Patient-Reported Outcomes Associated with Cancer Screening: A Systematic Review

Kim A[1], Chung KC[1], Keir C[1], Patrick D[2]

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Background

- Cancer screening tests are often offered to individuals who are asymptomatic and 'healthy',[1] thus, the potential psychological impact of screening is important to evaluate.
- While the US Preventive Services Task Force (USPSTF) recommends single-cancer screening for select cancer types,[2-7] multi-cancer early detection tests are currently being developed to enable earlier detection of multiple cancer types simultaneously through a standard blood draw.
- Psychological and social aspects of screening can be quantified through patient-reported outcome measures (PROMs), which consists of self-reported questionnaires or measures that directly report the status of a patients' health condition from the patient.[8]
- The objective of this review is to evaluate the evidence regarding the psychosocial effects of cancer screening.

Methods

- A systematic literature review was conducted using MEDLINE and EMBASE between Jan 2000 to Aug 2020
- Search terms included cancer, cancer screening, symptoms (e.g., anxiety, distress, worry), PROMs, patient-reported outcomes (PROs)
- Inclusion criteria: Publications with participants ≥18 years old in randomized controlled trials (RCTs) or observational studies of cancer screening either inside or outside of the US, self-assessment of PROs before and within 1 year of screening, including receipt of results (e.g., false positive (FP))
- Exclusion criteria: Publications that focused on previously or currently diagnosed cancer patients, assessed a diagnostic evaluation, included PROMs completed by a proxy or assessing treatments or interventions associated with screening, or consisted of non-longitudinal (e.g., cross-sectional) studies

Results

- 31 studies (12 RCTs; 19 observational studies) were included in this review (Figure 1).
- 7 constructs were identified in assessing the psychosocial impact of cancer screening (Figure 2).

Anxious symptoms (Figure 3)

- There was a temporary increase in anxious symptoms within 2 months after screening following positive or FP results, followed by a decrease after 3 months.
- More anxious symptoms were reported while waiting for screening results or immediately after screening.

Depressive symptoms (Figure 4)

- There were minimal changes in levels of depressive symptoms or mood, but an increase in depressive symptoms was seen directly following FP or positive test results, even at 2 weeks.

Results

Distress (Figure 5)

- Clinically and statistically significant increases in distress were reported in the indeterminate group even at 2 months from baseline.
- At 2 months, clinically significant and higher levels of distress were reported in those with indeterminate, compared to negative, results.

Worry (Figure 6)

- Fear of cancer or cancer worry increased shortly after screening or receiving abnormal results, and returned to baseline after 3 months.

Functional status and well-being, Preference-weighted health status, Other psychosocial measures

- Minimal changes in functional status and well-being and preference-weighted health status were observed following cancer screening.
- High satisfaction levels were reported while waiting for test results.

Results

Higher-risk of cancer subpopulations

- Higher-risk individuals reported more anxious symptoms, distress, and worry during the screening process (Figure 7).

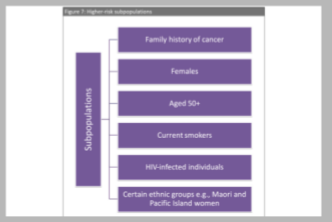
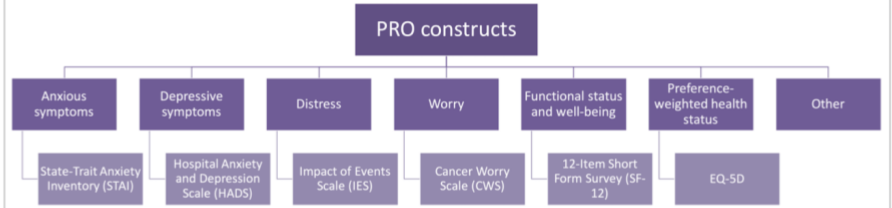


Figure 2: Commonly assessed PRO constructs and measures



Conclusions

- Overall, the psychosocial impact of cancer screening is low and short-lived, regardless of screening test result.
- Our review found there was a temporary increase in anxious symptoms, distress, and worry directly after or within 2 month following the screening exam, from before the exam at baseline, particularly in those with indeterminate or FP screening results.
- Higher-risk individuals experienced increased anxious symptoms and distress during the screening process compared to individuals at regular risk; more attention to individuals with a higher risk of cancer is recommended.
- As more novel screening tests, including muti-cancer early detection tests, are developed, further research is warranted to

