



Implementation of a Multidisciplinary Model of Care for Women With Metastatic Breast Cancer: Challenges and Lessons Learned

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Abstract

The present study examined the implementation of a multidisciplinary team model of care for 62 women with metastatic breast cancer who had accessed specialist services at a large Australian cancer center. The model of care strengthened team collaboration and assisted in the delivery of personalized assessment and complex care plans. However, new resources were required to deliver consistent care.

Introduction: The present study examined the feasibility and effects of integrating a multidisciplinary team (MDT) model of care for women with metastatic breast cancer (MBC) into a large Australian cancer center. The challenges encountered and lessons learned are described. **Patients and Methods:** In the present prospective, longitudinal, mixed-methods implementation study, the MDT model included face-to-face consultations with a breast care nurse and social worker, followed by a MDT case discussion and face-to-face delivery of a personalized management plan. Data were collected to describe the cohort of women living with MBC who had attended a specialist breast cancer service and their supportive care needs. **Results:** A total of 62 women with median age of 60 years (interquartile range [IQR], 37-82 years) participated. The median interval from the first breast cancer diagnosis was 5.7 years (IQR, 2.0-11.6 years), and the median interval from the diagnosis of MBC was 2.0 years (IQR, 0.9-3.6 years). The MDT care model required new resources and cross-sector participation. However, the participants indicated a preference for personalized needs assessment and care planning at the diagnosis of MBC. **Conclusions:** The results highlight the challenges of implementing and evaluating an MDT care model for women with MBC. The model coordinated MDT collaboration to strengthen the delivery of complex care plans. Investment in cross-sector partnerships to optimize care coordination for women with MBC was needed.

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Introduction

Breast cancer is the most commonly diagnosed cancer and the leading cause of cancer death among women worldwide.¹ In 1 Australian study, 7% of patients with breast cancer had metastatic disease at diagnosis and 10% of patients with a diagnosis of early-stage breast cancer (EBC) were found to have metastatic disease within 5 years.² Patients with metastatic breast cancer (MBC), also known as advanced, secondary, or stage IV breast cancer, have a median survival of 3 years, with survival of up to 15 years reported.³⁻⁶ Unlike EBC, few therapeutic standards have been recognized for patients with MBC, especially after first-line treatment.⁶

Women living with MBC have reported varied and complex supportive care needs in the physical, psychosocial, spiritual, and information domains.^{3,5,7-10} It has been recognized that their needs are under-addressed by the existing models of care.¹¹ In a survey of

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276 UK breast care nurses, 57% indicated that the care of patients with MBC was inadequate, mainly owing to the lack of time and resources and the need to focus on the high volume of women with EBC.¹² Compared with the care received by women with EBC, the provision of supportive care to patients with MBC has been inconsistent and often inadequate.³⁻⁵

The international guidelines for advanced breast cancer⁶ have advocated for the provision of multidisciplinary care for women with MBC. Multidisciplinary care is characterized by a collaborative approach to treatment, continuity of care, timely supportive care referrals, and care planning.^{4,13-15} However, limited systematic integration and study of coordinated multidisciplinary approaches in the treatment of women with MBC have been performed.⁶

The present study was initiated by a specialist breast cancer team to address the lack of a coordinated multidisciplinary service for patients with MBC at an Australian tertiary cancer center. A structured model of care was designed in accordance with the international best practice guidelines.⁶ The cases of patients with MBC were discussed by the multidisciplinary team (MDT) to inform the development and delivery of personalized care plans through breast care nurses and social workers. The study aimed to generate evidence for the broad application of the MBC multidisciplinary model of care that could contribute to the reduction of patient-reported burden and distress associated with unmet physical and psychosocial needs. The present report describes an Australian cohort of women living with MBC, their supportive care needs, and the challenges of implementing a best practice model of care in a specialist breast cancer service of a tertiary cancer center.

Patients and Methods

Design

A prospective, longitudinal, mixed-methods implementation study design was adopted using convenience sampling from a large Australian cancer center. The medical records were reviewed and the patient-reported outcomes data, including quality of care and coordination of treatment measures, were prospectively collected at study entry (baseline) and at 3, 6, and 9 months after receipt of a personalized care plan. Qualitative interview data were gathered from a subsample of participants. The Peter MacCallum Cancer Centre Human Research Ethics Committee approved the study (application no. 1306), which was performed in accordance with the Australian National Statement on Ethical Conduct in Human Research (2015) and the Canberra National Health and Medical Research Council. All participants provided written informed consent.

Participants

The eligibility criteria included female gender, age ≥ 18 years, a diagnosis of MBC, receipt of medical oncology care at the cancer center, and the ability to communicate in English without an interpreter. The exclusion criteria included attendance for second opinion or radiotherapy only, without follow-up performed at the cancer center; a history of acute psychiatric illness; and an inability to provide informed consent.

At study conceptualization, our intent was to recruit only women with a new diagnosis of MBC. However, it became apparent that the number of patients with a new diagnosis who had been seen by the service was considerably less than expected. To ensure the

viability of the project, it was necessary to include all women with a diagnosis of MBC who had attended the cancer center during the data collection period.

Recruitment

An information pack on the study requirements and an invitation to participate were mailed to the patients who met the eligibility criteria. A single follow-up telephone interview was performed by the study research assistant after confirming that the potential participant had not died in between contacts.

