Screening for psychological distress in inoperable lung cancer patients: an evaluation of the Brief Distress Thermometer (BDT)

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www.petermac.org/Research/NursingSupportiveCare
Psychological distress in lung cancer patients

Lung cancer:

- A leading cause of cancer death worldwide
- Relatively low 5-year survival rate
- Relatively high burden of physical symptoms
- Relatively high prevalence of psychological distress e.g. 43-61% vs. 32.8% breast & 30.5% prostate
Psychological distress

Definition:

- *An intrinsically unpleasant emotional experience that may range from fears, worry and sadness to clinical depression and anxiety disorders (NCCN)*

Psychological distress is associated with:

- Greater perceived unmet needs
- Lower quality of life (QOL)
- Predictor of mortality (*lung cancer*)
- Distress at diagnosis, predictor of subsequent distress (*lung cancer*)
Routine screening for psychological distress

Although QOL is often discussed with patients:

- Focus is on physical aspects (e.g. side-effects)
- Psychological distress is often underestimated or undetected

In response:

- Many screening tools have been developed
- Much support for distress screening to become part of routine cancer care:

  e.g. Distress as the “Sixth Vital Sign”
A distress screening measure for lung cancer patients?

Lung cancer patients:
- Relatively Culturally and Linguistically Diverse
- Relatively physically debilitated

The clinical setting:
- Busy
- Finite or limited resources

**Thus, a screening measure must be:**
1. Cost effective
2. Fast *(to complete and score)*
3. Simple *(to complete and score)*
The Hospital Anxiety and Depression Scale (HADS)

The HADS is the current “gold standard”, but…

X Cost effective? No
  • $1.45 (AU) per use

X Fast and simple to complete and score? No
  • 14-item
  • Each item: 4 possible responses (scored 0-3)
  • Anxiety and depression subscales. Sum of subscales represents general psych distress score
  • Manual required for scoring / interpretation
The Brief Distress Thermometer (BDT)

✅ **Cost effective? Yes**
- Free to use

✅ **Fast and simple to complete and score? Yes**
- Single-item, visual analogue scale - scored 0 (“no distress”) -10 (“extreme distress”)
- Patients are asked to circle the number that best describes how much distress they have been experiencing “in the last week, including today”
- Distress indicated by a score ≥ a defined cut-off score
Validation of the BDT

The BDT has been validated using the HADS a number of times in mixed samples (disease sites/stages): e.g.

<table>
<thead>
<tr>
<th>Author &amp; year</th>
<th>Sample</th>
<th>N</th>
<th>Lang.</th>
<th>cut-off</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Roth 1998</td>
<td>US prostate cancer outpatients</td>
<td>121</td>
<td>English</td>
<td>≥5</td>
</tr>
<tr>
<td>2. Patrick-Miller 2004</td>
<td>US oncology outpatients</td>
<td>1272</td>
<td>English</td>
<td>≥4</td>
</tr>
<tr>
<td>4. Gil 2005</td>
<td>S. European oncology outpatients</td>
<td>312</td>
<td>English</td>
<td>≥5</td>
</tr>
<tr>
<td>5. Ozalp 2007</td>
<td>Turkish oncology inpatients</td>
<td>182</td>
<td>Turkish</td>
<td>≥4</td>
</tr>
<tr>
<td>6. Dolbeault 2008</td>
<td>French oncology outpatients</td>
<td>561</td>
<td>French</td>
<td>≥3</td>
</tr>
<tr>
<td>7. Gessler 2008</td>
<td>UK oncology outpatients</td>
<td>171</td>
<td>English</td>
<td>≥5</td>
</tr>
<tr>
<td>8. Shim 2008</td>
<td>Korean oncology day care patients</td>
<td>108</td>
<td>Korean</td>
<td>≥4</td>
</tr>
<tr>
<td>10. Grassi 2009</td>
<td>Italian oncology outpatients</td>
<td>109</td>
<td>Italian</td>
<td>≥4</td>
</tr>
<tr>
<td>11. Clover 2009</td>
<td>Australian oncology outpatients</td>
<td>340</td>
<td>English</td>
<td>≥4</td>
</tr>
</tbody>
</table>

But not in an exclusive sample of lung cancer patients
Aim 1:

To determine the convergent validity of the BDT using the HADS in patients with advanced lung cancer (distress defined as a HADS score ≥15)

Aim 2:

To determine the optimal BDT cut-off score for this population
Methods

Baseline data from a large RCT:

→ *A psycho-educational support programme for inoperable lung cancer patients*

A consecutive sample (*PeterMac, East Melbourne)*:

- Inoperable lung cancer or mesothelioma
- Starting chemotherapy and/or radiotherapy
- >2 months since any previous treatment

Excluded:

- Serious cog/psych impairment
- Non-English speaking
- ECOG PS ≥3
Statistical analysis:
Receiver Operating Characteristic (ROC) curve

Description:

