



Clinical paper

Representativity and co-morbidity: Two factors of importance when reporting health status among survivors of cardiac arrest

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ARTICLE INFO

Article history:

Received 1 July 2015

Received in revised form 19 January 2016

Accepted 25 January 2016

Keywords:

Cardiac arrest

Comorbidity

Follow-up

Representative

Outcome

Survivors

ABSTRACT

Aim: Reports on differences between respondents and non-respondents of out-of-hospital cardiac arrest (OHCA) survivors are sparse. This study compares respondents with non-respondents in a follow-up study of a consecutive sample of OHCA survivors and describes the relation between respondents' self-reported morbidity and health.

Methods/design: Questionnaires were administered within 12 months after the OHCA. The study population was adult patients who had survived an OHCA during 2008 to 2011, with a cerebral performance score of ≤ 2 at discharge. The patients were identified through the Swedish registry of OHCA. The self-administered comorbidity questionnaire and EQ VAS (Euroqol questionnaire visual analogue scale) was used to measure morbidity and health status.

Results: Of 298 survivors, 224 were eligible for the study and 127 responded. Mean time from cardiac arrest (CA) to follow up was 178 days. Comparing the 127 respondents with the 97 lost to follow-up and non-respondents, no significant differences were found in terms of age, sex, factors at resuscitation and in-hospital interventions. The EQ VAS median was 75 (25th,75th percentile 60,80)). Self-rated health differed between respondents reporting 0–2 conditions ($n = 68$) and respondents reporting more than two ($n = 43$), median EQ VAS 78 (68,90) and 65 (50,80)), respectively; p -value 0.0001.

Conclusions: Despite a limited response rate, representativeness in terms of patient characteristics among survivors of OHCA with an acceptable cerebral function is achievable. A considerable proportion of the survivors lived with the burden of multi-morbidity which worsened health.

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Introduction

The body of knowledge about survival rates after out-of-hospital cardiac arrest (OHCA) is substantial.^{1–3} However, when it comes to reports on patient reported outcome measurements (PROM) after OHCA, sample sizes vary widely ($n = 19–697$),^{4–10} response rates are variable (63–90%),^{4,5,7–14} and analysis of similarities and differences between respondents and non-respondents is frequently lacking.^{6,7,9,11,13–15} This raises concern about the

representativeness of findings on the OHCA population, and thereby, what is actually known about survivors?

To achieve reliable and comparable knowledge about survivors' health status after OHCA researchers need to come to consensus with regard to how and what to evaluate.¹⁶ It is also important to provide a comprehensive description of the sample and compare respondents with non-respondents in order to evaluate the degree of representativeness of the sample in relation to the population under study. Interesting variables in this comparison besides sex and age are CA circumstances and in-hospital patient interventions that can be considered to have impact on survival and future life.

Another factor that might influence self-reported health is the patients' comorbidities. Comorbidity is seldom taken into account in reports of health status of survivors after CA, though it is well known that patients with multi-morbidity have poorer functioning and well-being than those with only one medical problem.^{17–19}

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Self-reported comorbidity data have been suggested to be used for predicting physical functioning and quality of life (QoL),²⁰ and is an efficient way to assess comorbid conditions in research, particularly when medical records are unavailable.²¹ Thereby it could be interesting to relate self-reported comorbidity data to self-reported overall health in this population in order to get a broader knowledge of their life situation.

During year 2008 to 2012 we collected patient reported outcome data from a consecutive sample of OHCA survivors in a region of Sweden. This paper is aimed to address two important factors to receive clearer information about the self-reported health among the population of survivors of OHCA. These factors were the representativeness of the sample and the participating patients' self-reported comorbidity. The research questions were: (a) Are the survivors of OHCA who contribute with information on self-reported health representative in terms of age, sex, factors at resuscitation and interventions in hospital compared with non-respondents? (b) In what way will the patients' self-reported comorbidity influence the self-reported health?

Method

Study design

This retrospective, observational study used postal questionnaires administered within 12 months after the OHCA. It was approved by Regional Ethics Review board, Western Sweden (No. 465-07).

