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Characteristics and decision making of hospital report card consumers: Lessons from an onsite-based cross-sectional study

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ABSTRACT

Background: Hospitals report cards (HRCs) have had little impact on the hospital choice of patients. Thus, health policy makers should learn more about HRC consumers to better understand how to present and target hospital-related quality information.
Objective: We sought to learn more about consumers of HRCs and determine the impact of the complexity and tailoring of HRCs on the hospital choice.
Methods: We used primary data drawn from an onsite-based survey, conducted in 2017 at Germany's premier portal, Weisse Liste (N = 635). We performed hierarchical multivariate logistic regression models to identify main predictors associated with hospital choices.
Results: HRC consumers differ from the national online population and the national population in general. Eighty percent of those patients or family members, who have used a HRC before, confirmed an impact on the hospital choice. The quality of hospital choices decreased with an increasing level of complexity ($p < .001$); the latter was identified as a significant predictor for making good choices. However, tailoring HRCs did not have an impact on the quality of the hospital choice ($p > .05$).
Conclusions: HRCs have a significant impact on the hospital choice among report card consumers. Health policy makers might focus on decreasing the level of complexity; this, more than tailoring report cards, may help consumers make good hospital choices.

1. Introduction

Public reporting of performance information about hospitals is widely discussed as a mechanism for improving transparency, accountability, choice, and quality of healthcare [1,2]. In particular, the increased level of transparency thereby achieved is proposed to guide patients to better-performing hospitals [3–5]. For this purpose, publicly available Internet rating websites (referred to in this paper as "hospital report cards" [HRCs]) have been developed and implemented in many high-income countries over the last two decades (e.g., Hospital Compare in the US, NHS Choices in the UK, Weisse Liste in Germany) [6–8]. Even though report cards differ widely between and within countries [1,2,6], they basically provide patients with quality-related information on hospitals and also enable hospital comparisons [9]. Thus far, systematic reviews have shown mixed results on whether public reporting has an impact on hospital choices of consumers [3,10,11]. Nevertheless, it seems likely that public reporting will gain even more importance in the near future [12]. For example, the Center for Healthcare Transparency has stated the vision of making information on the quality of health care services available to half of the US population by 2020, as a means of enabling and supporting the public in making more informed health care decisions [13].

Despite the growing body of evidence, we still need to learn how to increase the impact of public reporting [14]. As stated by Hibbard, the focus of the "next generation" of interventions to support consumer choices should aim at gaining a better understanding of HRC consumers and trying to meet them where they are [15]. The current research will help obtain an understanding of whom we are reaching and, further, better support informed consumer choices [15]. Thus far, no research has surveyed report card users at the point of seeking information about hospitals. Most studies have surveyed online samples [14,16,17], the general public [18], employees

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[19,20], nursing home residents [21], and others. Even though we have learned important lessons from those studies, the surveyed samples are not likely to be representative of patient groups or report card consumers. For example, the mean age of the sample in a study investigating the comprehension of hospital-related quality information for hip replacement surgery in the United States was 45.4 years [14]. In contrast, the mean age of primary hip arthroplasty patients in the United States in 2015 was 65.4 years [22]. This divergence might limit, at least to some extent, the usefulness of the derived findings.

Furthermore, we still need to better understand how to present and target publicly-reported quality information so that it is comprehensible to patients [14,23]. Several studies have shown that consumers struggle when using complex health information [14,16,17,19,20]. For example, in an experiment on the comprehension of a slightly modified version of Hospital Compare, only every second patient selected the hospital with the best clinical results [14]. Besides this, Schlesinger and colleagues have shown that the quality of decision-making decreases with an increasing level of complexity [16]. In this context, one promising strategy to build useful and effective report cards is to provide tailored or customized information that reflects the preferences of individual consumers [12,24–27]. Consumers should be able to refine the content and presentation of quality information and tailor the information provided [23,26]. For example, Smith and colleagues demonstrated in a qualitative study that consumers value report cards that are interactive, they feel are relevant to their situation, and provide them with a feeling of empowerment to support action [12]. Yet, little evidence has been published regarding the consumer perspective on tailoring hospital quality-related information [12,15,28]. The aim of this study was to (1) learn more about the characteristics of HRC consumers; (2) determine the impact of HRCs on the hospital choice; and (3) determine the impact of the complexity and tailoring of HRCs on the hospital choice.

2. Methods

This study was designed as an onsite-based, between-subjects experimental survey on Germany's premier transparency portal, Weisse-Liste.de (WL) [8]. Over a 5-month period (January through May 2017), we invited all consumers of WL, who either searched for specific hospital quality information or conducted hospital comparisons, to participate in the study.

2.1. The survey instrument

The questionnaire consisted of four parts. First, we collected general information to gain a better understanding of HRC consumers [15]; this included their expectations of the usage of WL, past hospital search behavior, and the current state of their hospital decision-making process. Next, we conducted an online-based experiment to analyze the comprehension of different report cards.

Table 1
Overview of the study sample (p value was calculated using chi-square test) (N = 635).