- A plot of the probability of false positive results against the probability of false negative results for each possible score on the new test (e.g. 0-10 on the BDT)
- Uses the established test to define a positive result (e.g. HADS ≥15)

There are 2 purposes to ROC curve analysis:

A. Compare the performance of new to the established test (the area under the curve = measure of accuracy)

B. Determine the optimal cut-off (the optimal trade-off between the probability of false positives and false negatives)
Results:
progression of study participants

Screening

Patients screened: $N = 1009$

Approached: $N = 188$

Not eligible: $N = 744$
Not approached: $N = 69$

Consented: $N = 111$ (59%)

Enrolment

Declined participation: $N = 77$

Data collection

HADS + BDT

Analysis

Analysed: $N = 108$

Missing BDT data: $N = 3$
## Results:
### Sample characteristics

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Mean age:</strong></td>
<td>63 years</td>
</tr>
<tr>
<td><strong>Gender:</strong></td>
<td></td>
</tr>
<tr>
<td>F:</td>
<td>39.8%</td>
</tr>
<tr>
<td>M:</td>
<td>60.2%</td>
</tr>
<tr>
<td><strong>Small-cell lung cancer:</strong></td>
<td>8.3%</td>
</tr>
<tr>
<td>Limited stage</td>
<td>3.7%</td>
</tr>
<tr>
<td>Extensive stage</td>
<td>4.6%</td>
</tr>
<tr>
<td><strong>Non-small-cell lung cancer:</strong></td>
<td>86.2%</td>
</tr>
<tr>
<td>Stage I</td>
<td>3.7%</td>
</tr>
<tr>
<td>Stage II</td>
<td>5.6%</td>
</tr>
<tr>
<td>Stage III</td>
<td>35.2%</td>
</tr>
<tr>
<td>Stage IV</td>
<td>41.7%</td>
</tr>
<tr>
<td><strong>Mesothelioma:</strong></td>
<td>5.6%</td>
</tr>
<tr>
<td><strong>Palliative treatment:</strong></td>
<td>59.3%</td>
</tr>
<tr>
<td><strong>Radical treatment:</strong></td>
<td>40.7%</td>
</tr>
</tbody>
</table>
Results: the ROC curve

A. Convergent validity  
B. Optimal BDT cut-off point

- **Low** probability of **false positive** results
- **High** probability of **false negative** results

\[
\begin{align*}
\text{Sensitivity} & \quad 1.0 \quad 0.8 \quad 0.6 \quad 0.4 \quad 0.2 \quad 0.0 \\
1 - \text{Specificity} & \quad 1.0 \quad 0.8 \quad 0.6 \quad 0.4 \quad 0.2 \quad 0.0 \\
\end{align*}
\]

**B. Cut-off score:**

Point of optimal trade-off between probability of false negative and false positive results

- **Low** probability of **false negative** results
- **High** probability of **false positive** results

**A. Area under the curve:**

Represents accuracy of the BDT compared to the HADS
A. The **validity** of the BDT:
   • The area under the curve = 0.781 \( (SE 0.048, 95\% CI: 0.688, 0.874) \)
   • This indicates a fair level of convergent validity
     • \( (1.0-0.9 \text{ is excellent, } 0.9-0.8 \text{ is good, } 0.8-0.7 \text{ is fair, } 0.7-0.6 \text{ is poor, and } 0.6-0.5 \text{ is worthless}) \)

B. The optimal BDT **cut-off score**:
   • The optimal trade-off between the probability of false positives and the probability of false negatives for the BDT for patients with inoperable lung cancer occurs at a BDT score \( \geq 4 \)
Translation into practice: should routine screening be implemented?

The BDT:

• Offers a valid and feasible distress screening option for inoperable lung cancer patients, amenable to day-to-day use in clinical oncology settings *(due to its brevity, ease of completion and interpretation)*

Therefore: **Should routine screening with the BDT be implemented?**

It is unclear due to a lack of research regarding:

1. The efficacy of screening to improve patient outcomes
2. The optimal / efficient use of screening instruments
3. The acceptability of screening instruments to patients, clinical and support staff
The efficacy of screening to improve outcomes:

- Research should progress to investigate how screening measures can be used effectively to improve patient outcomes

The efficient use of screening:

- Routine screening may waste resources on “false positives”
- Research should investigate the most efficient ways to use screening instruments (e.g. focussed screening /two-stage screening)

The acceptability to stakeholders:

- Research should investigate the acceptability to patients, clinicians, support staff, allied health, etc.
Conclusions

- **Lung cancer patients**: a relatively large group, high prevalence of psychological distress
- **Psychological distress**: often undetected/underestimated
- **The BDT**: is a valid and feasible instrument for inoperable lung ca patients, optimal cut-off score is $\geq 4$
- **The optimal use of screening measures**: is unclear due to a lack of research
- **Further research is urgently needed**: to determine how screening may be used to:
  
  A. Improve **patient outcomes**, in an
  B. **efficient** fashion, that is
  C. **acceptable** to stakeholders
Funding and acknowledgements

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