Components of the New Model of Care and Implementation Process

After consultation with a medical oncologist, the MDT model included a requirement for face-to-face consultations with a breast care nurse and social worker, respectively, and establishment of a weekly MDT meeting to discuss and develop personalized care plans, which were delivered to the women in-person by the breast care nurse. The MDT meetings were attended by breast care nurses, medical oncologists, radiation oncologists, a social worker, and a palliative care physician or nurse and, if required, other allied health professionals.

For study purposes, the women completed baseline self-report measures at recruitment to the study, followed by consultations with a breast care nurse and social worker, who assessed the women's general understanding of their prognosis, supportive care needs, and how well they and their support networks were coping. The breast care nurse and social worker also identified any specific concerns raised by the women. Individual cases were discussed at an MDT meeting, which followed study-specific case conference management guidelines. The resulting personalized care plans included targeted referrals to address the women's unmet needs in the cancer center or the community. A breast care nurse delivered and discussed the plans with each participant. Any issues identified were discussed with the MDT and promptly addressed. The study required all components of the model of care to be delivered to the participants in face-to-face consultations. The reasons for, and challenges caused by, this requirement are described in subsequent sections.

Variables and Measures

The demographic and clinical data were gathered from the medical records. Implementation of the new MDT model was evaluated using the implementation outcome variables adopted from 2 existing implementation research frameworks.^{16,17} The operational data relevant to the implementation outcome variables were gathered from a study-specific screening log and the medical records. The operational data were supplemented with self-report and interview data. The patient self-report data were gathered using a customized questionnaire. The outcomes variables adopted and the measures used to evaluate them are listed in [Table 1](#).

The self-report measures, which were broadly compliant with standards for use in patient-centered outcomes research,¹⁸ were used to characterize the quality of life and supportive care needs of the women at study entry. The measures included the European Organization for Research and Treatment of Cancer (EORTC) Quality of Life Questionnaire Core 30 (QLQ-C30),¹⁹ a 30-item cancer-specific health-related quality of life measure; the EORTC breast cancer module (QLQ-BR23),²⁰ a 23-item supplement to the QLQ-C30 to

Table 1 Implementation Outcome Variables

Outcome	Aspect	Measure
Acceptability		Interview data
	Model credibility and willingness to try	Operational data: consent rate
Appropriateness	Ongoing acceptance	Operational data: intentional withdrawals
	Relevance and perceived fit	Interview data
Fidelity	Perceived usefulness or suitability	Customized visual analog scales; interview data
	Adherence	Operational data: consultation attendance (ie, met with breast care nurse, met with social worker)
	Delivery as intended	Operational data: approach rate; timing of consultations (delivered in the right order at the right time); discussion at MDT meeting; delivery of personalized care plan

Abbreviation: MDT = multidisciplinary team. Data from Peters et al¹⁶ and Proctor et al.¹⁷

assess the specific quality of life issues relevant to women with breast cancer; and the Supportive Care Needs Survey-short form with a modified response format,^{21,22} a 34-item cancer-specific measure of unmet supportive care needs. A set of customized visual analog scales (VAS)²³ was used to assess the appropriateness of the MDT model and women’s perceptions of the quality of care and coordination of their treatment at the cancer center, with responses ranging from 0 (low quality) to 10 (high quality).

Semistructured, audio-recorded interviews were conducted with a randomly selected sample of 20 participants. The interview schedule was designed to assess the acceptability and appropriateness of the MDT model. The interviews focused on the participants’ perceptions of the helpfulness of the nursing and social work consultations, whether they believed the consultations had been undertaken at the right time, and whether they had accessed other forms of support before enrollment in the present study. Finally, the participants were asked whether they would recommend that the consultations should be available to other women living with MBC.

Statistical Analysis

Descriptive statistics (counts and percentages, means and standard deviations or medians and interquartile ranges [IQR], as appropriate) were used to summarize the demographic, clinical, operational, and baseline patient-reported outcome measures data.

An analysis of the responses to the customized VAS was performed by fitting a linear mixed model to each item separately.²⁴ Models included a fixed effect for time and a random participant effect.²⁵ Differences between the baseline and follow-up assessment results were estimated with the 95% confidence intervals using contrasts within each model.

The interviews were audio-recorded and transcribed verbatim. The analysis used NVivo qualitative data management software²⁶ and involved reading the interview transcripts and performing deductive content analysis²⁷ to extract the relevant data according to the topics of interest.

Table 2 Participant Characteristics (n = 62)

Characteristic	n (%)
Age, y	
Mean ± standard deviation	60.0 ± 11.8
Range	37-82
Place of residence	
Major city	52 (84)
Inner regional	7 (11)
Outer regional	3 (5)
Marital status	
Married/partner	38 (68)
Divorced/separated	12 (21)
Single	4 (7)
Widowed	2 (4)
Missing data	6 (10)
Living situation	
Lives with husband/partner	25 (45)
Lives with husband/partner and children	11 (20)
Lives alone	9 (16)
Lives with children	8 (15)
Other	2 (4)
Missing data	7 (11)
Interval from first breast cancer diagnosis to study entry, y	
Median	5.7
Interquartile range	2.0-11.6
Range	0.1-33.1
Time since diagnosis of MBC at study entry, y	
Median	2.0
Interquartile range	0.9-3.6
Range	0.1-10.3
Metastatic sites ^a	
Bone	47 (76)
Liver	29 (47)
Lung	16 (26)
Nodal	8 (13)
Ascites/pleural effusion	6 (10)
Brain	2 (3)
Stomach	2 (3)
Other	5 (8)
No. of metastatic sites	
1	28 (45)
2	18 (29)
3	14 (23)
4	2 (3)

Abbreviation: MBC = metastatic breast cancer. ^aMultiple responses allowed; thus, data do not sum to 100%.

