Contralateral prophylactic mastectomy (CPM): A systematic review of patient reported factors and psychological predictors influencing choice and satisfaction

Brittany Ager, Phyllis Butow, Jesse Jansen, Kelly-Anne Phillips, David Porter

A School of Psychology, The University of Sydney, Australia
B Centre for Medical Psychology and Evidence Based Decision-Making, The University of Sydney, Australia
C Psycho-Oncology Co-operative Research Group (PoCoG), The University of Sydney, Australia
D Sydney Medical School, The University of Sydney, Australia
E Division of Cancer Medicine, Peter MacCallum Cancer Centre, Victoria, Australia
F Sir Peter MacCallum Department of Oncology, The University of Melbourne, Victoria, Australia
G Dept of Medical Oncology, Auckland Hospital, Auckland, New Zealand
H Faculty of Medical and Health Sciences, The University of Auckland, New Zealand

Objective: Conduct a systematic review of quantitative and qualitative studies exploring patient reported factors and psychological variables in influencing the decision to have contralateral prophylactic mastectomy (CPM), and satisfaction with CPM, in women with early stage breast cancer.

Methods: Studies were identified via databases: Medline, CINAHL, Embase and PsycINFO. Data were extracted by one author and crosschecked by two additional authors for accuracy. The quality of included articles was assessed using standardised criteria by three authors.

Results: Of the 1346 unique citations identified, 17 were studies that met the inclusion criteria. Studies included were primarily cross-sectional and retrospective. No study utilised a theoretical framework to guide research and few studies considered psychological predictors of CPM. Fear of breast cancer was the most commonly cited reason for CPM, followed by cosmetic reasons such as desire for symmetry. Overall, women appeared satisfied with CPM, however, adverse/diminished body image, poor cosmetic result, complications, diminished sense of sexuality, emotional issues and perceived lack of education regarding alternative surveillance/CPM efficacy were cited as reasons for dissatisfaction.

Conclusion: Current literature has begun to identify patient-reported reasons for CPM; however, the relative importance of different factors and how these factors relate to the process underlying the decision to have CPM are unknown. Of women who considered CPM, limited information is available regarding differences between those who proceed with or ultimately decline CPM.

Introduction

Breast cancer (BC) is the most common cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012 [1]. This represents about 12% of all new cancer cases and 25% of all cancers in women [1].

Women with a history of BC are at increased risk of developing future BC including contralateral breast cancer (CBC). Risk of CBC depends on a range of genetic factors, family history, and possibly characteristics of the primary cancer (lobular histology, multicentricity). In a summary of recent studies, Portschy and Tuttle [2] reported an annual CBC risk of 0.4% among BRCA1/2-negative women with estrogen receptor (ER) positive BC taking hormone therapy, and 0.5% among those with ER negative BC, although a lower annual rate of 0.19% has been reported for Australian low-risk...
warmer, risk of metastases has been estimated to be 26 times greater than CBC, although metastatic risk for any given woman is highly variable, depending on the stage and phenotype of her breast cancer [4]. Five year survival rates after CBC are equivalent to that after primary breast cancer (88–98% depending on tumour size).

Treatments commonly offered at the time of first breast cancer diagnosis to reduce risk of metastases (endocrine therapy and chemotherapy) also reduce risk of CBC. The most effective option for reducing risk of CBC, however, is contralateral prophylactic mastectomy (CPM), the surgical removal of the unaffected breast. CPM reduces risk of CBC by 90–95% [5,8]. Nonetheless, due to the low base-rate of CBC, the risk-reduction offered from CPM is relatively low in women without BRCA1/2 mutations or a strong family history. Furthermore, CPM does not reduce risk of metastases [7,8].

CPM can also incur significant costs and harms. Complications occur in 15–20% of bilateral mastectomies with reconstruction, and in half these cases, complications occur in the contralateral breast [9]. Complications may significantly delay adjuvant therapy thus potentially increasing risk of metastatic disease [9]. Other negative CPM outcomes include perceived poor cosmetic results, negative impacts on sexuality, femininity and body image, and depression [10–12]. Thus the Society of Surgical Oncology (USA) recommends CPM only for women with clinical indications for high risk of future BC [13].

For women where CPM is not clinically indicated, the decision to have CPM is considered a preference-sensitive decision [14] and women are required to weigh up the potential harms and benefits of the procedure. Despite the relatively small benefits of CPM for women at low-risk of CBC, rates of CPM have been dramatically increasing [15]. Results from a recent study in the USA indicated that 2% of BC patients elected CPM in 1998 compared to over 12% in 2011, with a greater increase (30%) observed in women under 40 years [16].

As a result of increasing rates of CPM, in addition to the patient-preference nature of the decision, researchers have identified a need to isolate factors influencing the decision to have CPM, especially for women where there are limited or no clinical indications for the procedure. Women with a high risk of developing breast cancer (who have not been diagnosed with cancer), may consider bilateral prophylactic bilateral mastectomy (BPM). Although this might be considered to be a similar decision to CPM, as both procedures aim to reduce risk and are based on patient preferences, women considering BPM have not had cancer nor surgery to remove one breast, therefore there are likely differences in predictors and preferences.

A recent systematic review of CPM decision-making, which included articles published before 2011, concluded that studies of factors influencing the decision to have CPM were primarily of retrospective data from large databases, and thus represented CPM population trends rather than identifying factors influencing decision-making at the individual level [17]. Subsequent research began to ask women about factors influencing their decision regarding CPM. Whilst recommendations for decisional support in this area have been made [18], limited evidence is available regarding patient reported factors influencing this decision. The aim of this systematic review is to identify patient-reported and/or psychological factors influencing the decision to have CPM and/or satisfaction with CPM in the current literature, to guide future interventions aimed at supporting women in making an informed decision about CPM.

Method

Search strategy

A systematic search of relevant databases including MEDLINE, PsycINFO, CINAHL and Embase was conducted. An eligibility checklist was developed (Table 1) to assess articles for inclusion. The list of search terms is presented in Table 2 in the appendix.

