

Study protocol

Project title: Education level and health-related quality of life after oesophageal cancer surgery

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Background

Several studies have found a relationship between socioeconomic status and morbidity as well as mortality.^{1,2} Even in modern welfare states, lower income, education and occupational position predict worse outcomes.³ Higher socioeconomic status has been associated with health benefits and improved survival for some cancer types.⁴⁻⁶ For cancer patients, mortality is known to be predicted by health quality of life (HRQOL).⁷⁻⁹ Moreover, advances in cancer therapy and care have contributed to an increased survival rate. Today, a growing number of people living with and beyond the diagnosis of cancer and HRQOL has become a widely used outcome measure. For oesophageal cancer, the 8th most common cancer worldwide, social inequalities exist, particularly in survival.^{10,11} HRQOL in oesophageal cancer patients seem to improve over time. Many patients recover and return to their baseline HRQOL. However, a significant proportion of patients do not reach full recovery in HRQOL¹²⁻¹⁵. Comorbidities, tumor histology and location, tumour stage and postoperative complications are known risk factors for poor HRQOL after oesophageal cancer surgery^{16,17}. Since education seems to be important for mortality and morbidity, it is important to investigate how education level influences HRQOL. Thus, the purpose of this study is to investigate whether lower education is associated with reduced HRQOL 6 months and 3 years after oesophageal cancer surgery.

Methods

Study design

A prospective, Swedish nationwide cohort study including patients curatively operated for oesophageal cancer during a five years period (2001-2005). Patients were followed up until the end of 2010, i.e. up to 3 years following surgery. Data from participants who gave informed consent are included in the database.

Data collection

A detailed description of this nationwide data collection is found in other publications.^{5,14} In brief, the study is based on a complete, nationwide network of 174 Swedish hospital departments with contact clinicians involved in diagnostic procedures or treatment of patients with oesophageal cancer. Information regarding patient and tumour characteristics, treatment, and complications have been prospectively collected, and based on a predefined study protocol to ensure completeness and uniformity. Comorbidity is predefined as diabetes; cardiac, respiratory, renal or other specified conditions. By linking the unique personal identity number, assigned to all residents in Sweden, information about comorbidity can be collected from the Swedish Patient Register, which contains all in-hospital diagnoses in Sweden since 1987 and all out-patient specialist care since 2001. Patients' self-reported HRQOL has been collected by validated questionnaires at 6 months and 3 years after surgery for oesophageal cancer.

Education level

Information on education is collected from the Longitudinal Integration database for health insurance and labour market (LISA), which holds registers since 1990 and is updated yearly with information on the highest formal education level attained by each Swedish resident

(ref Statistics Sweden). The highest attained education level at the time of the oesophagectomy will be classified into three categories based on the Swedish National School of Administration and Statistics Sweden: 1) Compulsory education, which corresponds to 9 years or less, including primary and lower secondary education (up to the age of 16 years) 2) intermediate education, corresponding to 10-12 years, including upper secondary education (The standard is 3 years) or 3) high education, represented by 13 years or more formal education, including post-secondary education.

Health-related quality of life assessment

HRQOL is assessed using two self-administered questionnaires, both developed and validated by the European Organisation for Research and Treatment of Cancer Quality of Life (EORTC).^{17,18} The EORTC Quality of Life Questionnaire-Core 30 (QLQ-C30) consists of 30 items for measuring HRQOL aspects in cancer patients in general.¹⁷ Questionnaire items are grouped into one global quality of life scale, five function scales (physical, role, emotional, cognitive, and social), three symptom scales (fatigue, nausea/vomiting, and pain), and six single items (dyspnoea, insomnia, appetite loss, constipation, diarrhoea, and financial difficulties). An oesophageal cancer-specific questionnaire, the EORTC Quality of Life Questionnaire–OES18 (QLQ-OES18) is used to assess problems common among oesophageal cancer patients.¹⁸ This 18-item questionnaire consists of four scales (dysphagia, reflux, eating difficulties, and oesophageal pain), and six single items (trouble swallowing saliva, choking, dry mouth, coughing, speech difficulties, and tasting problems). In both questionnaires, the four response alternatives were: “not at all”, “a little”, “quite a bit”, and “very much”. The only exception is the items in the global quality of life scale, which has a seven-graded rating, ranging from 1 (“very poor”) to 7 (“excellent”).

Since we have no baseline data for the QLQ-C30 and QLQ-OES18 questionnaires, HRQOL data from a reference population will be used as a proxy. These data are collected from a random sample of 6,969 adults in Sweden. Among 4,910 (70.5%) participants, complete HRQOL data were obtained from 4,867 (99.1%) individuals. Results from this study can be found in detail in a previous study.¹⁸ Each patient will then be matched to 40 people from the reference population according to age, sex, comorbidity and education level.

Statistical analyses

Due to lack of power, patients with high and intermediate education will be grouped together, and will be regarded as the reference group and compared to patients with low education level. Linear regression model will be used to assess the association between level of education and HRQOL, expressed as mean HRQOL scores with 95% confidence intervals (CIs). The analyses will be performed separately for 6 months and 3 years and further stratified for men and women. We will perform 2 models, a crude (univariate) model examining the association between education level and reduced HRQOL, and an adjusted (multivariate) model to correct for influence of potential confounders. The multivariable regression model will be adjusted for age (<60, 60-75, or >75 years), sex, comorbidities (0, ≥1 according to Charlson Comorbidity Index), tumour stage (0-I, II, III, IV) and tumour histology (squamous cell carcinoma or adenocarcinoma) tumour location (upper/middle, lower oesophagus, or cardia), Body Mass Index (BMI) ≥25, complications appearing within 30 days of surgery (yes or no) and proxy baseline HRQOL scores from the reference population.

Results

Table 1. Patient and tumour characteristics and health related quality of life 6 months after oesophageal cancer surgery categorized by education level.

Table 2. Patient and tumour characteristics and health related quality of life 3 years after oesophageal cancer surgery categorized by education level.

Table 3. Health-related quality of life between patients 6 months and 3 years after oesophageal cancer surgery categorized by education level.

Table 4. Health-related quality of life between men and women 6 months and 3 years after oesophageal cancer surgery categorized by education level.

Figure 1. Health-related quality of life and education level 6 months and 3 years after oesophageal cancer surgery

Clinical significance

If our hypothesis is confirmed, then patients with lower education may need guidance with closer follow-up and more intensive rehabilitation after discharge from hospital to obtain optimal recovery in HRQOL.

Revised time plan

August 2016	Literature review and study planning
September	Starting manuscript writing (introduction, methods and data analysis)
February 2017	Data analysis
April	Interpretations of results
May	Finish manuscript writing
June	Submission to journal

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