Results
Study Profile

Of the 103 eligible women, 12 were not approached for study participation, 29 declined, and 62 agreed to participate (consent

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Table 3 Descriptive Statistics for the EORTC QLQ-C30 and QLQ-BR23 at Study Entry (n = 62)

Scale and Item	Patients, n	Mean ± SD	Median	Interquartile Range
QLQ-C30				
Functional scales ^a				
Physical function	62	75 ± 22	80	65-92
Role function	61	71 ± 28	67	50-100
Emotional function	62	73 ± 24	75	56-92
Cognitive function	62	76 ± 24	83	67-100
Social function	62	72 ± 27	83	67-100
Symptom scales ^b				
Fatigue	62	39 ± 25	33	22-56
Nausea/vomiting	62	9 ± 15	0	0-17
Pain	62	22 ± 27	17	0-33
Dyspnea	62	22 ± 26	33	0-33
Insomnia	62	38 ± 32	33	0-67
Appetite loss	61	22 ± 28	0	0-33
Constipation	62	17 ± 21	0	0-33
Diarrhea	61	11 ± 20	0	0-33
Financial problems	61	26 ± 32	0	0-33
Global health status ^c	62	63 ± 23	67	48-83
QLQ-BR23				
Functional scales ^d				
Body image	62	70 ± 30	83	58-100
Sexual functioning	60	13 ± 18	0	0-33
Sexual enjoyment	16	54 ± 30	50	33-67
Future perspective	62	40 ± 34	33	0-67
Symptom scales ^e				
Systemic therapy	62	22 ± 16	21	10-29
Breast symptoms	62	9 ± 12	0	0-17
Arm symptoms	62	14 ± 19	11	0-22
Hair loss	18	57 ± 36	50	33-100

Abbreviations: QLQ-BR23 = European Organization for Research and Treatment of Cancer breast cancer-specific quality of life questionnaire; QLQ-C30 = European Organization for Research and Treatment of Cancer Quality of Life Questionnaire Core 30; SD = standard deviation.

^aHigher scores represent higher levels of functioning.

^bHigher scores represent higher levels of symptoms and/or problems.

^cHigher scores represent greater quality of life.

^dFor body image and future perspective, higher scores represent lower levels of functioning; for sexual functioning and sexual enjoyment, higher scores represent greater levels of functioning; the sexual enjoyment item would only be answered if the respondent had been sexually active.

^eHigher scores represent higher levels of symptoms and/or problems.

rate, 60%) from December 2013 to January 2015. The reasons for not approaching eligible women and those declining participation are shown in [Supplemental Figure 1](#); available in the online version). The demographic and clinical characteristics of the study participants are summarized in [Table 2](#). The median interval from the first diagnosis of breast cancer was 5.7 years (IQR, 2.0-11.6 years), and the median interval from the diagnosis of metastatic disease was 2.0 years (IQR, 0.9-3.6 years). Of the 62 women, 24 (39%) had metastatic disease when breast cancer was first diagnosed (ie, de novo MBC).

Most (39 of 62; 63%) participants were receiving treatment while enrolled in the present study. Of these 39 patients, 37 attended regular medical oncology clinic and chemotherapy day unit appointments and 2 attended regular chemotherapy day unit appointments only. Of those who had not received medical treatment

(23 of 62; 37%), 21 attended regular medical oncology clinic appointments only and 2 attended appointments for imaging studies only. Twelve women received care as inpatients during the study period. Eleven women were referred to the pain and palliative care service of the cancer centre.

Descriptive statistics for the EORTC QLQ-C30 and QLQ-BR23 scales and individual items are provided in [Table 3](#). Other than some small-sized differences, the participants' self-reported cancer- and diagnosis-specific health-related quality of life at study entry were comparable to those reported previously for similar samples.^{3,28,29}

Descriptive statistics for prevalent supportive care needs items are presented in [Table 4](#). An item was considered prevalent if ≥ 25% of the women had reported a moderate-to-high level of need. The top 10 items, other than “not being able to do things you used to,”

Table 4 Descriptive Statistics for Prevalent Supportive Care Needs Survey—Short Form Need Items at Study Entry^a

Need Item	Domain	Patients, n	Need Response, %			
			High	Moderate	Low	None
Uncertainty about the future	P	62	29	23	26	23
Fears about cancer spreading	P	62	27	21	27	24
Concerns about the worries of those close to you	P	62	23	21	21	35
Being informed about your test results as soon as possible	HSI	62	21	19	15	45
Being informed about things you can do to help yourself to get well	HSI	60	18	20	23	38
Not being able to do things you used to	PDL	61	10	28	25	38
Worry that results of treatment are beyond your control	P	62	23	15	26	37
Learning to feel in control of your situation	P	61	11	25	20	44
Feelings about death and dying	P	62	19	15	21	45
Having 1 member of hospital staff with whom you can talk to about all aspects of your condition, treatment, and follow-up	HSI	61	20	13	20	48
Being informed about cancer that is under control or diminishing	HSI	59	20	12	24	44
Work around the home	PDL	61	8	23	21	48
Keeping a positive outlook	P	62	11	19	26	44
Being treated like a person not just another case	HSI	62	18	13	11	58
Lack of energy/tiredness	PDL	61	10	20	34	36
Being treated in a hospital or clinic that is as physically pleasant as possible	HSI	62	18	11	18	53
Feelings of sadness	P	62	10	16	26	48
Having access to professional counseling if you or your family or friends need it	HSI	60	12	13	25	50

Abbreviations: HSI = health system and information; P = psychological; PDL = physical and daily living.