Information extraction and quality assessment

Decisions regarding selection were made by one author (BA) and verified by two co-authors (PB and JJ). A data extraction table was used to summarise variables such as type of participants, study design, methods, measures and themes/outcomes. The QualSyst tool was used to assess document criteria as it provides guidelines for a range of study designs, including qualitative and quantitative research [19]. The QualSyst tool includes 14 criterion for quantitative studies (objective, design, subjection selection, subject characteristics, outcome measures, sample size, analytic methods, estimate of variance, controlled for confounding, results, conclusion) and 10 criterion for qualitative studies (objective, design, context, theoretical framework, sampling, data collection, analysis, verification, conclusions and reflexivity). Three criteria related to interventional studies were excluded from quantitative ratings, as they were considered irrelevant to the included articles. Articles were independently assessed by BA, 8 articles crosschecked with PB and 9 articles crosschecked with JJ. Possible scores for each criteria were 0 – no, 1 – partial or 2 – yes. Disagreement was defined as the proportion of items where authors did not reach the same score. Percentage of agreement between BA/PB and BA/JJ according to criteria is presented in Table 3 and calculated by number of agreements in observations/number of observations. Initial inter-rater reliability was moderate (Kappa = 0.6–0.8) [20] between BA/PB and BA/JJ. Discrepancies were discussed and reviewed until consensus on the ratings had been reached. Quality of evidence was ranked according to the following cut-offs: high (>80), moderate (70–80), adequate (50–70) and low (<50) used in previous research [21].

Results

The search strategy yielded 1346 unique citations and based on their title and/or abstract 181 full-texts were selected for review (Fig. 1). Of these, 17 articles met the inclusion criteria. Examination of selected studies revealed three key areas used to guide organisation of review findings, including: (i) patient reported factors influencing the decision to have CPM (Table 4) (ii) psychological factors predicting the decision to have CPM (Table 5) and (iii) patient reported factors influencing satisfaction with CPM (Table 6) (see Appendices for tables).

(i) Patient reported factors influencing the decision to have CPM

Characteristics of included studies

Eight studies [10,11,22–27] explicitly explored patient reported factors influencing the decision to have CPM. Quality ratings ranged from 60% [11] to 100% [26] including three studies of high standard [10,23,26], three studies of moderate standard [22,25,27] and two studies considered adequate [11,24]. Two studies [22,23] employed a qualitative approach and the remaining 6 studies [10,11,24–27] implemented quantitative analyses.

In order to ascertain reasons for CPM, 5 studies [10,24–27] presented participants with lists of reasons for CPM and 2 studies included open ended questions in an interview format [23] or routine psychological assessment [22]. The format of questions was unclear in one study [11]. Only 1 study [22] explored views of women prior to having surgery. The remaining studies employed...
reported in the remaining 3 studies [23–25]. The time frame since CPM was not reported in 5 studies that reported specific time periods since the procedure [10,11,22,26,27]. The time frame since CPM was not reported in the remaining 3 studies [23–25].

Reasons for CPM

Fear

Concern about future breast cancer (conceptualised as fear or worry) was the most commonly reported reason for the choice of CPM across studies, reported in all 8 studies [10,11,22–27]. When reflecting on their decision, women reported that they anticipated that CPM would offer ‘peace of mind’ or relief from concern about future breast cancer. In 5 studies [22–25,27] fear of future BC was reported to be the most influential factor in deciding to have CPM.

Vulnerability

Two qualitative studies [22,23] revealed that despite knowledge of the low risk of CBC, concern about future breast cancer prevailed. For some women, any risk was considered ‘intolerable’ [22] as they reported feeling overwhelmingly vulnerable to future cancer. It appeared that for some women at low risk of CBC, the existence of any risk (not the degree of risk), guided decisions about CPM. In addition, there was a sense for some women that recurrence felt ‘inevitable’ [23]. One quantitative study reported that 81% of women rated that ‘feeling’ at increased risk for CBC was ‘extremely important’ when considering CPM [26].

Survival

In two studies [24,26] women indicated that ‘extending life’ or ‘improved survival’ were reasons for CPM. In another study it was suggested that women felt as if there was an inevitable progression from CBC to metastases to death [23].

Cosmesis

The desire for breast symmetry was identified as an important factor in 5 studies [11,22,23,25,26].

Influence of others

Five studies [11,23,25–27] considered whether important others (family, friends, spouse, physician) influenced the decision to have CPM.

○ Physician.

Healthcare provider encouragement was an influential factor for 18% of women in one study [25] and physician advice regarding high-risk of CBC was reported as a reason for CPM by 30% of women in another study [11]. The desire to follow physician recommendation was considered ‘very important’ by 22% in a study that rated the importance of different factors influencing the decision to have CPM [26]. Furthermore, one study [22] indicated that surgeons did not try to dissuade patients, but rather, referred them to a psychologist to help them make a decision.

Discussion about CPM appeared to be patient-initiated for the majority of non-BRCA carriers in one recent study [26]. This is in comparison to a study from 1999 where 72% of women reported that the physician initiated the conversation about CPM, despite only 2/296 women reporting a known mutation in the BRCA genes [11]. This suggests that who initiates the discussion of CPM has changed over time.

○ Family and Friends.

