Data on patient-reported outcomes and the risk of readmission following a cardiac diagnosis

Borregaard, Britt; Christensen, Anne Vinggaard; Ekholm, Ola; Rasmussen, Trine Bernholdt; Juel, Knud; Lauberg, Astrid; Vámosi, Marianne; Thrysoee, Lars; Berg, Selina Kikkenborg

Published in:
Data in Brief

DOI:
10.1016/j.dib.2019.104859

Publication date:
2020

Document version
Final published version

Document license
CC BY

Citation for published version (APA):

Terms of use
This work is brought to you by the University of Southern Denmark through the SDU Research Portal. Unless otherwise specified it has been shared according to the terms for self-archiving. If no other license is stated, these terms apply:

- You may download this work for personal use only.
- You may not further distribute the material or use it for any profit-making activity or commercial gain.
- You may freely distribute the URL identifying this open access version.

If you believe that this document breaches copyright please contact us providing details and we will investigate your claim. Please direct all enquiries to puresupport@bib.sdu.dk

Download date: 15. Jun. 2020
Data Article

Data on patient-reported outcomes and the risk of readmission following a cardiac diagnosis

Britt Borregaard a, b, *, Anne Vinggaard Christensen c, Ola Ekholm d, Trine Bernholdt Rasmussen e, Knud Juel d, Astrid Lauberg f, Marianne Vámosi g, Lars Thrysoe b, h, Selina Kikkenborg Berg i

a Department of Cardiothoracic and Vascular Surgery, Odense University Hospital, Odense, Denmark
b University of Southern Denmark, Odense, Denmark
c Department of Cardiology, Rigshospitalet, Copenhagen University Hospital, Copenhagen, Denmark
d National Institute of Public Health, University of Southern Denmark, Copenhagen, Denmark
e Department of Cardiology, Herlev and Gentofte University Hospital, Denmark
f Department of Cardiology and Cardiothoracic Surgery, Aalborg University Hospital, Aalborg, Denmark
g Department of Public Health, Section for Nursing, Aarhus University, Aarhus & Department of Cardiology, Aarhus University Hospital, Aarhus, Denmark
h Department of Cardiology, Odense University Hospital, Odense, Denmark
i Institute of Clinical Medicine, University of Copenhagen, Copenhagen, Denmark

Article history:
Received 28 September 2019
Received in revised form 12 November 2019
Accepted 13 November 2019
Available online 22 November 2019

Keywords:
Cardiac readmission
Patient-reported outcomes
Anxiety
Depression
Quality of life
Cardiology

Abstract

The data presented in this paper describe a supplementary figure and supplementary tables to the research article; Patient-reported outcomes predict high readmission rates among patients with cardiac diagnoses - Findings from the DenHeart study [1]. The data reports on findings from the DenHeart study, investigating the association between patient-reported outcomes (PROs) and the risk of readmission after a cardiac diagnosis. Data from a national survey with register-based follow-up of a cohort of 34,564 patients were analysed. PROs included the following instruments; The Short Form-12 (SF-12), the Hospital Anxiety and Depression Scale (HADS), the EuroQol 5 Dimensions 5 Levels (EQ-5D 5L), the HeartQol and the Edmonton Symptom Assessment Scale (ESAS). The included tables show the association between PROs and the...
The data shared in this paper are based on the DenHeart study [1,2]; a national survey with register-based follow-up conducted in Denmark from April 2013 to April 2014. All cardiac patients who were discharged or transferred from one of the five Danish Heart Centres were invited to complete a paper-based questionnaire at discharge. Table 1 outlines the included patient-reported outcome measures of the survey. Table 2 shows the association between patient-reported outcomes (PROs) and cardiac readmissions within one year after discharge, whereas Table 3 shows the association between PROs and acute cardiac readmissions within 30 days after discharge among all patients and patients diagnosed with
ischemic heart disease and arrhythmia, respectively. The cumulative incidence functions of all-cause readmissions and acute and elective cardiac readmissions, respectively, with death as a possible competing risk are illustrated in Fig. 1.