^aAn item was considered prevalent if $\geq 25\%$ of the women reported a moderate-to-high level of need.

mapped to the psychological or health system and information needs domains. The top 3 needs indicated the dominance of uncertainty, fears, and concerns, and others highlighted the desire to be well-informed, to learn strategies to manage their current circumstances, and, importantly, to have a single point-of-contact within the hospital to discuss all aspects of their condition, treatment, and follow-up.

Implementation Fidelity

The variable nature of the medical care and follow-up of the participants, amendment of the study eligibility criteria, and the requirement that consultations with breast care nurses and social workers be undertaken face-to-face compromised the implementation fidelity (ie, ability of the new model of care to be delivered as specified in the study protocol).³⁰

Of the 62 women who had consented to study participation, 61 (98%) received ≥ 1 component of the new model of care. Thus, 61 women met with a breast care nurse, 57 met with a social worker, the cases of 59 women were discussed at an MDT meeting, and 55 women received a personalized care plan. The timing of the consultations and delivery of the personalized care plans often deviated substantially from the protocol-specified schedule (Figure 1). Also, 31 participants were withdrawn from the study at different points and for various reasons (Supplemental Figure 1; available in the online version).

Quality of Care and Coordination of Treatment

The linear mixed model results for the customized VAS are presented in Table 5. The appropriateness of the MDT model was shown, with a significant effect over time for 2 items: (1) coordination between the cancer center and other care providers in the community; and (2) knowledge of the point of contact at the cancer center to direct queries or address concerns in between clinic appointments. In both cases, the perceptions of quality had improved.