The number of participants endorsing the influence of family and friends on their decision to have CPM was varied. In one study [27] 64.1% said friends/family influenced their decision to have CPM. When asked whether encouragement from family or friends influenced their decision, only 12% reported this as a contributing

Table 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Inclusion criteria</th>
<th>Exclusion criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants</td>
<td>Women with a diagnosis of early stage (or early stage invasive, or early) breast cancer diagnosis (stage I or II)</td>
<td>Women without a breast cancer diagnosis</td>
</tr>
<tr>
<td></td>
<td>Women considering CPM in the future or women who have previously undergone CPM (also referred to as: bilateral mastectomy, contralateral risk-reducing mastectomy)</td>
<td>Women with stage III or IV breast cancer (not early stage)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Women with a diagnosis of breast cancer in a high risk category (e.g. known BRCA mutation)</td>
</tr>
<tr>
<td>Study design</td>
<td>Original research articles from peer reviewed journals, including:</td>
<td>Women who have had a bilateral mastectomy to treat bilateral BC/CBC</td>
</tr>
<tr>
<td></td>
<td>- Patient preference studies (self-reported)</td>
<td>Review papers</td>
</tr>
<tr>
<td></td>
<td>- Quantitative and qualitative studies (interviews, focus groups, surveys)</td>
<td>Editors</td>
</tr>
<tr>
<td></td>
<td>- Retrospective and prospective studies</td>
<td>Case reports</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Papers published in languages other than English</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not patient reported</td>
</tr>
</tbody>
</table>

Fig. 1. Flow diagram of literature search.
factor [25]. In another study that rated the level of importance of each factor, advice from family and friends was considered ‘very important’ by 6% of the sample [26]. Results from a qualitative study suggested that the most valued sources of information were family and friends who had experienced cancer [23].

○ Spouse.

Only one study [27] explicitly listed spouse/partner as a response option for factors influencing CPM to which 68% reported that positive opinions for surgery from their spouse/partner influenced their decision to have surgery, with 49.1% reporting that their spouse/partner influenced the final decision.

(ii) Psychological factors influencing choice of CPM

Characteristics of included studies

Four studies explicitly explored psychological factors influencing choice of CPM [28–31]. Psychological factors considered included perception of risk [28,30], distress/anxiety [28,30], neuroticism [30], breast cancer knowledge [30], causal beliefs about cancer [31] and worry about BC recurrence [29]. Three studies were cross-sectional [28,30,31]; one study [30] surveyed women within 6 weeks of a BC diagnosis whilst two of the studies [28,31] surveyed women after surgery. Only one study [29] employed a longitudinal approach. Quality ratings ranged from 55% [31] to 100% [29] with two studies [29,30] considered high standard and two studies [28,31] of an adequate standard.

Two studies [30,31] included validated measures to assess psychological variables. One study [31] included a single item from the Brief Illness Perception Questionnaire [32] to assess causal beliefs of cancer. Validated measures in another study [30] included the Impacts of Events Scale [33] to measure cancer specific distress, the Brief Symptom Inventory [34] to measure general distress, Neuroticism scale of the NEO-FFI personality inventory [35] and the Decisional Conflict Scale [36].

Psychological predictors of CPM

Preferences for CPM were associated with higher perceived risk of BC [30], higher neuroticism [30] and beliefs that cancer was caused by hormonal/genetic factors [31]. Surgical recommendation was associated with less decisional conflict and stronger preference for bilateral mastectomy [30].

CPM vs. No CPM

Two studies [28,29] compared women who had CPM to women who did not have CPM. Specifically, one study [28] compared perceptions of risk, psychological distress and estimates of an average woman’s BC risk between those who had breast conserving surgery/unilateral mastectomy and women who had bilateral mastectomy/CPM. No differences were found in these variables between surgery types. However a longitudinal study [29] which included women who had ‘strongly considered’ CPM and compared women who eventually did and did not have CPM over a period of approximately 3 years, found that women who had CPM were more often ‘very worried’ about recurrence compared to women who did not have CPM.

(iii) Patient reported factors influencing satisfaction with CPM.

Characteristics of included studies

Ten studies [10,11,25–27,37–41] reported levels of satisfaction with CPM: five of these studies [10,11,25–27] reported levels of satisfaction, in addition to reasons for CPM, and are also included in section (i). Seven studies [11,25–27,38–40] were quantitative and 3 studies [10,37,41] combined quantitative and qualitative approaches. Five studies [10,26,38–40] were assessed to be of a high standard, three studies [25,27,41] considered of moderate standard and 2 studies [11,37] of adequate standard.

Levels of satisfaction

Overall, the majority of women reported that they were satisfied with CPM. In 8 studies [10,11,25–27,38–40], over 85% of the samples within each study reported that they ‘felt good’ [25], had few regrets [11] or were satisfied [10,27,38–41] with their decision to have CPM. In one longitudinal study, 90% of women reported being ‘satisfied’ or ‘very satisfied’ with the decision a mean of 20 years after CPM and only 16% of the sample changed their level of satisfaction throughout the 10-year follow-up [38]. In the six studies [10,25–27,37,38] that explicitly asked women if they would choose CPM again, between 83% and 96% of the sample stated that they would make the same decision.

Reasons for satisfaction

Three studies [10,37,38] considered factors influencing satisfaction with CPM. Peace of mind [10,38], satisfaction with cosmetic results [10] and body image [37,38], absence of problems with the procedure [10], risk reduction [10] and a sense of ‘prevailing over cancer’ [37] were cited as factors influencing satisfaction with CPM.

Reasons for dissatisfaction

Reasons for dissatisfaction or regret after CPM included adverse/diminished body image [38], poor cosmetic result [10,11], complications [11,38], diminished sense of sexuality [11] and lack of education regarding alternative surveillance/CPM efficacy [11]. One study [26] considered women’s experiences related to expectations of CPM: 42% reported that their sense of sexuality was worse than expected, and one third reported that their appearance was worse than expected. Less contentment with quality of life (QoL) was associated with poor/fair general health perception, dissatisfaction with appearance when dressed, self-consciousness about appearance and avoiding thoughts about BC in one study [39]. In another study [37] that included closed and open ended questions, 85% reported that they were ‘satisfied’ or ‘very satisfied’ with CPM on a closed-question item, yet comments in the open-ended responses suggested that many women continued to experience some degree of dissatisfaction. Negative responses were related to body image, sexuality, and emotional concerns.