2. Experimental design, materials, and methods

2.1. Population

Adult patients were consecutively included. Exclusion criteria were: patients who were below the age of 18 years, patients without a Danish civil registration number (due to lack of possibility of register-based follow-up) and patients who did not understand Danish.

The included patients were grouped based on their ICD-10 diagnosis (primary diagnosis):

- **Ischemic heart disease**: I200-I259, T823D, Z951, Z955.
- **Heart failure**: I500-I509, I420-I438, I110, I517, R570.
- **Congenital heart disease**: Q00-Q99, I278A, I279, I280.
- **Heart valve disease**: I050-I060, I340-I372, Z952-Z954, I391, I392, I511A.

2.2. Variables

2.2.1. Clinical and sociodemographic data

Clinical and sociodemographic data were obtained from the following national registers: The Danish Civil Registration System [3], the Danish National Patient Register [4] and the Danish Education Register [5]. Data on comorbidities were used to calculate the Tu comorbidity index score, which includes several cardiac-related co-morbidities based on primary and secondary diagnoses [6].

Information on smoking, alcohol consumption, height and weight for calculating body mass index (BMI) were self-reported data and obtained through the survey. These data were used as potential confounders in the current analyses.
Table 2
Various patient-reported outcomes and the association with cardiac readmissions within one year following hospital discharge.

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
<th>Ischemic heart disease</th>
<th>Arrhythmia</th>
<th>Heart failure</th>
<th>Heart valve disease</th>
<th>Observation for heart disease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR (CI)a</td>
<td>HR (CI)a</td>
<td>HR (CI)a</td>
<td>HR (CI)a</td>
<td>HR (CI)a</td>
<td>HR (CI)a</td>
</tr>
<tr>
<td>HADS-A≥8 vs. HADS-A&lt;8</td>
<td>1.24 (1.17–1.32)</td>
<td>1.27 (1.15–1.39)</td>
<td>1.30 (1.16–1.46)</td>
<td>1.14 (0.90–1.44)</td>
<td>1.02 (0.82–1.26)</td>
<td>1.21 (0.98–1.49)</td>
</tr>
<tr>
<td>HADS-D≥8 vs. HADS-D&lt;8</td>
<td>1.30 (1.21–1.39)</td>
<td>1.36 (1.22–1.52)</td>
<td>1.41 (1.23–1.62)</td>
<td>1.15 (0.88–1.49)</td>
<td>0.84 (0.65–1.07)</td>
<td>1.40 (1.10–1.79)</td>
</tr>
<tr>
<td>Index score per 1 point SF-12 PCS</td>
<td>0.98 (0.98–0.98)</td>
<td>0.98 (0.98–0.98)</td>
<td>0.98 (0.98–0.99)</td>
<td>0.98 (0.96–0.99)</td>
<td>1.01 (1.00–1.02)</td>
<td>0.98 (0.97–0.99)</td>
</tr>
<tr>
<td>&lt;20</td>
<td>1.41 (1.28–1.55)</td>
<td>1.32 (1.13–1.53)</td>
<td>1.56 (1.30–1.87)</td>
<td>1.32 (0.90–1.95)</td>
<td>0.61 (0.42–0.87)</td>
<td>1.35 (0.95–1.90)</td>
</tr>
<tr>
<td>20–39</td>
<td>1.21 (1.10–1.34)</td>
<td>1.15 (0.98–1.35)</td>
<td>1.32 (1.10–1.59)</td>
<td>1.05 (0.71–1.57)</td>
<td>0.74 (0.52–1.08)</td>
<td>1.50 (1.07–2.10)</td>
</tr>
<tr>
<td>40–59</td>
<td>0.96 (0.87–1.06)</td>
<td>0.94 (0.81–1.11)</td>
<td>1.10 (0.91–1.32)</td>
<td>0.77 (0.52–1.13)</td>
<td>0.59 (0.41–0.84)</td>
<td>0.84 (0.58–1.22)</td>
</tr>
<tr>
<td>60–79</td>
<td>1.01 (0.91–1.11)</td>
<td>0.95 (0.81–1.12)</td>
<td>1.06 (0.88–1.28)</td>
<td>0.97 (0.67–1.41)</td>
<td>0.79 (0.56–1.11)</td>
<td>0.86 (0.60–1.25)</td>
</tr>
<tr>
<td>≥80</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
</tr>
<tr>
<td>EQ-5D</td>
<td>0.91 (0.89–0.93)</td>
<td>0.87 (0.85–0.90)</td>
<td>0.93 (0.89–0.96)</td>
<td>0.91 (0.85–0.97)</td>
<td>1.09 (1.02–1.17)</td>
<td>0.91 (0.86–0.97)</td>
</tr>
<tr>
<td>Index score per 0.1 point HeartQoL Global</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index score per 1 point ESAS per 1 point</td>
<td>0.72 (0.70–0.75)</td>
<td>0.76 (0.71–0.80)</td>
<td>0.70 (0.66–0.76)</td>
<td>0.66 (0.57–0.77)</td>
<td>1.20 (1.05–1.38)</td>
<td>0.75 (0.65–0.86)</td>
</tr>
<tr>
<td></td>
<td>1.01 (1.01–1.01)</td>
<td>1.01 (1.01–1.02)</td>
<td>1.02 (1.01–1.02)</td>
<td>1.02 (1.01–1.02)</td>
<td>0.99 (0.99–1.00)</td>
<td>1.01 (1.01–1.02)</td>
</tr>
</tbody>
</table>