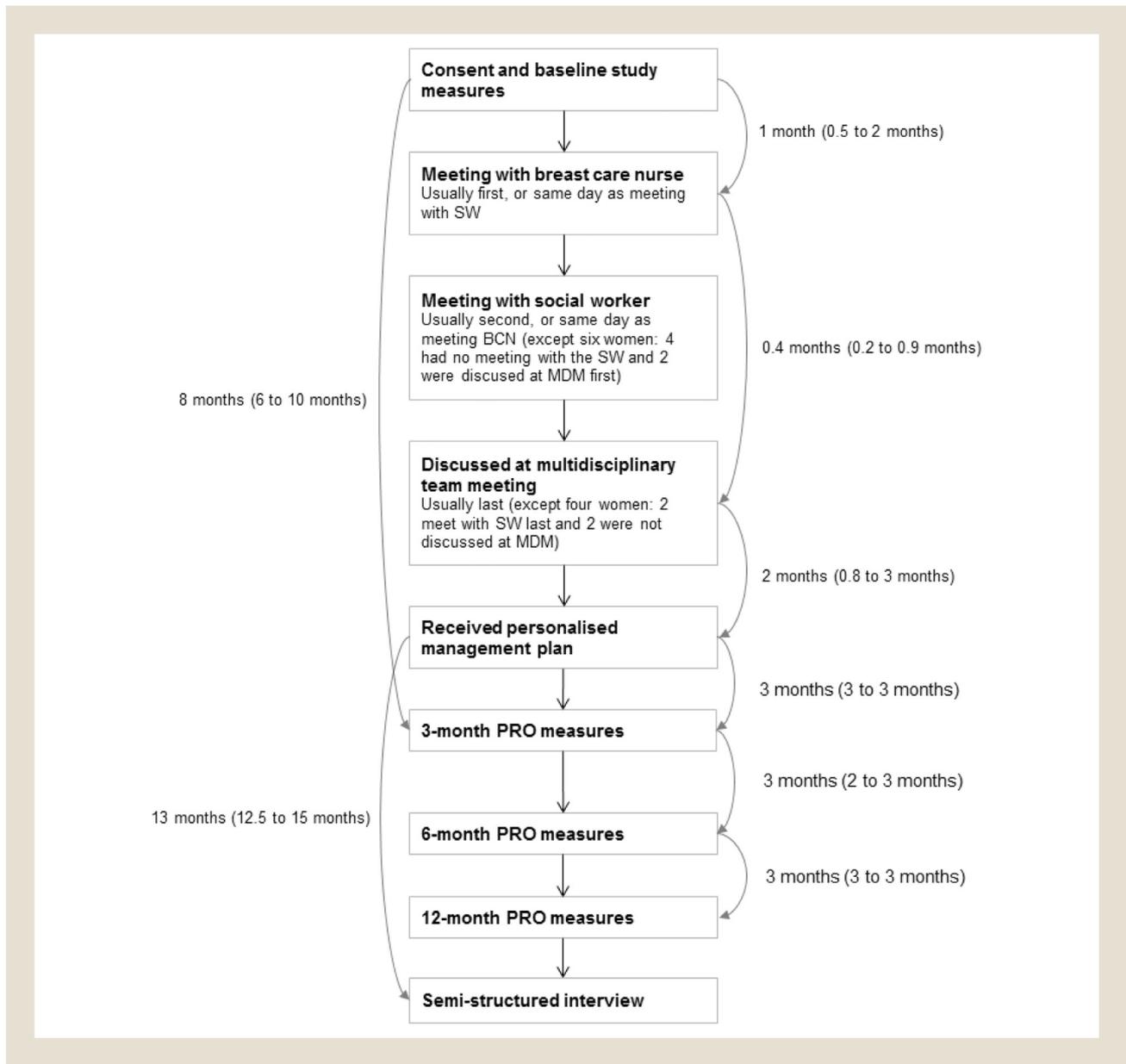
Interviews

Twenty randomly selected study participants with a median age of 62 years (range, 36-76 years) were interviewed. They agreed to participate in the interviews 13 to 21 months after enrollment into the study. Eight women (40%) had a diagnosis of de novo MBC. Six (30%), 2 (10%), and 4 (20%) women were diagnosed with MBC 1 to 5 years, 5 to 10 years, and over 10 years after their initial EBC diagnosis, respectively. The interviews took an average of 7 minutes (range, 3-21 minutes) to complete, and all interviews were conducted via the telephone.

The women reported that the MDT model of care was useful: "... very methodical and um we covered a lot of topics ..." (patient 3), and "... good thing that it's offered especially you know in the advanced stage ..." (patient 45). In particular, the consultation and contact with the breast care nurse was viewed as helpful: "... nurses are helpful in the clinical sense and to receive all the information

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Figure 1 Actual Timing of Assessments and Meetings



needed...” (patient 45). Specifically, the women valued having a clear point-of-contact in the hospital, someone who could answer their questions and provide information relevant to their specific needs: “... I only wanted to know about my own breast cancer, I couldn’t even contemplate thinking more broadly than that” (patient 5). Women valued the early consultation with a breast care nurse and the benefits described included “didn’t make you feel so alone” (patient 24), “giving me a place to touch base” (patient 55), and “an extra kind of support” (patient 45). Knowledge of the availability of a social worker to allow the women to access additional support and counseling when needed was regarded as a valuable component of the MDT model of care: “... the oncologist and doctor, they don’t have the time to sit and talk and be um more like a counsellor or somebody you can just have a chat to” (patient 26).

In addition, women provided helpful feedback regarding the timing and mode of consultations with breast care nurses and social workers and described the consultations to be of greatest value when they first received the diagnosis of MBC and before they started treatment. Some women could not recall having received a personalized care plan, which might be attributed to the long interval between the receipt of the plan and the interview (median, 13 months; IQR, 13-15 months). When the women were able to recall receipt of the care plan, they described it as a reassuring and a valuable documentation to refer to in the future: “Well I haven’t needed to refer to it very much but I know it’s there and that is good” (patient 17). Most of the women interviewed indicated that the MDT model of care should be available to all women with MBC who could choose whether to access it: “... for sure and then it’s, I think, up to the woman, the individual, to [um] use that service ...” (patient 45).

Table 5 Mixed Model Results for Customized VAS Assessing Quality of Care and Coordination of Treatment

Item	Baseline (n = 62); Estimate ± SE	Change From Baseline After Intervention (95% CI)			P Value
		3 mo (n = 46)	6 mo (n = 37)	9 mo (n = 31)	
How well do you feel that your care has been coordinated between the doctors, nurses, and allied health staff at Peter Mac?	7.9 ± 0.2	0.5 (0.0 to 1.0)	0.6 (0.0 to 1.1)	0.1 (−0.5 to 0.7)	.12
How well do you feel that your care has been coordinated between the Peter Mac Breast service team and your GP?	7.0 ± 0.3	0.4 (−0.2 to 1.1)	0.4 (−0.3 to 1.1)	0.2 (−0.6 to 0.9)	.57
How well do you feel that your care has been coordinated between the Peter Mac Breast service team and doctors in other hospitals you have to attend? ^a	7.8 ± 0.4	−0.2 (−1.0 to 0.7)	−0.3 (−1.2 to 0.6)	0.0 (−1.0 to 1.0)	.85
How well do you feel that your care has been coordinated between the Peter Mac and other care providers in the community? ^b	6.5 ± 0.3	1.2 (0.3 to 2.0)	1.3 (0.3 to 2.3)	0.8 (−0.3 to 1.8)	.02
I feel that I always know who to contact at Peter Mac if I have a problem or query in between appointments	7.8 ± 0.3	0.4 (−0.2 to 0.9)	0.8 (0.2 to 1.4)	0.8 (0.1 to 1.4)	.03
I feel that I can always get to see or speak with my treating doctor in a reasonable timeframe, if I have a problem or query in between appointments	7.9 ± 0.2	0.5 (−0.1 to 1.1)	0.7 (0.1 to 1.4)	0.5 (−0.2 to 1.1)	.10
I feel I always have an opportunity to be involved in decisions about my care if I want to be	8.0 ± 0.2	0.2 (−0.3 to 0.8)	0.3 (−0.3 to 0.9)	0.3 (−0.4 to 0.9)	.69

Abbreviations: CI = confidence interval; GP = general practitioner; Peter Mac = Peter MacCallum Cancer Centre; SE = standard error; VAS = visual analog scales.

^aBaseline, n = 22; 3 months after intervention, n = 16; 6 months after intervention, n = 15; and 9 months after intervention, n = 9.

^bBaseline, n = 48; 3 months after intervention, n = 38; 6 months after intervention, n = 26; and 9 months after intervention, n = 21.