Information and decision-making roles

42% of women who had CPM were satisfied with the information they were given prior to the procedure: informational needs included details about recurrence, benefits of lumpectomy vs. mastectomy, details specific to individual circumstances, more presurgery information on prophylactic surgery, need for mammography, resources for purchasing bras and healthy eating [41]. In one study [40], women who reported active roles in the decision making process were twice as likely to be satisfied with their decision 6 months after CPM compared to women who shared decision making-responsibility with their medical doctor.
Discussion

Studies reviewed explored patient reported and psychological factors influencing the decision to have, or satisfaction with, CPM, primarily in women who had previously made the decision to have CPM years prior. We focused on women with low-risk of CBC for whom there were no clinical indications for CPM, in order to understand potential reasons for the increasing rate of CPM over recent years.

The included studies were primarily descriptive and included cross-sectional and retrospective designs. In these studies participants were asked to reflect on factors influencing their decision to have CPM from immediately after surgery up to 10 years after they had made the decision. The majority of studies presented women with a list of potential reasons for CPM, with few studies asking open-ended questions or rating the importance of different factors. Importantly, no studies employed a theoretical approach to consider the decision-making process. The inclusion of theoretical frameworks in future studies will further assist in identifying the relationship between individual factors influencing the decision to have CPM and form the basis for interventions.

Reasons for CPM

Fear or worry about future BC emerged as the primary factor influencing the decision to have CPM. Although fear was the most frequently cited reason, mechanisms by which fear influences choice of CPM remain unclear. In two qualitative studies [22,23], women appeared to acknowledge their risk of BC was low, however, described a sense of overwhelming vulnerability to cancer in general, where any risk was considered intolerable. Consequently for some individuals, receiving information about their cancer risk may not address this overwhelming feeling of vulnerability. Results from a recent systematic review concluded that the majority of patients with early-stage breast cancer judged small benefits (median 0.1–10% increase in survival rate) sufficient to consider adjuvant systemic therapy worthwhile [42]. The current review suggests that some women may also consider the relatively low risk-reduction offered by CPM worthwhile, and it has also been reported that women commonly over-estimate their BC risk and survival benefit from CPM [43]. Furthermore, in one study [23] women did not understand that if identified early, BC can be treated curatively [7,44], and rather perceived an inevitable progression from breast cancer in one breast to CBC to metastases to death, and this may be one reason for the fear of BC. Providing information about treatment options in the instance of BC and differences between CBC and metastasis may address some of the fear around CBC.

Following fear of BC, cosmetic reasons (e.g. symmetry) were cited as important when considering CPM. About 10–30% of women choose CPM for pragmatic reasons, to maintain chest balance and avoid “lopsidedness” after unilateral mastectomy [13,27]. Women may also seek balanced reconstructions, with women undergoing unilateral mastectomy three times more likely to simultaneously undergo CPM, if followed by double-reconstruction [39]. However, while reconstruction may improve body image, it also poses greater risks (higher re-operation rates and regret) than unilateral mastectomy alone, partly due to unrealistic cosmetic expectations [40].

The influence of others on the decision to have CPM is unclear in the literature. Although some studies considered whether clinician advice/encouragement influenced the decision to have CPM [11,25,26], it is unclear whether or not many women received a recommendation to have CPM from their physician. In recent years, the decision to have CPM for low-risk women has been considered patient-initiated [22] with the majority of women initiating the discussion with their physician rather than the other way around [26]. Thus the extent to which physician recommendation influences the decision to have CPM is unknown. Encouragement or advice from friends and family did not appear to be influential for the majority of women. However, only one study [27] considered the influence of the spouse specifically. While body image and sexuality were important factors influencing satisfaction with CPM, the impact of intimate relationships on the decision to have CPM is absent from the literature. Results from a qualitative study suggested that the most valued sources of information were family and friends who had experienced cancer [23]. Previous research has suggested that the experience of a family member who developed BC despite maintaining a healthy lifestyle caused other family members to doubt they could manage their risk of BC [45]. The impact of the cancer experience of family and friends on the decision to have CPM is unknown. Future research ought to consider the impact of the cancer experience of others on fear and feelings of vulnerability to cancer.

Psychological factors

Psychological factors predicting choice of CPM included perception of risk [28,30], distress/anxiety [28,30], neuroticism [30], breast cancer knowledge [30], causal beliefs about cancer [31] and worry about BC recurrence [29]. However, only perception of risk was considered repeatedly across studies; the remaining factors were explored within single studies, thus the consistency of findings is unknown. Only one study [31] considered knowledge, however this measure included questions about breast cancer and BRCA mutations in general, not questions specific to potential risks or benefits of CPM. Furthermore, only one study employed validated measures to assess psychological factors. Other psychological factors ought to be considered, such as anticipated regret of not having CPM. Higher anticipated regret, when presented with the scenario of rejecting a prophylactic mastectomy and later being diagnosed with BC, has been associated with a stronger preference for prophylactic mastectomy in women at-risk for BC [46].

Satisfaction with CPM

The majority of participants reported that they were satisfied with CPM, with few expressing regrets about their decision. However, women were often asked about satisfaction years after the procedure. These findings are consistent with cognitive dissonance theory, or the tendency for an individual to agree with prior decisions by reducing inconsistencies between prior and present views of the decision [47]. Few studies explicitly explored reasons for satisfaction or dissatisfaction; however, the most commonly cited factors were related to ‘peace of mind’ and body image. Satisfaction was often measured by asking participants whether they would choose CPM again or a closed-question about whether or not they were satisfied with CPM without consideration of why an individual was/wasn’t satisfied. Future studies ought to consider different factors that influence satisfaction before and after CPM, given that CPM may have costs as well as benefits. In addition, further research should consider the satisfaction of women who develop metastatic breast cancer following CPM, as well as the views of long term survivors, as satisfaction may differ between these groups.
Limitations and future research

A limitation of the current study is that initial screening of titles and abstracts was completed by one author. However, any ambiguity was checked with the senior authors during this process, thus the authors are confident that no relevant study was incorrectly excluded.

The current review has revealed a paucity of research on patient reported factors and psychological predictors of the decision to undergo CPM. In particular, psychological factors influencing choice prior to the decision of CPM are poorly understood. Women appear to be satisfied with the procedure, however, factors influencing satisfaction and regret, and changes in satisfaction over time, remain unclear.