Hazard ratios with 95% confidence intervals.  
HADS-A = Hospital Anxiety and Depression Scale – Anxiety, HADS-D = Hospital Anxiety and Depression Scale – Depression, HR = hazard ratio, CI = confidence interval, MCS = mental component summary, PCS = physical component summary, ESAS = Edmonton Symptom Assessment Scale.  
* Cox proportional hazards model with age as the time scale adjusted for sex, marital status, education, smoking behaviour, alcohol intake, body mass index and the Tu comorbidity index.
### Table 3
Various patient-reported outcomes and the association with acute cardiac readmissions within 30 days following hospital discharge.

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
<th>Ischemic heart disease</th>
<th>Arrhythmia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HR (CI)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>HR (CI)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>HR (CI)&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>HADS-A ≥ 8 vs. HADS-A &lt; 8</td>
<td>1.36 (1.19–1.55)</td>
<td>1.33 (1.07–1.65)</td>
<td>1.70 (1.23–1.61)</td>
</tr>
<tr>
<td>HADS-D ≥ 8 vs. HADS-D &lt; 8</td>
<td>1.57 (1.36–1.81)</td>
<td>1.50 (1.18–1.91)</td>
<td>1.93 (1.46–2.53)</td>
</tr>
<tr>
<td>SF-12 PCS Index score per 1 point</td>
<td>0.98 (0.98–0.99)</td>
<td>0.98 (0.97–0.99)</td>
<td>0.99 (0.98–1.00)</td>
</tr>
<tr>
<td>SF-12 MCS Percentiles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>1.61 (1.30–2.00)</td>
<td>1.06 (0.74–1.53)</td>
<td>2.18 (1.43–3.32)</td>
</tr>
<tr>
<td>20–39</td>
<td>1.19 (0.95–1.49)</td>
<td>0.90 (0.62–1.31)</td>
<td>1.80 (1.18–2.74)</td>
</tr>
<tr>
<td>40–59</td>
<td>1.13 (0.90–1.41)</td>
<td>0.91 (0.63–1.32)</td>
<td>1.13 (0.72–1.77)</td>
</tr>
<tr>
<td>60–79</td>
<td>0.94 (0.74–1.19)</td>
<td>0.70 (0.48–1.02)</td>
<td>1.06 (0.68–1.64)</td>
</tr>
<tr>
<td>≥ 80</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
<td>1 (ref)</td>
</tr>
<tr>
<td>EQ-5D Index score per 0.1 point</td>
<td>0.89 (0.85–0.92)</td>
<td>0.87 (0.82–0.93)</td>
<td>0.93 (0.87–1.00)</td>
</tr>
<tr>
<td>HeartQoL Global Index score per 1 point</td>
<td>0.73 (0.68–0.80)</td>
<td>0.86 (0.75–0.99)</td>
<td>0.67 (0.58–0.78)</td>
</tr>
<tr>
<td>ESAS per 1 point</td>
<td>1.02 (1.01–1.02)</td>
<td>1.01 (1.01–1.02)</td>
<td>1.02 (1.01–1.03)</td>
</tr>
</tbody>
</table>

Hazard ratios with 95% confidence intervals.