Discussion

Despite active involvement of the breast cancer service at a large cancer center in the present study, the paucity of women with a new diagnosis of MBC relative to the large prevalent population with MBC suggests how “hidden” these women are in hospital systems. This finding supports recommendations⁶ to improve the visibility and care coordination for this group of patients.

Inviting all women with MBC, irrespective of the time since the diagnosis of metastatic disease, to participate in the study resulted in recruitment of a heterogeneous group of women in terms of the time since the MBC diagnosis. Their needs for acute and community services varied considerably, as shown in previous studies.^{3,4} Therefore, a stable baseline against which to assess the effect of the new MDT model of care could not be established. However, the items related to community service referrals scored the lowest at all assessment points, with only small improvements over time. This finding underscores the importance of timely and appropriate referrals to community and supportive care, which is a key component of the MDT models of care³¹ and suggests an important area for improvement.

Our study has demonstrated the limited capacity of breast care nurses and social workers to provide timely face-to-face consultations in an acute hospital setting with a variable model of MBC care. They reported having little available time to follow-up with women with MBC owing to the volume of, and focus on, women with EBC. Women with MBC have different needs than those of women with EBC and live with complex physical, emotional, and social needs experienced within the context of incurable disease.^{3,5} Other than a project officer, no additional study resources were

provided to coordinate and deliver the new MDT model of care, which was intended to be sustainable after the study. The additional caseload arising from the study resulted in delays in the face-to-face delivery of consultations and personalized care plans to the study participants. In addition, the study protocol specified that the face-to-face consultations were to coincide with participants’ regular hospital visits to mitigate the burden on the participants. However, this requirement added considerable variation to the timing and delivery of the components of the MDT model of care. Thus, these findings underpin the importance of investigating more flexible and sustainable modes of delivery of supportive care to women with MBC. Telephone consultations and telehealth have shown successful application in other MDT cancer care models.^{4,32,33}

Because MDT models of care are considered best practice,^{13,14} conduct of randomized controlled trials to evaluate these models could be considered unethical.^{14,34} This has made robust research into MDT models of care challenging.¹⁴ Mixed methods, implementation science, and program logic and evaluation methods might offer more meaningful approaches to designing and evaluating health service delivery enhancements for women with MBC.

Our study has provided important insights regarding the supportive care needs of women with MBC. The study participants indicated their preference for early involvement of breast care nurses and social workers in their care and highlighted the urgent need for investment in supportive care expertise and timely referrals for women with MBC. They also indicated the importance of access to their specialist MDT through a centralized hospital-based point-of-contact. However, given the increasing

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number of women living with MBC, the provision of their care in acute sectors only lacks feasibility and flexibility. The development and evaluation of robust shared-care models among primary health, acute care services, and specialist advocacy groups are urgently needed.

Study Limitations

In the present study, a protocol amendment was required to allow for participation of all women with a diagnosis of MBC, irrespective of the time since the diagnosis, to achieve sufficient study numbers. This resulted in recruitment of a heterogeneous cohort of women who had had a diagnosis of EBC within months or years of confirmation of MBC and who had diverse needs and had received varying levels of support and awareness of support services. The amendment also resulted in a sudden influx of study participants who were required to be seen face-to-face by the breast care nurses and social workers, in addition to their usual care caseload. This challenged implementation fidelity because the nurses and social workers lacked the additional time necessary to meet time frames for face-to-face consultations as set out in the study protocol. In reality, this would not be reflected in day-to-day practice when the number of women with a new diagnosis of MBC or those with progression to a diagnosis of MBC is very low. Thus, the adoption of the model into usual care would be less resource intensive. Owing to the project constraints, only a limited amount of operational data could be collected, limiting the ability to address all components of the implementation frameworks used to guide the study design.

Conclusions

Our study results suggest that establishment of a structured multidisciplinary model of care for women with MBC enabled a coordinated and collaborative response to their complex treatment and care needs. The study also highlighted the challenges of implementing an MDT model of care for women with MBC, with resource, time, and supportive care expertise implications. Although the study limitations precluded definitive conclusions regarding efficacy of structured MDT care for women with MBC, the findings have confirmed a benefit as perceived by the study participants.

Clinical Practice Points

- Women living with MBC have reported varied and complex supportive care needs in physical, psychosocial, spiritual, and information domains.
- The international guidelines for MBC have advocated for the provision of a multidisciplinary care approach; however, this cohort of women has often been overlooked owing to the ambulatory nature of their treatment and intermittent contact with specialists.
- Acute cancer services have a dominant focus on treating large numbers of women with EBC, and the resources available are often restricted to these women.
- Women with MBC indicated a desire for early involvement of a breast care nurse and social worker in their care and highlighted an urgent need for investment in accessibility of supportive care expertise and timely referral to a specialist multidisciplinary team through a centralized hospital-based point-of-contact.
- In the present study, the lack of breast care nurse and social worker resources to provide timely, face-to-face consultations became apparent when implementing the multidisciplinary model of care.
- Existing models of care might not adequately address the needs of women with MBC and the resources targeted to them require investment.
- The present findings suggest that establishment of a structured multidisciplinary model of care can enable a coordinated, comprehensive response to the complex treatment and care needs of women with MBC.
- Co-designing and trialing feasible models of supportive care for this group of women will offer opportunity to affect patient experience and delivery of efficient health care.

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Disclosure

The authors declare that they have no competing interests.

Supplemental Data

The supplemental figure accompanying this article can be found in the online version at <https://doi.org/10.1016/j.clbc.2018.12.014>.