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CHAT NARRATION DISCLOSURES ABSTRACT REFERENCES CONTACT AUTHOR

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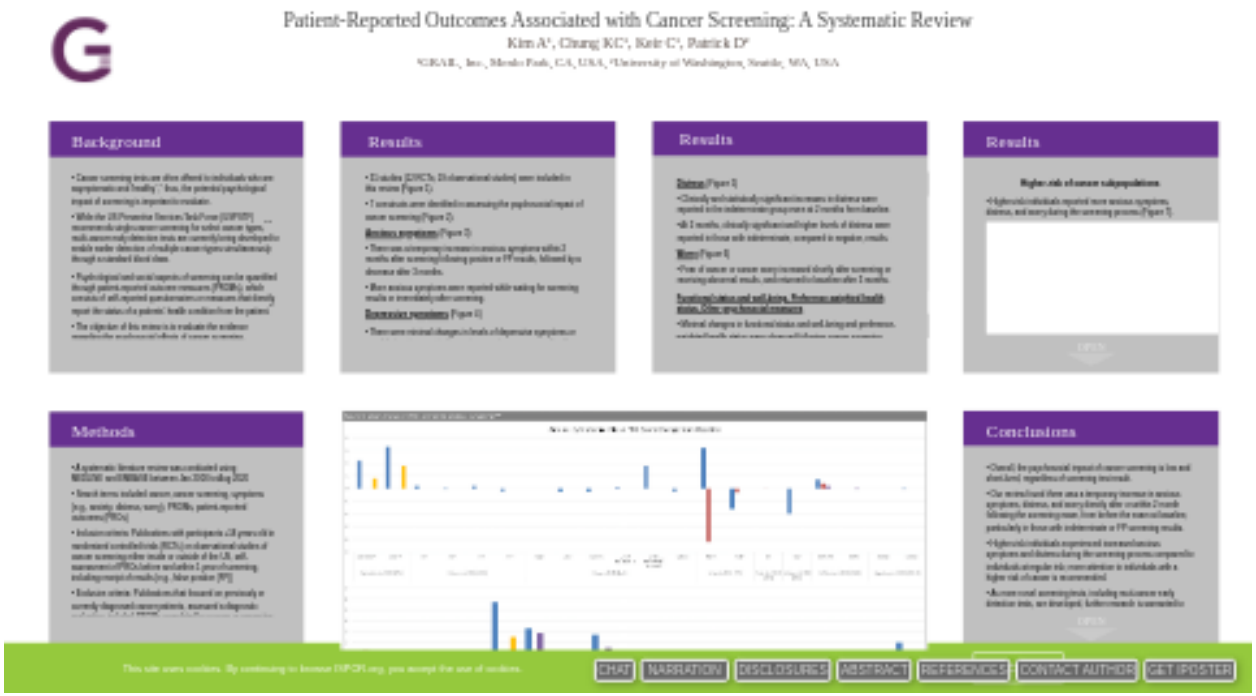

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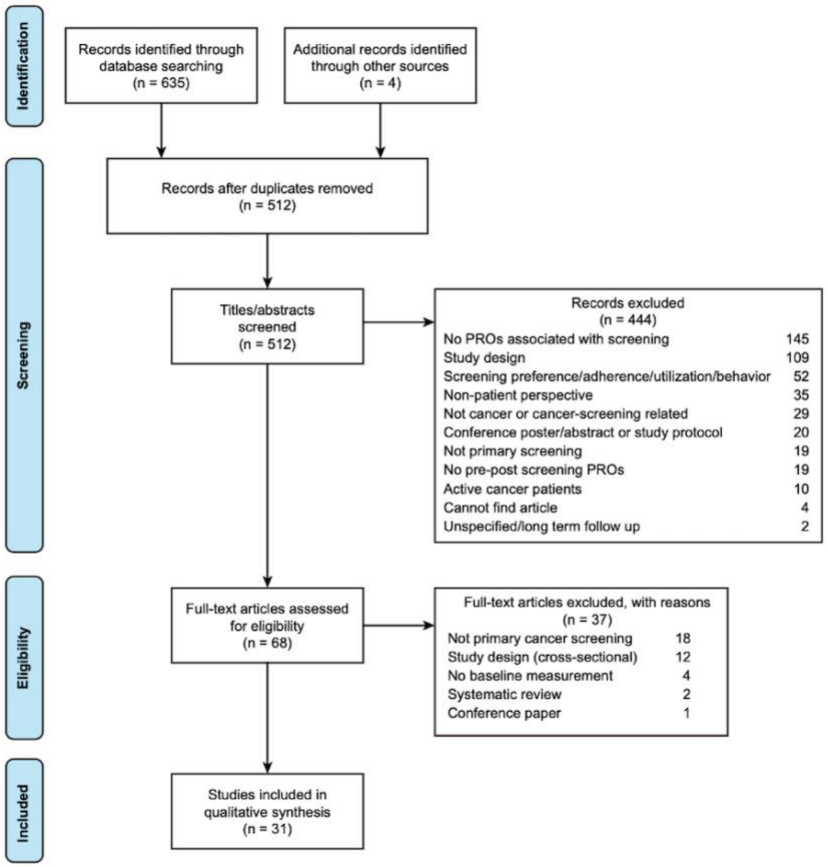
RESULTS

