International Journal of Gynecology and Obstetrics xxx (2016) xxx–xxx

Contents lists available at ScienceDirect

International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo

CLINICAL ARTICLE

Predictive value of self-rated health in pregnancy for childbirth complications, adverse birth outcomes, and maternal health

Irena Stepanikova [a,b,*], Lubomir Kukla [a], Jan Svancara [a,c]

[a] Research Centre for Toxic Compounds in the Environment, Masaryk University, Brno, Czech Republic
[b] Sociology Department, University of Alabama Birmingham, Birmingham, AL, USA
[c] Institute of Biostatistics and Analysis, Masaryk University, Brno, Czech Republic

ARTICLE INFO

Article history:
Received 23 November 2015
Received in revised form 10 March 2016
Accepted 9 June 2016

Keywords:
Birth outcomes
Childbirth complications
Maternal health
Pregnancy
Self-rated health

ABSTRACT

Objective: To investigate whether self-rated health (SRH) in pregnancy can predict childbirth complications, adverse birth outcomes, and maternal health problems up to 3 years after delivery. *Methods:* A retrospective analysis was performed of data obtained in a prospective longitudinal population-based birth cohort study. Pregnant women resident in the Brno or Znojmo regions in the Czech Republic were included if they were expected to deliver between March 1991 and June 1992. SRH data were collected between 1991 and 1995 via pen-and-paper questionnaires administered in mid-pregnancy, and at 6 months, 18 months, and 3 years after delivery. Medical records were reviewed for pregnancy complications, childbirth complications, and birth outcomes. Multivariate regression analysis was performed. *Results:* Overall, 4811 women were included. Better SRH in pregnancy predicted fewer childbirth complications ($b=-0.03$; $P=0.036$); lower odds of cesarean delivery (odds ratio 0.81; $P=0.003$); and fewer maternal health problems at 6 months ($b=-0.32$; $P<0.001$), 18 months ($b=-0.28$; $P<0.001$), and 3 years after delivery ($b=-0.30$; $P<0.001$). The effects of SRH were independent of diagnosed complications and self-reported health problems in pregnancy. *Conclusion:* SRH in pregnancy has predictive value for subsequent health outcomes, and might be an additional tool for assessment of pregnant women's health.

1. Introduction

Self-rated health (SRH) is an increasingly popular indicator of health status. It has been employed since the 1950s [1], but its use has increased rapidly in recent years. A PubMed-based search in February 2016 showed that publications with "self-rated health" in the title or abstract increased from 424 in the period 1980–2000 to more than 2000 in the past 5 years.

Arguably, SRH owes its popularity to several advantages. From a practical point of view, its main strength is its simplicity and ease of use. Typically, SRH is assessed via one item asking respondents to rate their health on a Likert-type scale. This brief measure has an undeniable appeal both for researchers concerned with respondent burden and cost [2], and for practitioners interested in perceived health.

From a conceptual perspective, SRH captures a broader, more comprehensive view of health as compared with objective measures such as clinical diagnoses and biomarkers of risk. Ratings of own health represent a complex human judgement and reflect an array of factors, some of which are inherently subjective [3], such as bodily sensations, subjectively experienced symptoms, perceptions of health history, awareness of risks (hereditary, environmental, and behavioral), social comparisons, and perceived cultural conventions [1,4]. When making judgements about their own health, individuals actively filter subjective somatic sensations and medical events, discounting experiences such as recent acute illness that are not meaningful indicators of long-term health [5]. SRH captures nonspecific symptoms of various illness states that can be overlooked in routine clinical practice, such as hyperalgesia, weakness, changes in sleep and eating patterns, and decreased motivation [6]. In summary, SRH reflects physical, emotional, and social well-being, not just absence or presence of disease. This makes it compatible with WHO's holistic definition of health [7].