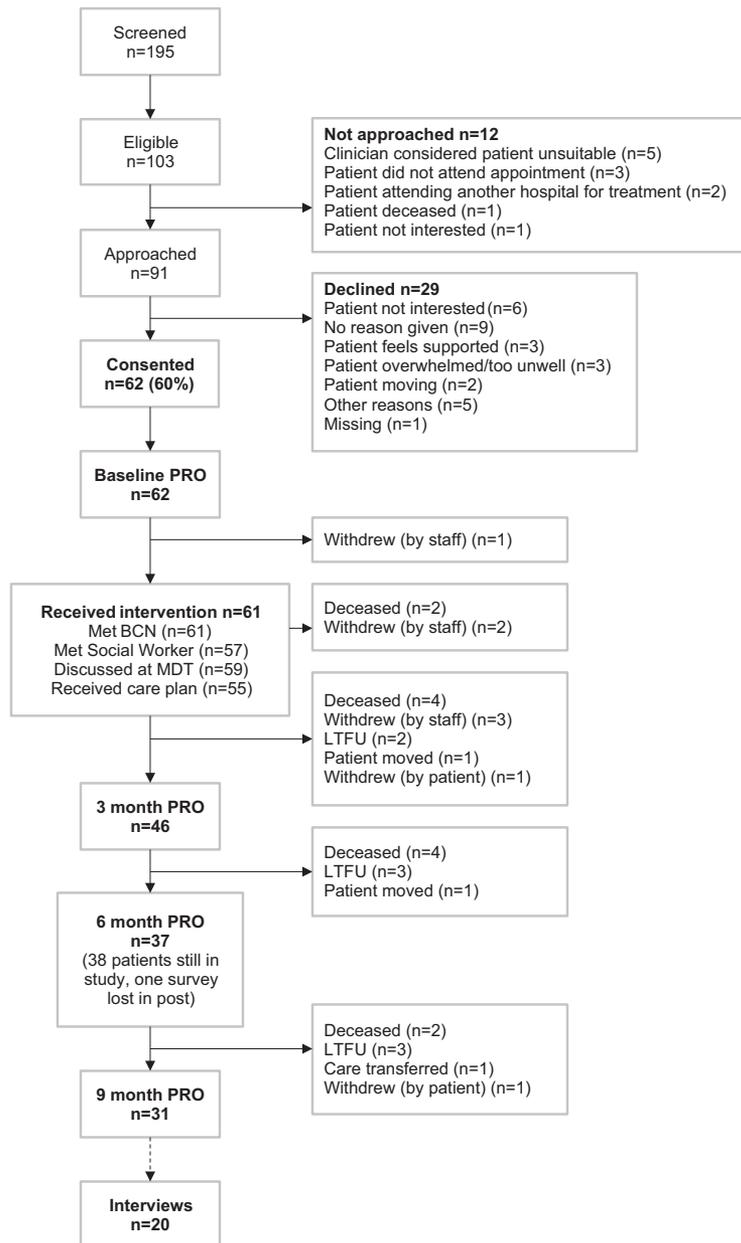
References

1. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global cancer statistics. *CA Cancer J Clin* 2011; 61:69-90.
2. Lord SJ, Marinovich ML, Patterson JA, et al. Incidence of metastatic breast cancer in an Australian population-based cohort of women with non-metastatic breast cancer at diagnosis. *Med J Aust* 2012; 196:688-92.
3. Aranda S, Schofield P, Weih L, et al. Mapping the quality of life and unmet needs of urban women with metastatic breast cancer. *Eur J Cancer Care* 2005; 14:211-22.
4. Bennett E, Hume A, Telford E. Specialist service for patients with secondary breast cancer: Emma Bennett and colleagues describe the development and evaluation of an initiative to provide clinical nurse specialist support for people with advanced disease. *Cancer Nurs Pract* 2013; 12:25-30.
5. Monash Health and Strategy Department for the Victorian Department of Health. Monash Health Metastatic Breast Cancer Nurse Practitioner Model of Care. Available at: http://www.health.vic.gov.au/_data/assets/pdf_file/0011/918074/Monash-Health_Metastatic-Breast-Cancer.pdf. Accessed: March 10, 2018.
6. Cardoso F, Costa A, Norton L, et al. 1st International consensus guidelines for advanced breast cancer (ABC 1). *Breast* 2012; 21:242-52.
7. Cella DF, Mahon SM, Donovan MI. Cancer recurrence as a traumatic event. *Behav Med* 1990; 16:15-22.
8. Hanson Frost M, Suman VJ, Rummans TA, et al. Physical, psychological and social well-being of women with breast cancer: the influence of disease phase. *Psychooncology* 2000; 9:221-31.
9. Uchida M, Akechi T, Okuyama T, et al. Patients' supportive care needs and psychological distress in advanced breast cancer patients in Japan. *Jpn J Clin Oncol* 2010; 41:530-6.
10. Mahon SM, Casperson DS. Psychosocial concerns associated with recurrent cancer. *Cancer Pract* 1995; 3:372-80.
11. Secondary Breast Cancer Taskforce. Improving the care of people with metastatic breast cancer: final report. London, UK: Breast Cancer Care. 2008. Available at: <https://www.breastcancercare.org.uk/information-support/secondary-metastatic-breast-cancer/standards-care-secondary-breast-cancer-patients>. Accessed: March 10, 2018.
12. Reed E, Scanlon K, Fenlon D. A survey of provision of breast care nursing for patients with metastatic breast cancer—implications for the role. *Eur J Cancer Care* 2010; 19:575-80.
13. Department of Health and Human Services, State Government of Victoria. Victorian Integrated Cancer Services multidisciplinary team meeting statewide survey 2014: final report. Available at: <https://www2.health.vic.gov.au/about/health-strategies/cancer-care/cancer-services-framework/multidisciplinary-care>. Accessed: March 10, 2018.