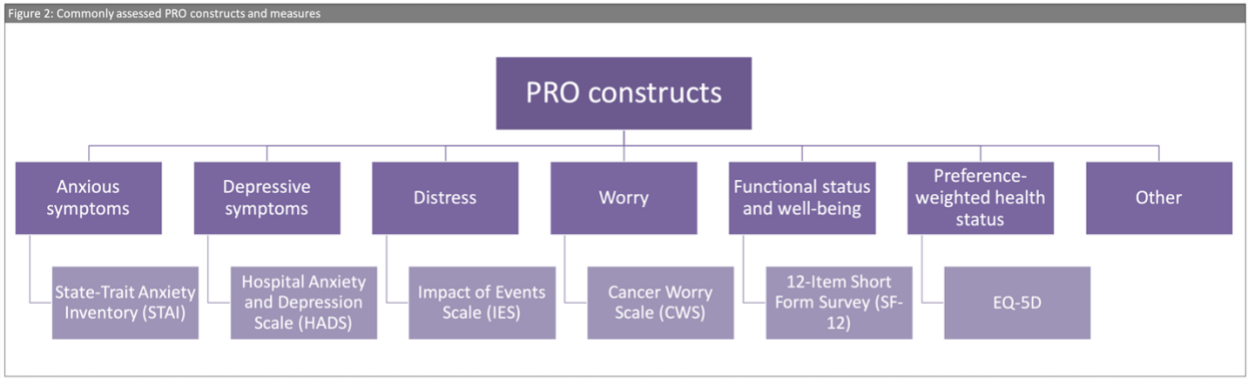
• 31 studies (12 RCTs; 19 observational studies) were included in this review (Figure 1).

Figure 1: PRISMA Flow Diagram



• 7 constructs were identified in assessing the psychosocial impact of cancer screening (Figure 2).

Figure 2: Commonly assessed PRO constructs and measures



Anxious symptoms (Figure 3)

• There was a temporary increase in anxious symptoms within 2 months after screening following positive or FP results, followed by a decrease after 3 months.

• More anxious symptoms were reported while waiting for screening results or immediately after screening.

Figure 3: Mean change in PROs scores for anxious symptoms[9-23]