Given the subjective nature of SRH and the as-yet incomplete understanding of what it is that SRH captures precisely [1], the examination of its predictive value for objective health outcomes has been a central part of the effort to justify its scientific use. In 1997, a review of 27 representative community studies in 13 countries [8] revealed that SRH consistently predicted mortality after adjusting for morbidity. More recent work corroborates this

* Corresponding author at: Sociology Department, University of Alabama Birmingham, 1401 University Blvd, Birmingham, AL 35233, USA. Tel.: +1 205 934 3308; fax: +1 205 975 5614.
E-mail address: irena@uab.edu (I. Stepanikova).

http://dx.doi.org/10.1016/j.ijgo.2016.03.029
0020-7292/

conclusion and clarifies how the association between SRH and mortality varies by sociodemographic characteristics [9–11].

The predictive value of SRH is largely unknown in pregnancy because most prospective studies focus on midlife and older age. For example, poorer SRH has been shown to predict: future onset of coronary heart disease, diabetes, stroke, lung disease, and arthritis among individuals aged 51–61 years [12]; higher rates of physical disability after a major medical event among elderly people [13]; and more physician visits and hospitalization among elderly Canadians [14]. A Danish prospective study [15] linked SRH in pregnancy with a higher risk of rheumatic arthritis. In cross-sectional studies, poorer SRH in pregnancy has been associated with objective diagnoses, higher body mass index, psychologic stress, past smoking, and inflammation [16], and retrospective ratings of own health during pregnancy have been linked with preterm birth, low birth weight (LBW), and small-for-gestational-age neonates [17].

However, the predictive value of SRH, as previously documented for more stable life periods, cannot be assumed for pregnant women. Pregnancy represents a dynamic life phase with unique features. The bodily changes are profound, and symptoms that would probably indicate illness in nonpregnant women—e.g. nausea, vomiting, fatigue, and pain—occur frequently in otherwise healthy pregnancies [18]. Changes in health behaviors during pregnancy are common [19], because many women limit risks such as smoking and alcohol consumption and obtain health care if available. At the same time, bodily changes make physical activity challenging for some women, and emotional changes can add to stress. Given this complex picture, the aim of the present study was to evaluate the value of SRH in pregnancy for prediction of birth complications, birth outcomes, and subsequent maternal health problems.

2. Materials and methods

Data were retrospectively assessed from the European Longitudinal Study of Pregnancy and Childhood in the Czech Republic (ELSPAC-CZ), a population-based prospective birth cohort study conducted in the Brno and Znojmo regions of the country between 1991 and 2011. ELSPAC-CZ, which aims to assess children's health from the fetal period until the age of 19 years, is part of ELSPAC, a multisite study initiated by WHO to identify factors that affect pregnant women's and children's health in Europe [20]. Before data collection, ELSPAC-CZ was approved by the Scientific Council of Pediatric Research Institute in Brno concerning the adherence to ethical standards. In 2002, the study was moved to Masaryk University and approved by its Ethical Council. All participants gave written informed consent.

Eligibility criteria for ELSPAC-CZ included a permanent address in the districts of Brno or Znojmo, and an expected date of delivery between March 1, 1991, and June 30, 1992. Recruitment to ELSPAC-CZ was conducted in collaboration with local gynecologic practices identified in a central registry. The goal was to reach the whole population of pregnant women in Brno and Znojmo districts within the specified period. Gynecologists were contacted with a request to identify potential participants, inform them about the purposes of the study, and ask about interest in participation. Consent forms and pen-and-paper questionnaires were distributed to prospective participants, either by staff during a prenatal visit or by mail. Most baseline questionnaires were distributed around week 20 of pregnancy. Women were asked to complete questionnaires within 4 weeks and return them during a prenatal visit or by mail using a pre-addressed envelope. Follow-up surveys were collected at 6 months, 18 months, 3 years, 5 years, 7 years, 11 years, 13 years, 15 years, 18 years, and 19 years after delivery. At each timepoint, a reminder was mailed to non-respondents. Women who did not respond to the reminder were contacted to schedule an at-home visit. As incentives, participants received discount cards sponsored by local businesses.