The current literature includes views of a non-random selection of a subset of the population that had CPM, most of whom have currently not relapsed. This group of primarily longer term survivors is therefore somewhat biased; these women may feel that their decision for CPM has been vindicated despite the negative consequences they have endured.

Future research ought also to compare those who have/do not have CPM. Whilst current literature has begun attempts to identify patient-reported reasons for CPM, the relative importance of different factors and underlying mechanisms of the decision-making process are unknown. Exploring psychological and patient-reported factors over time, with longitudinal study designs, would allow for the consideration of the relative importance of different factors throughout the decision-making process. Further studies should also consider the influence of others (such as spouse and physician), in addition to the impact of the cancer experience of others. In order to aid the development of future interventions, future studies ought to include a theoretical framework to understand health decisions in addition to validated measures to assess psychological constructs that may influence decisions. One study [48] has considered Protection Motivation Theory to predict intentions to have CPM using a hypothetical scenario after previous research has demonstrated its utility in predicting intentions for genetic testing [49] and chemoprevention [49] for breast cancer.

Clinical implications

The current review suggests that clinicians should assess individual expectations of relief from fear of BC and cosmetic results offered by CPM, as these two factors appeared to be the most commonly cited reasons from the limited literature. Clinicians should also be aware of the impact of perceived vulnerability to cancer when discussing risk estimates for women; a woman informed of her low risk of CBC may have difficulty tolerating any level of risk. This review highlights the need for future interventions to assist women with low risk of breast cancer to feel more comfortable with low risks, and to make an informed decision about CPM consistent with their preferences and values.

Conflict of interest statement

None declared.

Acknowledgements

This project is funded by the Australian and New Zealand Breast Cancer Trials Group (ANZBCTG). KAP is an Australian National Breast Cancer Foundation Fellow. PB is an NHMRC Senior Principle Research Fellow.

Appendices

Abbreviations

BC  breast cancer  
BCS  breast-conserving surgery  
BM  bilateral mastectomy  
CBC  contralateral breast cancer  
CPM  contralateral prophylactic mastectomy  
DCIS  ductal carcinoma in situ  
UM  unilateral mastectomy

Table 2

Search terms according to database.

<table>
<thead>
<tr>
<th>MEDLINE</th>
<th>PsycINFO</th>
<th>EMBASE</th>
<th>CINAHL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double mastectomy OR bilateral mastectomy OR prophylactic mastectomy OR preventive mastectomy</td>
<td>AND Breast Neoplasms OR early stage breast cancer</td>
<td>AND breast cancer AND double mastectomy OR bilateral mastectomy OR preventive mastectomy</td>
<td>AND Breast Neoplasms AND Breast cancer AND double mastectomy OR bilateral mastectomy OR preventive mastectomy</td>
</tr>
<tr>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
</tr>
</tbody>
</table>

Table 2

Search terms according to database.

<table>
<thead>
<tr>
<th>MEDLINE</th>
<th>PsycINFO</th>
<th>EMBASE</th>
<th>CINAHL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double mastectomy OR bilateral mastectomy OR prophylactic mastectomy OR preventive mastectomy</td>
<td>AND Breast Neoplasms OR early stage breast cancer</td>
<td>AND breast cancer AND double mastectomy OR bilateral mastectomy OR preventive mastectomy</td>
<td>AND Breast Neoplasms AND Breast cancer AND double mastectomy OR bilateral mastectomy OR preventive mastectomy</td>
</tr>
<tr>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
<td>Patient Satisfaction OR Decision Making OR decision or decid* OR attitude* OR Health Knowledge OR patient preferences</td>
</tr>
</tbody>
</table>
Table 3
Percentage of agreement* between raters according to Qualysyst criteria for initial ratings.

<table>
<thead>
<tr>
<th>Question description</th>
<th>Design context description</th>
<th>Theoretical/empirical connection</th>
<th>Sampling strategy</th>
<th>Subject characteristics</th>
<th>Data collection methods</th>
<th>Means of assessment reported</th>
<th>Sample size</th>
<th>Data analysis</th>
<th>Estimate of variance reported</th>
<th>Controlled for confounding</th>
<th>Results reported in sufficient detail</th>
<th>Verification procedure to establish credibility</th>
<th>Conclusions supported by results</th>
<th>Reflexivity of the account</th>
</tr>
</thead>
<tbody>
<tr>
<td>BA/PB 100%</td>
<td>88.9%</td>
<td>75%</td>
<td>75%</td>
<td>88.9%</td>
<td>85.7%</td>
<td>66.7%</td>
<td>42.9%</td>
<td>100%</td>
<td>66.7%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>66.7%</td>
</tr>
<tr>
<td>BA/JJ 66.7%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>66.7%</td>
<td>88.9%</td>
<td>100%</td>
<td>77.8%</td>
<td>100%</td>
<td>77.8%</td>
<td>87.5%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>55.6%</td>
</tr>
</tbody>
</table>

* Calculated by number of the same scores/total number of observed scores.

Table 4
Patient reported factors influencing the decision to have CPM.