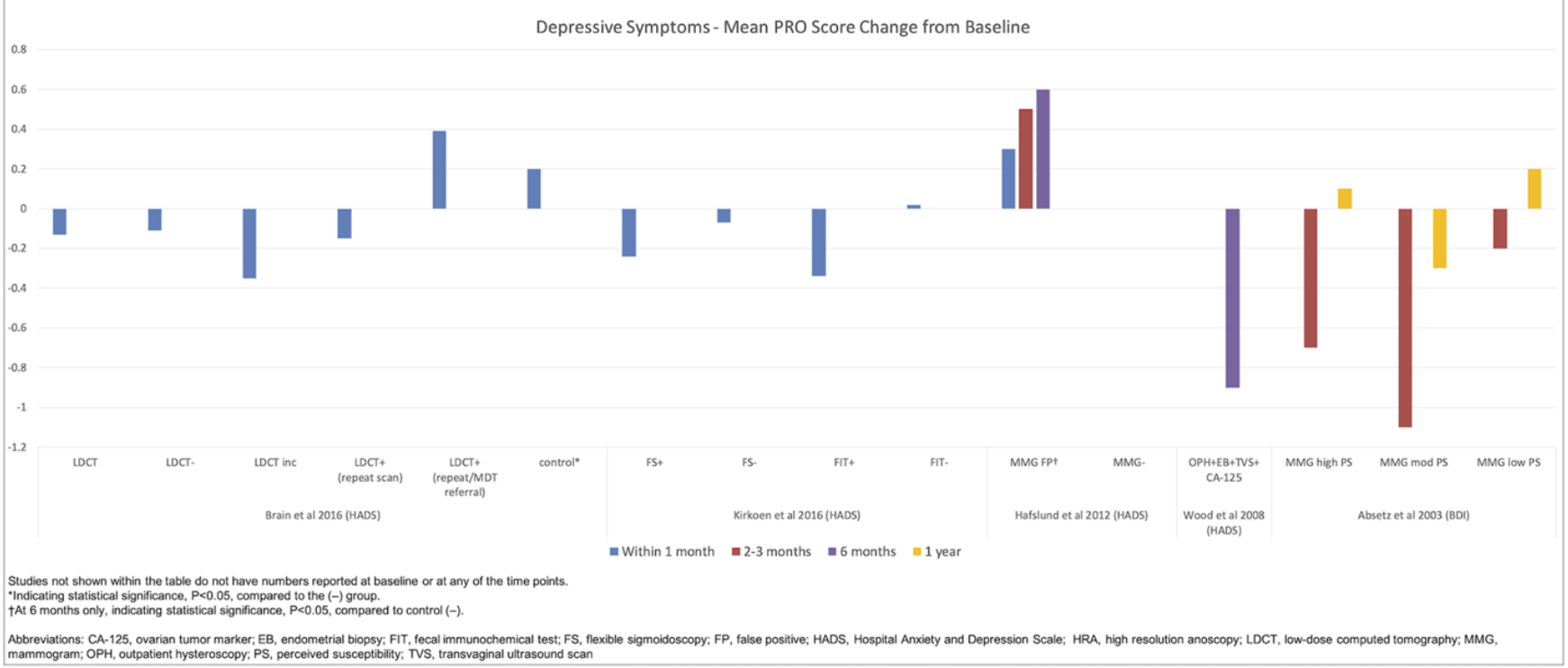
Studies not shown within the table do not have numbers reported at baseline or at any of the time points.
*Indicating statistical significance, P<0.05.
†Compared to baseline, more participants had a clinically significant increase (i.e., MCID ≥10) in anxious symptoms at 1 month following receipt of positive results, and to a lesser degree at 12 months.
‡Indicates those with a STAI score>44, which is considered clinically significant.
§18% had a clinically significant level of anxiety at 2 weeks.
¶At 2 months only, Indicating statistical significance, P<0.05.
#Fewer individuals had a clinically significant difference in anxious symptoms after receiving their results, compared to while waiting for their results.

Abbreviations: BCSQ, Bowel Cancer Screening Questionnaire; CA-125, ovarian tumor marker; COS-LC; Consequences Of Screening in Lung Cancer; EB, endometrial biopsy; FIT, fecal immunochemical test; FP, false positive; FOBT, fecal occult blood test; FS, flexible sigmoidoscopy; HADS, Hospital Anxiety and Depression Scale; HRA, high resolution anoscopy; LDCT, low-dose computed tomography; MMG, mammogram; OPH, outpatient hysteroscopy; PS, perceived susceptibility; Sev, severe; STAI, State-Trait Anxiety Inventory; Susp, suspicious; TP, true positive; TVS, transvaginal ultrasound scan.

Depressive symptoms (Figure 4)

• There were minimal changes in levels of depressive symptoms or mood, but an increase in depressive symptoms was seen directly following FP or positive test results, even at 2 weeks.

Figure 4: Mean change in PROs scores for depressive symptoms[10,11,15,18,22]



Studies not shown within the table do not have numbers reported at baseline or at any of the time points.
*Indicating statistical significance, P<0.05, compared to the (–) group.
†At 6 months only, indicating statistical significance, P<0.05, compared to control (–).