HADS-A = Hospital Anxiety and Depression Scale — Anxiety, HADS-D = Hospital Anxiety and Depression Scale — Depression, HR = hazard ratio, CI = confidence interval, MCS = mental component summary, PCS = physical component summary, ESAS = Edmonton Symptom Assessment Scale.

<sup>a</sup> Cox proportional hazards model with age as the time scale adjusted for sex, marital status, education, smoking behaviour, alcohol intake, body mass index and the Tu comorbidity index.

---

**Fig. 1.** The cumulative incidence function of readmission. The Figure illustrates the cumulative incidence function of readmission with death as a possible competing risk. All-cause readmission, acute and elective cardiac readmission are illustrated.
2.2.2. Patient-reported outcomes

The following PRO measurements were included in the survey:

- The Short Form-12 (SF-12): The SF-12 is a brief self-reported measure of overall health status. The scores are expressed in terms of two summary scores: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). A higher score indicates a better health status [7].

- The Hospital Anxiety and Depression Scale (HADS): The HADS is composed of 14 items (seven items to assess anxiety, HADS-A, and seven to assess depression, HADS-D). The subscales range from 0 (minimum level) to 21 (maximum level), and the cut-off score ≥ 8 suggests the presence of anxiety or depression [8].

- The EuroQol 5 Dimensions 5 Levels (EQ-5D 5L): The EQ-5D 5L is a standardised measure of health status. The EQ-5D 5L consists of a classification system, the EQ-5D Index Score, and a Visual Analogue Scale, the EQ-5D VAS. Higher scores indicate a better self-perceived health [9].

- The HeartQol: The HeartQol is a 14-item, disease-specific questionnaire measuring health-related quality of life in cardiac patients. The HeartQol is expressed in a global score and two subscales (a physical scale and an emotional scale). The scales range from 0 to 3, with better scores indicating a better self-rated quality of life [10,11].

- The Edmonton Symptom Assessment Scale (ESAS): The ESAS assess symptoms, including pain, tiredness, nausea, depression, anxiety, drowsiness, appetite, well-being and shortness of breath. The scores of ESAS range from 0 to 10, with lower scores indicating better status [12].

2.2.3. Readmission and mortality

Readmissions were defined as admissions occurring more than 24 hours after the index admission and were obtained from the Danish National Patient Register [4]. Readmissions up to one year after the index admission were included. In this dataset, we included both planned (elective) and unplanned (acute) readmissions, which were pre-defined based on data from the registry. Similarly, causes of readmissions were based on the ICD-10 coding.

Data on all-cause mortality were obtained from the Danish Civil Registration System [3].

2.3. Statistical analyses

To investigate the association between PROs and the risk of readmission, multivariable Cox proportional hazard models were performed with age as the underlying time scale. Results were reported as hazard ratios (HR) with 95% confidence intervals (CI). The models were adjusted for potential confounders (sex, marital status, educational level, smoking, alcohol intake, body mass index (BMI) and comorbidity). The models were performed for the overall population and stratified by diagnostic groups, Tables 2 and 3. The proportional hazard assumption and linear effects were checked graphically, and the assumption was met for all continuous scores, except the SF-12 MCS, which therefore was divided into quintiles for this score. The HADS-subscales were included as dichotomous variables (≥8 vs < 8).

To account for death as a competing risk, the incidence of readmission was evaluated using a cumulative incidence function in a Fine and Gray Proportional Hazard Model [13], Fig. 1.

SAS version 9.4 was used for the analyses.

Funding

The study was funded by Rigshospitalet, Herlev-Gentofte Hospital, Odense University Hospital, Aarhus University Hospital, Aalborg University Hospital and the Novo Nordisk Foundation (grant number: 7229).

Acknowledgements

We would like to thank the patients who took the time to participate in the survey and the 800 cardiac nurses who were involved in the data collection.
Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References