<table>
<thead>
<tr>
<th>First author Year</th>
<th>Country</th>
<th>Quality rating</th>
<th>Design and methods</th>
<th>Sample and setting</th>
<th>Measures specific to results: (+)/(−) = validated/un-validated</th>
<th>Results</th>
<th>Reasons for CPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Covelli 2015</td>
<td>Canada</td>
<td>85%[a,b,c,d,p]</td>
<td>Approach: qualitative. Design: cross-sectional, retrospective. Method: interviews (in person).</td>
<td>Sample: N = 29 Women with stage I or II BC who had UM or UM + CPM. Response rate: 72.5% Setting: 5 surgical centres (3 academic and 2 community).</td>
<td>Interview schedule based on grounded theory and systematic literature review.</td>
<td>Reasons for CPM: - fear around CBC (sense that recurrence was “inevitable”) - breast symmetry - ‘Taking control of cancer’ emerged as the dominant theme: surgery was exerting ‘greater control’ over cancer. Reasons for mastectomy (including UM and CPM) over BCS: - fear of cancer recurrence - increased survival Most common reason for CPM: “preventative was unaware of genetic abnormality”.</td>
<td></td>
</tr>
<tr>
<td>Fisher 2012</td>
<td>USA</td>
<td>65%[a,b,c,d,l,o]</td>
<td>Approach: quantitative. Design: cross-sectional, retrospective. Method: self-administered survey (in person).</td>
<td>Sample: N = 310 Women with stage 0, I or II BC (n = 256) or stage III, IV BC (n = 15) who had UM or BM. Response rate: N/A Setting: university setting.</td>
<td>- Surgical choices - Rationale for surgical choices</td>
<td>(continued on next page)</td>
<td></td>
</tr>
</tbody>
</table>
| First author  | Year | Country | Quality rating | Design and methods | Sample and setting | Measures specific to results: 
\( (+) / (-) = \text{validated/un-validated} \) | Results |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rosenberg</td>
<td>2013</td>
<td>USA</td>
<td>100%</td>
<td>Approach: quantitative. Design: cross-sectional, retrospective. Method: self-administered survey (mailed).</td>
<td>Sample: N = 123 Women with a diagnosis of BC who had BM. BRCA carriers (n = 34) and non-carriers, (n = 89).</td>
<td>-Factors influencing decision to have CPM: input from others and value of input, insurance coverage, religious beliefs, fear of recurrence or a new BC, availability of reconstruction</td>
<td>Reasons for CPM (considered ‘very important’ or ‘extremely important’ by non BRCA carriers): - desire to decrease risk for BC - peace of mind - desire to improve survival or extend life - feeling at increased risk for BC - desire to prevent breast cancer from spreading to other body parts - worry about ineffectiveness of screening - breast symmetry - family history of BC - desire to follow physician recommendation - desire to make breasts look better - advice from family or friends</td>
</tr>
<tr>
<td>Soran</td>
<td>2015</td>
<td>USA</td>
<td>70%</td>
<td>Approach: quantitative. Design: cross-sectional, retrospective. Method: self-administered survey (mailed).</td>
<td>Sample: women with a BC diagnosis who had undergone CPM minimum 1 year prior.</td>
<td>- Factors influencing decision to have CPM: input from others and value of input, insurance coverage, religious beliefs, fear of recurrence or a new BC, availability of reconstruction</td>
<td>Reasons for CPM: - fear of recurrence - covered by insurance - positive opinion from partner - in-situ diagnosis - positive opinion from friends/family - availability of reconstruction - having a spouse</td>
</tr>
</tbody>
</table>

- BM: Breast Mastectomy
- CPM: Contralateral Preventive Mastectomy
- CBC: Contralateral Breast Cancer
- YWS: Young Women’s Breast Cancer Study
**Approach:** quantitative and qualitative.
**Design:** cross-sectional, retrospective.
**Method:** self-administered survey (mailed).

**Sample:** N = 269 Women with stage 0, I or II BC who had CPM between 1960 and 1993.
**Response rate:** 94%
**Setting:** Mayo Clinic Rochester.

- Reasons for CPM
  - Choice to have CPM again
- Encouragement from doctor
- Cancer in the other breast
- Physician's advice
- Family history

---

**Table 5**

<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Country</th>
<th>Quality rating</th>
<th>Design and methods</th>
<th>Sample and setting</th>
<th>Measures specific to results: (+)/(-)</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbott</td>
<td>2011</td>
<td>USA</td>
<td>68%</td>
<td>Approach: quantitative.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Design: cross-sectional.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Method: self-administered survey.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sample: N = 74 Women over 18 with DCIS or stage I or II BC who had BM/CPM or BCS/UM.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Response rate: N/A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Setting: university hospital and private suburban hospital.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Perception of CBC risk (classified as high vs. low)
- Psychological distress as a result of BC

---

Hawley 2014 USA 100%

**Approach:** quantitative. **Design:** longitudinal, Time 1: m = 9 months and Time 2: m = 4 years after identification via rapid case ascertainment. **Method:** self-administered survey. **Sample:** N = 1447 Women with a diagnosis of primary DCIS or invasive BC (stage I–IIa), 7.9% (n = 81) received CPM. **Response rate:** Time 1: 73% Time 2: 68%

- Extent CPM was considered (not at all, a little, somewhat, quite a bit, very strongly)
- Worry about occurrence: how important were the following in making decision to have CPM (not at all to very important):
  a. keeping them from worrying about cancer coming back
  b. reducing the cancer from coming back

- Surgery (BM/CPM vs. BCS/UM): no differences in perception of risk or psychological distress or estimate of average women's risk of BC
- Perception of BC risk (high vs. low): high risk were more likely to report difficulty sleeping, nervousness or anxiety, difficulty meeting commitments and worry that a close relative may develop cancer.
- Entire sample: women overestimated risk of developing BC in contralateral breast (mean 10 year risk of CBC was estimated to be 31.4%)

**Reasons for CPM:**
- Preventing BC
- 78.1% indicated worry about recurrence was “very important” at the time of making decision

**Predictors of CPM:**
- 251 women 'strongly considered' CPM, 81 women received CPM
- Women who received CPM were more often white, highly educated and very worried about recurrence compared to women who strongly considered and did not receive CPM