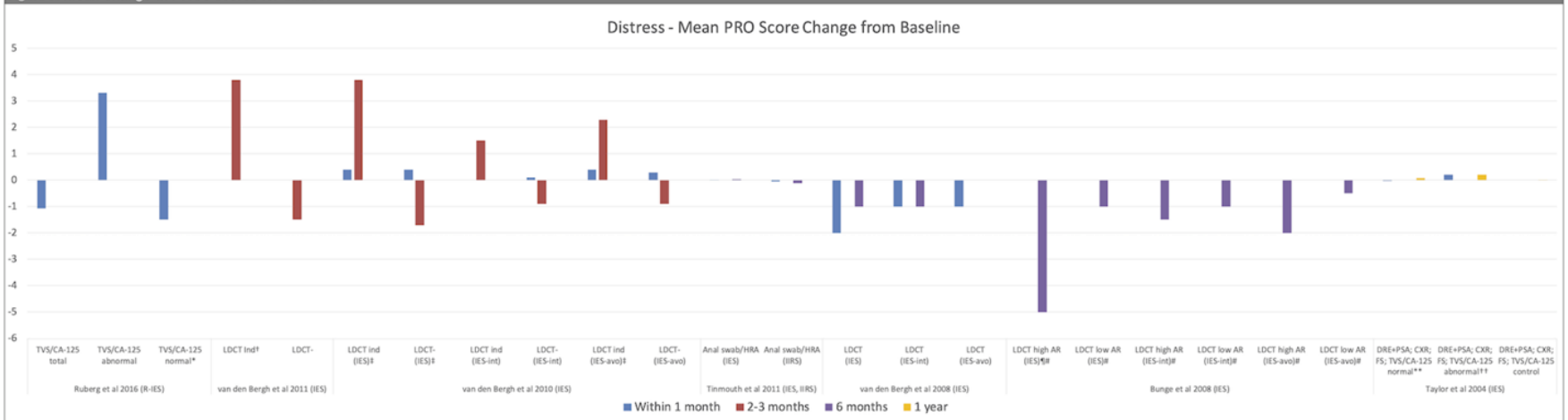
Abbreviations: CA-125, ovarian tumor marker; EB, endometrial biopsy; FIT, fecal immunochemical test; FS, flexible sigmoidoscopy; FP, false positive; HADS, Hospital Anxiety and Depression Scale; HRA, high resolution anoscopy; LDCT, low-dose computed tomography; MMG, mammogram; OPH, outpatient hysteroscopy; PS, perceived susceptibility; TVS, transvaginal ultrasound scan

Distress (Figure 5)

• Clinically and statistically significant increases in distress were reported in the indeterminate group even at 2 months from baseline.

• At 2 months, clinically significant and higher levels of distress were reported in those with indeterminate, compared to negative, results.

Figure 5: Mean change in PROs scores for distress[17,19,22,24-28]