14. Church DN, Kerr R, Kerr DJ. Multidisciplinary cancer care. In: Kerr DJ, Haller DG, van de Velde CJH, Baumann M, eds. *Oxford Textbook of Oncology*. 3rd ed. Oxford, United Kingdom: Oxford University Press; 2016.
15. National Breast Cancer Centre. Multidisciplinary meetings for cancer care: a guide for health service providers. Camperdown, New South Wales, Australia: National Breast Cancer Centre. 2005. Available at: https://canceraustralia.gov.au/sites/default/files/publications/mdm-mdc-meeting-for-cancer-care_504af02d7368d.pdf. Accessed: March 10, 2018.
16. Peters DH, Adam T, Alonge O, Agyepong IA, Tran N. Implementation research: what it is and how to do it. *BMJ* 2013; 347:f6753.
17. Proctor E, Silmere H, Raghavan R, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. *Adm Policy Ment Health* 2011; 38:65-76.
18. Reeve BB, Wyrwich KW, Wu AW, et al. ISOQOL recommends minimum standards for patient-reported outcome measures used in patient-centered outcomes and comparative effectiveness research. *Qual Life Res* 2013; 22:1889-905.
19. Aaronson NK, Ahmedzai S, Bergman B, et al. The European Organization for Research and Treatment of Cancer QLQ-C30: a quality-of-life instrument for use in international clinical trials in oncology. *J Natl Cancer Inst* 1993; 85:365-76.
20. Sprangers MA, Groenvold M, Arraras JL, et al. The European Organization for Research and Treatment of Cancer breast cancer-specific quality-of-life questionnaire module: first results from a three-country field study. *J Clin Oncol* 1996; 14: 2756-68.
21. Boyes A, Girgis A, Lecathelinais C. Brief assessment of adult cancer patients' perceived needs: development and validation of the 34-item Supportive Care Needs Survey (SCNS-SF34). *J Eval Clin Pract* 2009; 15:602-6.
22. Schofield P, Gough K, Lotfi-Jam K, Aranda S. Validation of the Supportive Care Needs Survey-short form 34 with a simplified response format in men with prostate cancer. *Psychooncology* 2012; 21:1107-12.
23. Aitken RC. Measurement of feelings using visual analogue scales. *Proc R Soc Med* 1969; 62:989-93.
24. Bates D, Maechler M, Bolker B, et al. Linear mixed-effects models using 'Eigen' and S4. CRAN Package "lme4." Available at: <https://github.com/lme4/lme4/> <http://lme4.r-forge.r-project.org/>. Accessed: March 10, 2018.
25. Fitzmaurice GM, Laird NM, Ware JH. *Applied Longitudinal Analysis*, Vol. 998. Hoboken, NJ: John Wiley & Sons; 2012.
26. QSR International Pty Ltd. *NVivo qualitative data analysis software for Macintosh, version 10*. Doncaster, VIC, Australia: QSR International Pty Ltd; 2014.
27. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs* 2008; 62: 107-15.
28. Efficace F, Biganzoli L, Piccart M, et al. Baseline health-related quality-of-life data as prognostic factors in a phase III multicentre study of women with metastatic breast cancer. *Eur J Cancer Care* 2004; 40:1021-30.
29. Twelves C, Cortés J, O'Shaughnessy J, et al. Health-related quality of life in patients with locally recurrent or metastatic breast cancer treated with etirinotecan pegol versus treatment of physician's choice: results from the randomised phase III BEACON trial. *Eur J Cancer Care* 2017; 76:205-15.
30. Carroll C, Patterson M, Wood S, Booth A, Rick J, Balain S. A conceptual framework for implementation fidelity. *Implement Sci* 2007; 2:40.
31. National Breast Cancer Centre. Multidisciplinary care in Australia: a national demonstration project in breast cancer. Camperdown, New South Wales. Available at: https://canceraustralia.gov.au/sites/default/files/publications/mds-multidisciplinary-care-mdc-in-australia-a-national-demonstration-project-in-breast-cancer-summary_504af02cceb4.pdf. Accessed: March 10, 2018.
32. Gorin SS, Haggstrom D, Han PK, Fairfield KM, Krebs P, Clauser SB. Cancer care coordination: a systematic review and meta-analysis of over 30 years of empirical studies. *Ann Behav Med* 2017; 51:532-46.
33. Sabesan S. Specialist cancer care through telehealth models. *J Rural Health* 2015; 23:19-23.
34. Séroussi B, Bouaud J, Gligorov J, Uzan S. Supporting multidisciplinary staff meetings for guideline-based breast cancer management: a study with OncoDoc2. *AMIA Annu Symp Proc* 2007; 2007:656-60.

Implementation of MDT Care for MBC

Supplemental Figure 1 Participant Flow Diagram



Abbreviations: BCN = breast care nurse; LTFU = lost to follow-up; MDT = multidisciplinary team; PRO = patient-reported outcomes.