(continued on next page)
<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Country</th>
<th>Quality rating</th>
<th>Design and methods</th>
<th>Sample and setting</th>
<th>Measures specific to results: $(+)/(−) = \text{validated/un-validated}$</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>King</td>
<td>2013</td>
<td>USA</td>
<td>86$^{[1]}$</td>
<td>Approach: quantitative. Design: cross-sectional. Method: survey and interview.</td>
<td>Sample: $N = 284$ Women aged 18–75 within 6 weeks of BC diagnosis.</td>
<td>- Surgical recommendation - Perceived risk of developing cancer $(+)$ - Impact of Events Scale (cancer specific distress) $(+)$ - Brief Symptom Inventory (general distress) $(+)$ - Knowledge $(+)$ - Neuroticism scale of the NEO-FFI personality inventory</td>
<td>Stronger preference for BM was associated with:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Response rate: 53.1% Setting: breast surgery clinics, data collected as part of a larger RCT. Groups: Exclusion: bilateral, inflammatory or stage IV BC, metastatic cancer, BRCA counselling.</td>
<td>- Knowledge $(+)$ - Decisional Conflict - surgical preferences</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sample size</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Setting: breast surgery clinics, data collected as part of a larger RCT. Groups: Exclusion: bilateral, inflammatory or stage IV BC, metastatic cancer, BRCA counselling.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Petrie</td>
<td>2014</td>
<td>USA</td>
<td>55$^{[2,3,4,5,6,7,8,9,10,11]}$</td>
<td>Approach: qualitative. Design: cross-sectional. Method: self-administered survey (online).</td>
<td>Sample: $N = 2269$ Women with a BC diagnosis who had surgery and were from a breast cancer research registry.</td>
<td>- Causal beliefs about cancer: &quot;what do you think was the most important factor that caused your BC?&quot;</td>
<td>- BM was significantly more common among women who reported hormonal factors/genetics as causing their cancer.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Response rate: N/A Setting: Army of Women’s breast cancer research registry.</td>
<td>from the $(+)$ Brief Illness Perception Questionnaire</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Majority of sample reported a causal belief for cancer (18.5% said that they “did not know”)</td>
</tr>
</tbody>
</table>

Score of 1 or 0 on the Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004) (Item number from quantitative [QN] and qualitative [QL] studies quality rating checklist).

$^{[1]}$Question description [QN 1; QL 1].

$^{[2]}$Study design [QN 2; QL 2].

$^{[3]}$Study context description [QL 3].

$^{[4]}$Theoretical/empirical connection [QL 4].

$^{[5]}$Sampling strategy [QN 3; QL 5].

$^{[6]}$Data collection methods [QN 5, 6, 7; QL 6].

$^{[7]}$Means of assessment reported [QN 8].

$^{[8]}$Sample size [QN 9].

$^{[9]}$Data analysis [QN 10; QL 7].

$^{[10]}$Controlled for confounding [QN 12].

$^{[11]}$Results reported in sufficient detail [QN 13].

$^{[12]}$Verification procedure to establish credibility [QL 8].

$^{[13]}$Conclusions supported by the results [QN 14; QL 9].

$^{[14]}$Reflexivity of the account [QL 10].
### Table 6
Patient reported factors influencing satisfaction with CPM.

<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Country</th>
<th>Quality rating</th>
<th>Design and methods</th>
<th>Sample and setting</th>
<th>Measures specific to results: (+) = validated/un-validated</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altschuler</td>
<td>2008</td>
<td>USA</td>
<td>59%</td>
<td>Approach: quantitative and qualitative. Design: cross-sectional. Method: self-administered survey.</td>
<td>Sample: N = 684 Women aged 18–80 who had experienced prophylactic bilateral (BPM) or contralateral (CPM) mastectomy 3–22 years prior. Response rate: 71% entire survey 48% open ended questions Setting: 6 community based health systems</td>
<td>- Quality of life</td>
<td>Closed questions: twice as many women with BPM made negative comments compared to women with CPM. Equal amount of positive comments by two groups.</td>
</tr>
<tr>
<td>Frost</td>
<td>2011</td>
<td>USA</td>
<td>86%</td>
<td>Approach: quantitative. Design: longitudinal. Time 1: m = 10 years after CPM Time 2: m = 20 years after CPM. Method: self-administered survey.</td>
<td>Sample: N = 269 Women with stage 0, I or II BC who had CPM between 1960 and 1993. Response rate: Time 1: 94% Time 2: 55% Setting: Mayo Clinic Rochester.</td>
<td>Time 1 specific measures: - Satisfaction with CPM - Choice to have CPM again - Overall quality of life - Impact of CPM on self-esteem, body appearance, femininity, sexual relationships, emotional stability Time 2 additional measures: (+) Body Image Scale (+) Medical Outcome Study subscales (health concerns and health distress) (+) Spielberger's trait anxiety scale (+) Revised Life Orientation Test (optimism and pessimism) (+) Decisional Conflict Scale</td>
<td>Open ended questions: coded into positive, negative or disparate. Positive: 4% of participants described &quot;peace of mind&quot; after having CPM and relief from breast cancer worry and anxiety. Negative: twice as many women who received BPM made general dissatisfaction comments compared to women with CPM and these included chronic pain, difficulties related to breast reconstruction (naturalness and surgical complications), emotional upset related to body image and loss of sensation to the breast and impact on sexuality.</td>
</tr>
<tr>
<td>Frost</td>
<td>2005</td>
<td>USA</td>
<td>82%</td>
<td>Approach: quantitative and qualitative. Design: cross-sectional. Method: self-administered survey (mailed).</td>
<td>Sample: N = 269 Women with stage 0, I or II BC who had CPM between 1960 and 1993. Response rate: 94% Setting: Mayo Clinic Rochester.</td>
<td>- Satisfaction with CPM (including open-ended question) - Choice to have CPM again. - Impact of CPM on: self-esteem, body appearance, feelings of femininity, sexual relationships, level of stress and emotional stability. - Perceived risk of BC before and after CPM.</td>
<td>- 90% of women were satisfied or very satisfied with decision a mean of 20 years after CPM. - 16% of women changed level of satisfaction (satisfied, neutral, dissatisfied) between two surveys. - 92% would choose CPM again.</td>
</tr>
</tbody>
</table>

(continued on next page)
<table>
<thead>
<tr>
<th>First author</th>
<th>Year</th>
<th>Country</th>
<th>Quality rating</th>
<th>Design and methods</th>
<th>Sample and setting</th>
<th>Measures specific to results: (+)/(-) = validated/un-validated</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montgomery et al.</td>
<td>1999</td>
<td>USA</td>
<td>60%&lt;sup&gt;e,h,b,j,k,l,m,n&lt;/sup&gt;</td>
<td>Approach: quantitative. Design: cross-sectional. Method: self-administered survey (mailed). Semi-structured telephone interviews for women that said they regretted their decision.</td>
<td>Sample: N = 296 Women who responded to national notices in lay journals who had reported having CPM. Response rate: Responded to notice (n = 1000), established contact (n = 346), completed survey (n = 296) Setting: population based.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soran et al.</td>
<td>2015</td>
<td>USA</td>
<td>70%&lt;sup&gt;h,l&lt;/sup&gt;</td>
<td>Approach: quantitative. Design: retrospective, cross-sectional.</td>
<td>Sample: women with a BC diagnosis who had undergone CPM minimum 1 year prior. Response rate: 86%.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Demographics
- Current quality of life
- Satisfaction with decision
- BC related worry
- Body image
- Sexual satisfaction
- Overall health perception
- “What is one thing you wish you had of known before prophylactic mastectomy?”
- “Is there anything you would like to share with us?”