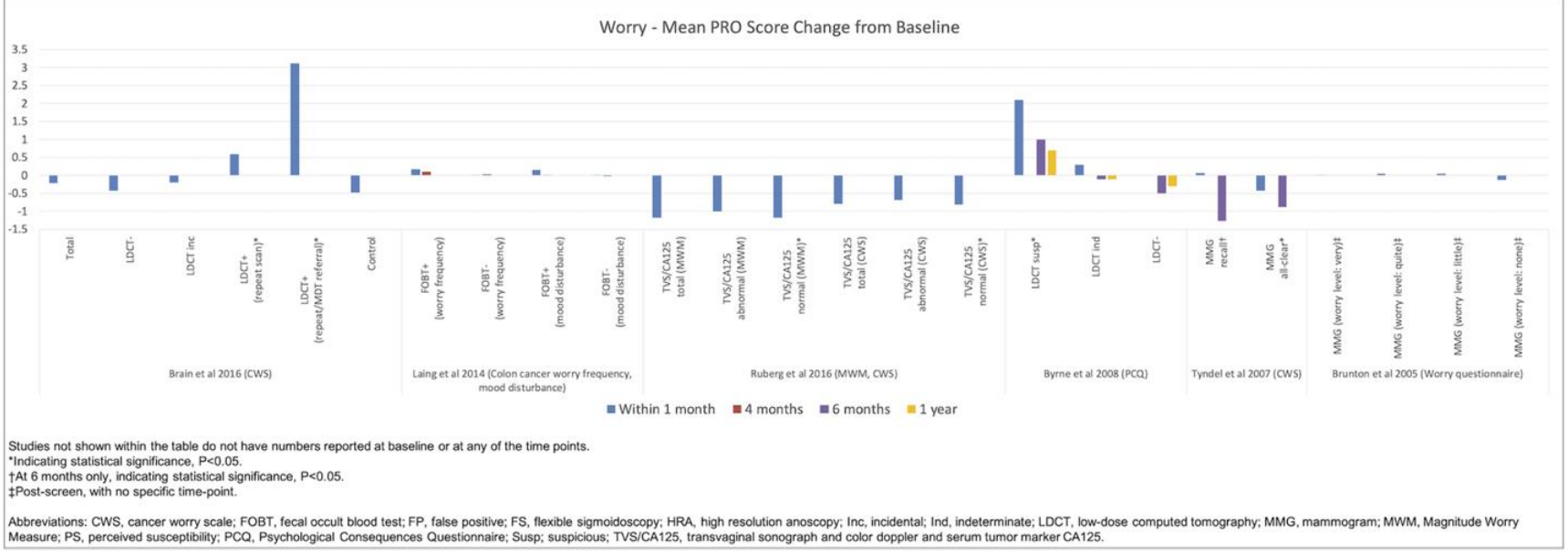
Studies not shown within the table do not have numbers reported at baseline or at any of the time points.
*Levels of distress decreased upon receipt of normal scan results (p=0.007), when compared to after screening.
†Clinically relevant (MID = half an SD) and significantly higher levels of distress were reported at 2 months in the indeterminate group, compared to the (–) group.
‡At 2 months, clinically relevant (MID = half an SD) and significantly different levels of distress (MID = half an SD) from baseline were seen in the indeterminate group, compared to 1 day after screening and before baseline.
§Post-screen results, with no specific time-point.
¶p<0.01 versus low AR.
#At 6 months, statistically significant decrease from baseline in both high and low risk perception groups (p≤0.01 for IES total, p<0.05 for IES intrusive/avoidance)
**At 1 month, those with abnormal results had higher level of intrusive thoughts, compared than those with normal results at 4-6 weeks after screening.
††At 12 months, statistically significant (P=0.03) increase in those with an abnormal result, compared with normal group.

Abbreviations: AR, affective risk; avo, avoidance; CA-125, ovarian tumor marker; CXR, chest x-ray; DRE, digital rectal exam; FP, false positive; FS, flexible sigmoidoscopy; HRA, high resolution anoscopy; IES, impact of event scale; IIRS, Illness Intrusiveness Ratings Scale; int, intrusive; LDCT, low-dose computed tomography; MID, minimal important difference; PSA, prostate specific antigen; R-IES, Revised Impact of Event Scale; SD, standard deviation; TVS/CA125, transvaginal sonograph and color doppler and serum tumor marker CA125.

Worry (Figure 6)

• Fear of cancer or cancer worry increased shortly after screening or receiving abnormal results, and returned to baseline after 3 months.

Figure 6: Mean change in PROs scores for worry[11-12,20,22,24,29-31]



Studies not shown within the table do not have numbers reported at baseline or at any of the time points.
*Indicating statistical significance, P<0.05.
†At 6 months only, indicating statistical significance, P<0.05.
‡Post-screen, with no specific time-point.

Abbreviations: CWS, cancer worry scale; FOBT, fecal occult blood test; FP, false positive; FS, flexible sigmoidoscopy; HRA, high resolution anoscopy; Inc, incidental; Ind, indeterminate; LDCT, low-dose computed tomography; MMG, mammogram; MWM, Magnitude Worry Measure; PS, perceived susceptibility; PCQ, Psychological Consequences Questionnaire; Susp; suspicious; TVS/CA125, transvaginal sonograph and color doppler and serum tumor marker CA125.

Functional status and well-being, Preference-weighted health status, Other psychosocial measures

• Minimal changes in functional status and well-being and preference-weighted health status were observed following cancer screening.

