assessors, data analysts), and how	Page 11
	17b	If blinded, circumstances under which unblinding is permissible, and procedure for revealing a participant's allocated intervention during the trial	Page 11
Methods: Data collection, management, and analysis			
Data collection methods	18a	Plans for assessment and collection of outcome, baseline, and other trial data, including any related processes to promote data quality (eg, duplicate measurements, training of assessors) and a description of study instruments (eg, questionnaires, laboratory tests) along with their reliability and validity, if known. Reference to where data collection forms can be found, if not in the protocol	Page 14-16
	18b	Plans to promote participant retention and complete follow-up, including list of any outcome data to be collected for participants who discontinue or deviate from intervention protocols	Ethics application

Data management	19	Plans for data entry, coding, security, and storage, including any related processes to promote data quality (eg, double data entry; range checks for data values). Reference to where details of data management procedures can be found, if not in the protocol	Ethics application
Statistical methods	20a	Statistical methods for analysing primary and secondary outcomes. Reference to where other details of the statistical analysis plan can be found, if not in the protocol	Page 17
	20b	Methods for any additional analyses (eg, subgroup and adjusted analyses)	Page 18
	20c	Definition of analysis population relating to protocol non-adherence (eg, as randomised analysis), and any statistical methods to handle missing data (eg, multiple imputation)	Page 18
Methods: Monitoring			
Data monitoring	21a	Composition of data monitoring committee (DMC); summary of its role and reporting structure; statement of whether it is independent from the sponsor and competing interests; and reference to where further details about its charter can be found, if not in the protocol. Alternatively, an explanation of why a DMC is not needed	NA
	21b	Description of any interim analyses and stopping guidelines, including who will have access to these interim results and make the final decision to terminate the trial	NA
Harms	22	Plans for collecting, assessing, reporting, and managing solicited and spontaneously reported adverse events and other unintended effects of trial interventions or trial conduct	NA
Auditing	23	Frequency and procedures for auditing trial conduct, if any, and whether the process will be independent from investigators and the sponsor	NA
Ethics and dissemination			
Research ethics approval	24	Plans for seeking research ethics committee/institutional review board (REC/IRB) approval	Page 11
Protocol amendments	25	Plans for communicating important protocol modifications (eg, changes to eligibility criteria, outcomes, analyses) to relevant parties (eg, investigators, REC/IRBs, trial participants, trial registries, journals, regulators)	Ethics application

Consent or assent	26a	Who will obtain informed consent or assent from potential trial participants or authorised surrogates, and how (see Item 32)	Page 7 & appendix C
	26b	Additional consent provisions for collection and use of participant data and biological specimens in ancillary studies, if applicable	Page 7 & appendix C
Confidentiality	27	How personal information about potential and enrolled participants will be collected, shared, and maintained in order to protect confidentiality before, during, and after the trial	Ethics application
Declaration of interests	28	Financial and other competing interests for principal investigators for the overall trial and each study site	Page 18
Access to data	29	Statement of who will have access to the final trial dataset, and disclosure of contractual agreements that limit such access for investigators	Ethics application
Ancillary and post-trial care	30	Provisions, if any, for ancillary and post-trial care, and for compensation to those who suffer harm from trial participation	Ethics application
Dissemination policy	31a	Plans for investigators and sponsor to communicate trial results to participants, healthcare professionals, the public, and other relevant groups (eg, via publication, reporting in results databases, or other data sharing arrangements), including any publication restrictions	Ethics application
	31b	Authorship eligibility guidelines and any intended use of professional writers	NA
	31c	Plans, if any, for granting public access to the full protocol, participant-level dataset, and statistical code	Page 18
Appendices			
Informed consent materials	32	Model consent form and other related documentation given to participants and authorised surrogates	NA
Biological specimens	33	Plans for collection, laboratory evaluation, and storage of biological specimens for genetic or molecular analysis in the current trial and for future use in ancillary studies, if applicable	NA

*It is strongly recommended that this checklist be read in conjunction with the SPIRIT 2013 Explanation & Elaboration for important clarification on the items. Amendments to the protocol should be tracked and dated. The SPIRIT checklist is copyrighted by the SPIRIT Group under the Creative Commons "Attribution-NonCommercial-NoDerivs 3.0 Unported" license.