- Surgical choices
- Rationale for surgical choices
- Satisfaction with outcomes

- Breast cancer worry
- (+) SURE Scale [sure of myself, understanding information, risk-benefit ratio, encouragement]
- Confidence about decision to have CPM
- If women would choose CPM again
- Experience with surgical and QoL outcomes (pain, cosmetic, sense of sexuality, recovery from reconstruction)

- Satisfaction with decision
- Would participant change decision

57%/17% femininity, 70%/7% sexual relationships, 58%/35% stress in life, 65%/23% emotional stability and 57%/26% self-esteem.
- 35% were satisfied with the information they were given prior to the procedure, almost 2/3 wished they had more information (primarily about longevity, appearance and complications of implants).
- 42% of women who received CPM were satisfied with the level of information they received.
- Negative complications of implants included pain and discomfort (n = 22), unnatural/asymmetrical result (n = 15), scarring (n = 10) and numbness (n = 10).
- 22 women wished they had information about negative emotions following mastectomy (no difference between BM or CPM).
- Informational needs reported specifically by women who had CPM included: risk of recurrence, benefits of lumpectomy vs. mastectomy, details specifically to individual circumstances, more pre-surgery information on prophylactic surgery, need for mammography, resources for purchasing bras, suggestions for healthy eating.
- 10/97 women who had CPM agreed with the statement that they would make a different decision [significantly less than patients with UM (n = 33/110)].
- 6% expressed regret: poor cosmetic result (39%), diminished sense of sexuality (22%), lack of education regarding alternative surveillance/CPM efficacy (22%).
- 80% of women were extremely confident in their decision
- 90% would definitely choose CPM if deciding again
- 87% of women reported that they had been extremely or very concerned about being diagnosed with CBC
- non BRCA carriers overestimated risk of CBC without CPM
- 57/89 non BRCA carriers reported that CPM discussion was initiated by themselves
- 97.1% who underwent surgery indicated being happy/satisfied with CPM.
- 96.1% would make the same decision again.
Method: self-administered survey (mailed).
Approach: quantitative.
Design: cross-sectional.
Method: self-administered survey (mailed).

Setting: women registered with the UPMC Cancer registry.
Sample: N = 637
Women 18–80 years with a diagnosis of early stage BC between 1979 and 1999 who were involved in a CPM efficacy study.
Response rate: 72.6%
Groups: CPM vs. no CPM

if marital status changed
- Would patient recommend CPM
- Current contentment with quality of life (QoL): single item from (+) Functional Assessment of Cancer Therapy-Breast Cancer
- Satisfaction with CPM
- Experience of BC thoughts: items 2 and 5 from (+) Revised Impact of Events scale
- Body image
- Sexual satisfaction
- CES-D scale (depression)
- Health perception: single item from (+) Medical Outcomes Study Short Form-36

97.1% would not change decision if marital status differed.
- CPM vs. no CPM: BC concern was reported by half the women who had CPM compared to almost 3/4 of women who did not undergo CPM (no other statistically significant differences reported).
- 76.3% of women who had CPM reported “very much” or “quite a bit” of contentment with their QoL.
- Less contentment with QoL was not associated with CPM.
- 86.5% of women who underwent CPM were satisfied.
- Entire sample: less contentment with QoL was associated with poor/fair general health perception, dissatisfaction with appearance when dressed, self-consciousness about appearance and avoiding thoughts about BC.

Geiger 2006 USA

Score of 1 or 0 on the Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet et al., 2004 [19]) (Item number from quantitative [QN] and qualitative [QL] studies quality rating checklist).

<table>
<thead>
<tr>
<th>Score code</th>
<th>Item description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Question description [QN 1; QL 1].</td>
</tr>
<tr>
<td>b</td>
<td>Study design [QN 2; QL 2].</td>
</tr>
<tr>
<td>c</td>
<td>Study context description [QL 3].</td>
</tr>
<tr>
<td>d</td>
<td>Theoretical/empirical connection [QL 4].</td>
</tr>
<tr>
<td>e</td>
<td>Sampling strategy [QN 3; QL 5].</td>
</tr>
<tr>
<td>f</td>
<td>Subject characteristics reported [QN 4].</td>
</tr>
<tr>
<td>g</td>
<td>Data collection methods [QN 5, 6, 7; QL 6].</td>
</tr>
<tr>
<td>h</td>
<td>Means of assessment reported [QN 8].</td>
</tr>
<tr>
<td>i</td>
<td>Data analysis [QN 10; QL7].</td>
</tr>
<tr>
<td>j</td>
<td>Estimate of variance reported [QN 11].</td>
</tr>
<tr>
<td>k</td>
<td>Controlled for confounding [QN 12].</td>
</tr>
<tr>
<td>m</td>
<td>Results reported in sufficient detail [QN 13].</td>
</tr>
<tr>
<td>n</td>
<td>Verification procedure to establish credibility [QL 8].</td>
</tr>
<tr>
<td>o</td>
<td>Conclusions supported by the results [QN 14; QL 9].</td>
</tr>
<tr>
<td>p</td>
<td>Reflexivity of the account [QL 10].</td>
</tr>
</tbody>
</table>