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Insurees' preferences in hospital choice—A population-based study

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ABSTRACT

In Germany, the patient himself makes the choice for or against a health service provider. Hospital comparison websites offer him possibilities to inform himself before choosing. However, it remains unclear, how health care consumers use those websites, and there is little information about how preferences in hospital choice differ interpersonally.

We conducted a Discrete-Choice-Experiment (DCE) on hospital choice with 1500 randomly selected participants (age 40–70) in three different German cities selecting four attributes for hospital vignettes. The analysis of the study draws on multilevel mixed effects logit regression analyses with the dependent variables: "chance to select a hospital" and "choice confidence". Subsequently, we performed a Latent-Class-Analysis to uncover consumer segments with distinct preferences.

590 of the questionnaires were evaluable. All four attributes of the hospital vignettes have a significant impact on hospital choice. The attribute "complication rate" exerts the highest impact on consumers' decisions and reported choice confidence. Latent-Class-Analysis results in one dominant consumer segment that considered the complication rate the most important decision criterion.

Using DCE, we were able to show that the complication rate is an important trusted criterion in hospital choice to a large group of consumers. Our study supports current governmental efforts in Germany to concentrate the provision of specialized health care services. We suggest further national and cross-national research on the topic.

1. Introduction

Germany has one of the highest hospital bed densities in the world (8.2 per 1000 inhabitants) [1] spread across a total number of 1956 hospitals [2]. Unlike other countries, a distribution plan for patients does not exist [3]. Germany therefore provides the choice between several hospitals to most of its citizens in case of need. Whereas financial issues on the side of the patient do not play a major role in this decision (due to a mandatory health insurance system for every German citizen or permanent resident) there may be grave differences in quality and efficiency between health care providers [4].

Over the last two decades, the internet has provided patients with multitudes of new informations on hospital performance. Websites such as the "Weisse Liste" (White List) offer information concerning structure and performance of hospitals [5]. Consequently, for the first time in history, a future patient has a wealth of information at hand when it comes to choosing a hospital for elective procedures. However, previous studies in various countries suggest that only a selective group of patients, that have always actively taken care of their health and treatment options, are able to benefit from the new possibilities [6–11]. In Germany, only about 1/3 of all consumers know of the possibility to compare hospitals online [7]. In addition, General Practitioners make limited use of hospital comparison websites to support patient choice [12].

This study aims to find out more about the importance of crucial aspects of hospitals to different consumers representative for the general public.

For this purpose, the present study used discrete choice methodology to estimate the relative likelihoods of choosing a certain hospital among a set of alternatives. Discrete choice methodology

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has seen growing interest in health research as a method for eliciting stated preference [13–15]. In a typical DCE, participants choose their preferred scenario with certain characteristics (attributes) and associated specified ranges (levels) among a set of alternatives. The analyses of stated preferences offer important insights about the relative contribution of alternatives' attributes in the decision process [16].

DCEs have been used and approved for similar aims [17–20] as in the present study. Although it has been used for this purpose abroad before [21–23], too the authors knowledge this is the first time a study applies the method to assess hospital choice in Germany.

2. Methods

The study team sent out a postal survey in October 2014–1500 German addressees between the ages of 40 and 70 years in the three cities Magdeburg, Wittenberg and Stendal in the East German state of Saxony-Anhalt (which equals one hospital-planning region of 16 within Germany). The three cities represent a big city (Magdeburg), a middle-sized city (Wittenberg) and one with rural character (Stendal). Including these three types of areas allows for assessing the preferences of health care consumers coping with varying access to care [24], enhancing the generalizability of results. We chose to set the lower age limit to 40 years to avoid bias by women (sub)consciously choosing a hospital for birth [25,26]. We assumed, older respondents might have difficulties in comprehending our questionnaire. Therefore, we set the upper age limit to 70. Random samples were officially obtained from the respective residents' registration offices. The data collection was undertaken anonymously. The Ethics Committee of the Otto-von-Guericke-University of Magdeburg (Germany) reviewed and approved the study (Ref 102/14).

2.1. Discrete choice study

DCEs make the respondent choose between several options (from now on referred to as "vignettes") differing in their attribute levels. By doing this, they try to elucidate the preferences regarding the attributes and attribute levels. In the present study, each choice task represents a set of two hospital vignettes.