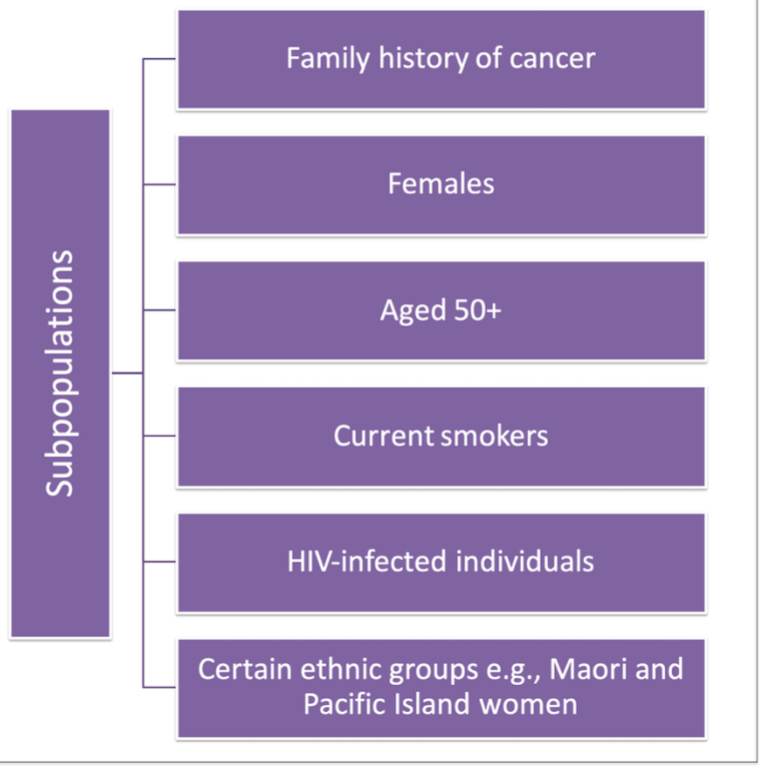
• High satisfaction levels were reported while waiting for test results.

• Minimal discomfort was reported while waiting for test results.

Higher-risk of cancer subpopulations

• Higher-risk individuals reported more anxious symptoms, distress, and worry during the screening process (Figure 7).

Figure 7: Higher-risk subpopulations



CONCLUSIONS

• Overall, the psychosocial impact of cancer screening is low and short-lived, regardless of screening test result.

• Our review found there was a temporary increase in anxious symptoms, distress, and worry directly after or within 2 month following the screening exam, from before the exam at baseline, particularly in those with indeterminate or FP screening results.

• Higher-risk individuals experienced increased anxious symptoms and distress during the screening process compared to individuals at regular risk; more attention to individuals with a higher risk of cancer is recommended.

• As more novel screening tests, including muti-cancer early detection tests, are developed, further research is warranted to assess multiple psychosocial outcomes with validated measures in cancer screening trials, and improve the interpretability of clinical trial results by dichotomizing PROM scores or reporting the minimal important difference.

DISCLOSURES

This study was funded by GRAIL, Inc. AK, KCC, CK are employees of GRAIL, Inc, with equity in the company. DLP serves as a consultant to GRAIL, Inc and received funding for this study.

ABSTRACT

OBJECTIVE(S)

Multi-cancer early detection tests are currently being developed to enable earlier detection of multiple cancer types. As reflected in patient-reported outcomes (PROs), the psychosocial impact of existing single-cancer screenings is unknown. Our aim is to evaluate the impact of primary cancer screening on PROs.

METHODS

A systematic review was conducted using MEDLINE, EMBASE, and reference lists of articles from January 2000 to August 2020 for relevant publications assessing the psychosocial impact of primary cancer screening before and after the screening process (up to 1 year), including after receiving abnormal results. Studies with patients undergoing only secondary screening or diagnostic evaluation, or with active cancer, were excluded.

RESULTS

A total of 31 studies were included, and reflected PRO assessments associated with lung, breast, colorectal, anal, ovarian, cervical, prostate, and pancreatic cancer screening procedures. Anxiety was the most commonly assessed construct, using the State-Trait Anxiety Inventory. Cancer-specific distress and health-related quality of life (HRQOL) were also assessed using a broad range of validated and unvalidated measures. Overall, individuals tolerated screening procedures well with no major psychosocial effects. Of note, higher levels of anxiety, distress, and worry were present while waiting for screening results and following indeterminate results that required further testing, which also decreased individuals' HRQOL. These negative psychosocial effects were, however, not long-lasting and returned to baseline, typically by 1 year. Furthermore, individuals with higher cancer risk, including current smokers and those with a family or personal history of cancer, tended to have higher levels of anxiety and distress throughout the screening process, even after receiving results.

CONCLUSIONS

The psychosocial impact of cancer screening is relatively low overall and short-lived, but can be significant. Individuals with a higher risk of cancer tend to experience more anxiety and distress during the screening process; thus, more attention to this group is recommended.

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