The present analysis was based on a record review of a subset of data collected between 1991 and 1995 from women who completed self-administered questionnaires during pregnancy in 1991–1992. SRH was measured as part of the baseline questionnaire using the question: "How would you rate your health in the last 2 weeks?" The answer was rated on a scale of 1 to 5 ("always poor," "often poor," "occasionally poor," "usually good," or "excellent"). On the basis of prior research [7,10], this variable was treated as continuous. During a pilot study, pregnant women had been asked to comment on clarity of survey instruments, problems with understanding, sensitivity of questions, time demands, and other issues. Revisions based on these comments were incorporated into the final survey instrument.

Pregnancy complications were extracted from medical charts, including: vaginal bleeding during the first trimester; vaginal bleeding during the second trimester; placenta previa; placental abruption; hyperemesis gravida; genital herpes; urinary tract infection; glycosuria; edema, proteinuria, or hypertension; eclampsia; diabetes; suspected fetal growth retardation; polyhydramnios; oligohydramnios; and a threat of premature delivery. A dichotomous variable for each complication was coded as 0 (not present) or 1 (present). A summary indicator was constructed as the mean across individual complications and rescaled to the range 0–15 to facilitate interpretation.

Birth outcomes included LBW (<2500 g) and mode of delivery (coded as cesarean or other). Childbirth complications extracted from the medical charts included edema, fever, prolonged first stage of labor, prolonged second stage of labor, arrested labor, alterations in fetal heartbeat, meconium in amniotic fluid, uterine abruption, eclampsia, umbilical cord prolapse, umbilical cord coiled around neck, and obstructed labor. Each complication was coded as 0 (not present) or 1 (present). As above, a summary indicator was constructed as the mean across individual complications and rescaled to 0–12.

Self-reported maternal health problems were assessed in mid-pregnancy and at 6 months, 18 months, and 3 years after delivery. At each time, respondents were presented with a list of health problems and asked to report whether they had experienced each problem. At mid-pregnancy, participants reported the following problems experienced since the beginning of their pregnancy: nausea, vomiting, diarrhea, bleeding from vagina, urinary tract infection, flu, yeast infection, and herpes on genitals. Problems reported at each observation time after delivery included headache, backache, digestive problems, cough or cold, flu, bronchitis, breathing problems, urinary tract infection, and hemorrhoids or piles. At 6 months, participants were asked about problems experienced since the delivery. At 18 months and 3 years, they reported problems experienced since 6 months and 18 months, respectively. Each problem was coded 0 (no) or 1 (yes). A summary indicator for each observation period was calculated as the mean across conditions and rescaled to the range 0–8 for mid-pregnancy and 0–9 for postdelivery observation times.

Control variables included the highest level of education (basic/vocational, secondary school, university), age in years, marital status, household size, singleton versus multiple pregnancy, and smoking. A parity indicator was based on women's reports of whether they had children.

Owing to funding limitations, an electronic database of the ELSPAC-CZ data was compiled only recently, facilitating the present analysis. Analyses were done with Stata version 14 (StataCorp, College Station, TX, USA) and in three steps. First, sample characteristics were estimated. To account for missing data, all analyses used multiple imputation with chained equations, also known as imputation using fully conditional specifications [21] or sequential regression multivariate imputation [22].

Second, multivariate analyses were performed using general linear models with robust variance estimators to account for deviations from normality. The models assessed how SRH in pregnancy was related to adverse birth outcomes, the index of childbirth complications, and indices of self-reported maternal health problems at the three timepoints after delivery. An identity link function was used for indices of birth complications and health problems; a logit link function was used for birth outcomes.

Please cite this article as: Stepanikova I, et al, Predictive value of self-rated health in pregnancy for childbirth complications, adverse birth outcomes, and maternal health, Int J Gynecol Obstet (2016), http://dx.doi.org/10.1016/j.ijgo.2016.03.029