The team of researchers selected the attributes and levels of the DCE based on desk research in hospital rating portals and the criteria these portals used to deliver information about hospital quality (e.g. Weisse Liste, TK-Klinikführer), as it was one aim of the study to find hints which hospital criteria to exhibit on hospital comparison websites to give usable and valuable information to patients. Eventually, we chose "distance to hospital", "level of information about the treatment", "number of respective treatments performed in this hospital per year", "complication rate compared to other hospitals" as attributes (displayed on the vignettes in this order). Implemented attributes and levels also closely mirror those reported in previous studies [21,27,28]. All appeared in two levels, of which one level was positive (from now on referred to as level 1) and the other level negative (level 2). Thus, there exist $4^2 = 16$ different hospital vignettes, all of which were included in the study. For example, for "distance to hospital", we chose "1 km from your home" as the positive level representing a hospital located in walking distance in the same city, and "20 km from your home" as the negative level representing a hospital in a neighboring city you need a car or public transportation to reach. While previous studies in the domain of adaptive choice-based conjoint also used 20 km as the maximum distance[21], $(20\,\text{km})^2 = 400\,\text{km}^2$ is also in line with recent figures about average catchment area of German hospitals [24]. For "number of respective treatments performed in this hospital per year" we chose "more than 100 per year" as the positive level and "less than 50 a year" as the negative level as these numbers were realistic for both diagnoses included in the study.

Participants in the study faced two diagnoses, one from the area of internal medicine (tumor search) and one from the area of surgery (cholecystectomy) along with a suggested treatment. They then were presented with eight pairs of hospital vignettes (four for each diagnosis) and indicated in which of the two hospitals they would prefer to undergo treatment. Therefore, each respondent evaluated eight of 16 possible vignettes for each diagnosis in a fractional design. We composed individual choice tasks according to a "balanced overlap" experimental design that pursues D-Optimality across all respondents [29–31] but relaxes the criterion of level balance to better capture possible interactions between hospital attributes as well as to make the choices more challenging [32]. Participants always had to decide for one of the presented options in a forced-choice paradigm; it was not possible to choose both or neither one of the vignettes. Furthermore, each addressee indicated the confidence of choosing from the choice set on a numeric rating scale (NRS, ranging from 1 = "very uncertain" to 10 = "very certain"). We also implemented a gauging vignette that was identical for all the test persons and had to be valued by its quality on an NRS between 1 and 10 instead of a comparison to another vignette. A questionnaire on personal information, e.g. age, gender, education and profession, supplemented the DCE to discover possible associations between personal traits and preferences in hospital choice (see Table A1 in Supplementary material).

We randomly administered two questionnaire versions (Fig. 1). Version 1 described the vignette attributes in a few words, version 2 also featured a star rating for each attribute, much like for hotels [33]. It is discussed to affect consumer preferences [34–38]. We aimed to find out if that is the case in hospital choice. In our study, the star rating was five out of five stars for level 1 and three out of five for level 2.

As a measure of comprehension, we asked for the time needed to complete the questionnaire. Respondents on average needed 17.2 min (SD = 11.1) to complete the questionnaire. There were no statistically significant differences between the two versions regarding the time spent answering the questionnaire.

2.2. Statistical analysis

The statistical analysis of stated preferences is based on multilevel mixed effects logit models with random effect intercept that took into account clustering of multiple hospital vignettes per respondent (8 choice tasks x 2 vignettes each). The decision to choose a certain hospital vignette for treatment ("yes" vs. "no") served as the binary dependent variable.

The independent variables (Table A1, in Supplementary material) were dichotomous by nature or were dichotomized for analysis. The confidence of the respondent in choosing from the choice set was split at the median = 8; NRS 1–8 referred to as "low confidence" vs. 9–10 "high confidence" [19]. Since a significant fraction of answers fell on the median ("8"), only 38.9% of the answered choice sets had a "high confidence".

As a measure of educational level, we employed the CASMIN (Comparative Analysis of Social Mobility in Industrial Nations) classification, an instrument developed to compare educational attainment internationally with the following three categories: low, middle, and high educational level [39,40].

We assessed odds ratios for multilevel mixed effects logit regression of each attribute in terms of the sign, magnitude, and significance of the respective coefficient. Likewise, we analyzed participants' and other factors (i.e. questionnaire version and confidence of choice) in terms of the sign and significance of the corresponding coefficient estimate. For the vignettes' attributes, we estimated main effects. Our design forbids estimating main