Towards tailored follow-up care for breast cancer survivors: latent class cluster analyses of symptom burden

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INTRODUCTION

- Many breast cancer survivors suffer from symptoms that may affect their health-related quality of life.
- Symptoms have mainly been studied as separate, independent items, however, survivors rarely report presence of singular symptoms.
- Studying an overall symptom burden is more relevant.
- Patterns of severity, burden, or magnitude of a certain pre-defined symptom cluster can be studied by latent class cluster analyses (LCA).

OBJECTIVES

To identify mutually exclusive subgroups of breast cancer survivors based on clusters of symptom burden, and patient and treatment characteristics that are associated with these subgroups.

PATIENTS AND METHODS

Patient population
- Patient selection (N=876) from Netherlands Cancer Registry (NCR).
- Surgically treated stage I-III breast cancer, diagnosed between 2012-2016.
- EORTC-QLQ-C30 questionnaire, administered in 2018.

Symptom burden: fatigue, nausea, pain, dyspnea, insomnia, appetite loss, constipation, diarrhea, emotional and cognitive symptoms; measured on a scale 0-100.

Demographics: age, educational level, comorbidities, disease status at time of survey.

Surveys administered through the online PROFILES Registry survey application.

Reference general population sample, 1:1 matched on age (n=1,369 women).

Analyses
- LGA: to determine subgroups based on symptom burden (Table, Figure).
- Chi-Square: group contrasts for patient, disease, treatment characteristics (Table).
- Multinomial logistic regression: to identify characteristics associated with subgroups.
- ANOVA: to compare outcomes per subgroup with reference population (Figure).

RESULTS

Table: Patient characteristics per subgroup

<table>
<thead>
<tr>
<th>Comorbidity</th>
<th>Low symptom burden (n=142)</th>
<th>Intermediate symptom burden (n=283)</th>
<th>High symptom burden (n=59)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of comorbidities*</td>
<td><strong>75</strong></td>
<td><strong>70</strong></td>
<td><strong>21</strong></td>
</tr>
<tr>
<td>Type of comorbidities**</td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>1</strong></td>
</tr>
<tr>
<td>Stage</td>
<td><strong>N=142</strong></td>
<td><strong>N=283</strong></td>
<td><strong>N=59</strong></td>
</tr>
</tbody>
</table>
| Statically significant differences for symptom burden (n=142, 55%) | Fatigue, pain, depression, anxiety, nausea, constipation, diarrhea, emotional, and cognitive symptoms.

Three subgroups of survivors were identified:

1. Low symptom burden (n=116/404, 29%):
   - Lower symptom burden than the general population.

2. Intermediate symptom burden (n=224/404, 55%):
   - Symptom burden similar to the general population.
   - Worse scores for fatigue, insomnia, cognitive symptoms (small-medium clinically relevant differences).

3. High symptom burden (n=59/404, 15%):
   - Worse symptom burden than the general population.
   - Large clinically relevant differences for fatigue, pain, dyspnea, insomnia, appetite loss, cognitive symptoms.
   - Medium clinically relevant differences for constipation.

The subgroups were mutually exclusive

For all domains but diarrhea, confidence intervals around mean scores were not overlapping between subgroups.

Significantly associated with high burden subgroup compared to the intermediate subgroup:
- Comorbidities, one (RRR: 2.75; CI: 1.22-6.19; p=0.015) or more (RRR: 9.19; CI: 3.70-22.8; p<0.001).
- No associations with patient/treatment characteristics.

CONCLUSION

- Studying the clustering of overall symptom burden is expected to better identify subgroups of survivors with various needs for symptom management.
- We identified three mutually exclusive subgroups of breast cancer survivors based on symptom burden.
- The high burden subgroup reported symptom levels that were medium to large clinically relevant differences compared to the general population (reference group).
- We found no treatment-related characteristics associated with subgroup membership. We did find an association with comorbidities, that needs to be further explored in future research.