Setting

The setting for the study was a region in Sweden with 1.6 million inhabitants and about 850 CAs annually, with a thirty-day survival rate of about 10%. Within the region there are nine different hospitals in which survivors of OHCA are treated.

Sample

The study population consisted of adult patients who had survived an OHCA which occurred in the region during the recruitment period 1st January 2008 to 31st December 2011. The consecutive sample was identified through the Swedish cardiac arrest register (SCAR). Inclusion criteria were age >18 years, >30 day survival, a Cerebral Performance Category (CPC) score 1 or 2 at discharge and still alive at follow up. Exclusion criteria were cardiac arrest due to trauma, attempted suicide, intoxication or abuse and patients not residents in the region.

Cerebral Performance Category (CPC) score

The CPC score is a 5-point scale (1–5) measuring neurological function. CPC 1 denotes subjects who are alert and have good cerebral function, CPC 2, relatively good cerebral function, CPC 3, conscious but in need of support to carry out the activities of daily living, CPC 4, unconscious and requiring to be at an institution and CPC 5 brain death.²²

The Swedish CA Register (SCAR)

The SCAR is a national quality register supported financially by the Swedish government and the Swedish Association of Local Authorities and Regions. Patients who experience an OHCA for which an Emergency Medical Service (EMS) team is dispatched and on whom CPR and/or defibrillation is started, either prior to or on the arrival of the EMS should be included in the register. Started in 1990, the register has been web-based since 2008 and

currently contains details of almost 100% of OHCA cases. The register form comprises two parts. The first contains variables related to CA treatment, documented by the EMS team on conclusion of the mission. The second part is completed 30 days after the CA event by a trained nurse at the hospital. The variables are in-hospital patient medical treatment and 30 day survival according to medical records. In some cases the national administrative authorities were contacted regarding information about survival when in-hospital records lacked information on this.

Data collection

A postal questionnaire was sent to all patients who met the inclusion criteria and were alive when identified by the research team. The information about whether the patient was alive or not, was received through the national administrative authorities.

If no response was received within 2–3 weeks a reminder was sent. The questionnaires contained no information that could identify the respondents outside the research group, only a code number. The intention was to identify all patients corresponding to the inclusion criteria within the first year after the CA. Data such as sex, age, CA circumstances and in-hospital treatment were collected from the SCAR, both for respondents and non-respondents. Data collection was performed 2008–2012.

Questionnaires

The Self-administered comorbidity questionnaire (SCQ) was used to measure morbidity in the sample.²¹ SCQ has shown modest correlation with a widely used medical record-based comorbidity instrument, the Charlson Comorbidity Index (CCI),²¹ and has been found to be equally good at predicting both QoL and functional capacity,²⁰ when compared to the CCI.

The SCQ comprises 13 items related to heart disease, high blood pressure, lung disease, diabetes, ulcer or other stomach disease, kidney disease, liver disease, anaemia or other blood disease, cancer, depression, osteoarthritis, back pain and rheumatoid arthritis. Up to three additional conditions can be added in the form of open-ended questions. For each condition the respondent is asked whether she/he receives treatment and if it limits her/his activities. A respondent can receive a total of three points for each condition; one point for its presence, one point if she/he receives treatment for it and one point if it limits their activities. The possible range of scale score is 0 to 39 points or 48 points if all three additional conditions are reported.²¹

To measure self-rated health status the EQ VAS (Euroqol visual analog scale) was used.²³ EQ VAS, uses a visual analogue scale, like a thermometer, to record perceptions of the participants own overall health on the current day. The scale is graduated from 0 (the worst imaginable health state) to 100 (the best imaginable health state).²³

Statistical analysis

The SAS data statistical software was used for analysis. The Mann–Whitney–Wilcoxon test was used for differences in continuous variables. For comparisons of dichotomous variables, Fischer exact test was used. All *p*-values were two-tailed and considered significant if less than 0.05. Stratum-adjusted Kruskal–Wallis test was used to calculate sex and age adjusted *p*-values regarding difference in VAS score.

Results

During the study period there were 3082 OHCA in the region reported to the SCAR. Of the 298 patients who were alive at 30 days after the event a total of 224 (75%; 224 of 298) fulfilled the inclusion

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