Variable	Study Sample %	Comparison groups					
		WL user[§]	p	Germany general[&]	p	Germany online[#]	p
Age							
29 years and younger	8.1%	5.9%		30.5%	<.001	30.3%	<.001
30 to 39 years	10.7%	11.7%		12.5%		16.3%	
40 to 49 years	14.9%	17.3%	.210	13.4%		20.8%	
50 to 59 years	28.8%	27.9%		16.0%		17.0%	
60 to 69 years	21.5%	21.8%		11.9%		15.7%	
70 years and older	16.0%	15.3%		15.7%			
Gender							
Male	40.5%	42.6%	.262	49.3%	<.001	52.2%	<.001
Female	59.5%	57.4%		50.7%		47.8%	
Educational attainment							
(Technical) University entrance qualification or higher	63.6%	63.2%		32.2%	<.001	34.8%	<.001
Intermediate secondary school	25.3%	25.9%	.363	30.8%		30.3%	
Secondary general school	10.2%	10.6%		32.9%		35.0%	
Without school qualification	0.8%	0.4%		4.1%			
Health insurance coverage							
Statutory Health Insurance (additional private HI)	62.8%	65.3%	.140	88.4%	<.001	n.a.	n.a.
Statutory Health Insurance (no additional private HI)	19.7%	16.8%				n.a.	
Private Health Insurance	17.5%	17.8%		11.6%		n.a.	
Marital status							
Married	31.9%	n.a.		43.9%	<.001	n.a.	n.a.
Widowed	18.1%	n.a.	n.a.	6.9%		n.a.	
Divorced	23.7%	n.a.		7.5%		n.a.	
Separated/never married	26.3%	n.a.		41.6%		n.a.	
Chronic conditions							
Yes	50.2%	n.a.	n.a.	38.8%	<.001	n.a.	n.a.
No	10.2%	n.a.		61.2%		n.a.	
I doń know	5.7%	n.a.		n.a.		n.a.	
Health Status							
Very good	15.4%	n.a.	n.a.	22.0%	<.001	n.a.	n.a.
Good	41.9%	n.a.		49.6%		n.a.	
Satisfactory	27.1%	n.a.		21.9%		n.a.	
Less good	7.6%	n.a.		5.4%		n.a.	
Bad	2.4%	n.a.		1.0%		n.a.	
I wish not to answer this question	5.7%	n.a.		n.a.		n.a.	

[§] Education is derived from an onsite-based survey conducted in 2015. Age and Gender are derived from an onsite-based survey conducted in 2016. Health insurance coverage is derived from another onsite-based survey conducted in 2017. [Numbers for respondents without HIC are not presented.].

[&] Age, Gender, Education (not considering those still in educational programs; 3.7%), Marital Status derived from the German Federal Statistical Office (2016); Chronic Conditions, Health Status from the Robert Koch-Institut (2012) [p value was calculated without considering those who didn't know or did not want to answer.].

[#] Age, Gender, Education are derived from AGOF (2015).

Each respondent was randomly assigned to answer two choice tasks for both the current report card design of WL and one of two tailored report card designs (see below). To pose hospital choice tasks in a realistic fashion, we followed Lagu and colleagues (2013) [29] and slightly modified WL [8]. The baseline version of the report card includes information on patient satisfaction, procedure-relevant medical equipment, number of patients treated, metrics of technical quality of care, patient safety and hygiene, and travel distance (supplementary material 1). We varied the complexity of both choice tasks by assigning respondents to HRCs incorporating 5, 10, or 15 hospitals. To assign realistic information, we derived data from the German hospital quality reports as well as WL, though we assigned this information to unnamed hypothetical institutions. Each report card contained one dominating as well as one dominated hospital; the dominating hospital performed equally to or better on all dimensions, compared to the other hospitals in the choice set [14]. Finally, we collected sociodemographic information. The main outcome measures were the selection of the dominating performing hospital. Before conducting the study, the questionnaire was piloted by 20 individuals and modified accordingly. We designed the survey using Questbacks Internet-based EFS Survey software.

2.2. Tailoring hospital report cards

We randomly assigned respondents to two different tailoring arms. Based on Sandmeyer and Fraser as well as Kumpunen and colleagues [24,30], respondents were able to calculate an individual composite measure in the first arm of our study. Composite measures combine a large number of specific measures that may or may not be highly related to one another statistically and require the decision maker to differentially weigh the various factors according to individual values, preferences, and needs [23,31]. Respondents were able to score each of the above mentioned six hospital information items on a 1–5 scale (1 = not all important; 5 = extremely important). Based on the respondents'results, we presented an individual composite measure for each hospital in addition to the baseline version of WL. In our second arm, respondents initially had the opportunity to determine the number and order of hospitals on the report card. In a qualitative study, Zwijnenberg and colleagues demonstrated that respondents' preferences differ concerning how many and in which order health care providers should be presented [32]. Another study by Bardach and colleagues showed that most respondents wanted websites to provide additional ways of sorting information as one improvement approach [33]. Based on this, the respondents had the opportunity to choose between a low, medium, or high number of hospitals within each study arm and to determine the information item for ordering the hospitals (see above).

2.3. Data analysis

Results are presented as both mean and standard deviation for scaled survey items and as numbers and percentages for non-scaled survey items. We performed comparisons regarding the selection of the dominating hospital using the one-way analysis of variance (ANOVA) test and Tukey post hoc test. Additionally, we used chi-square for nonparametric data (two-sided). We conducted hierarchical multivariate logistic regression models to identify main predictors associated with selection of the dominant hospital. Thereby, we introduced an additional set of variables demonstrated by past research to affect medical decision-making behavior in each stage [14]: (1) baseline model (including exclusively variables for experimental arms); (2) adding demographic measures (age, gender, marital status, education, health insurance) [4,34,35]; (3) adding health-related experiences (chronic conditions and health status) [14,36]; (4) adding decision-making style (perceptions of quality differences among hospitals, maximal travel distance) [14]. We applied Bonferroni correction to account for the bias of repeated testing effects. Thus, we used adjusted p-values to test for significance by setting the significance cut-off at α/n for each model. Here, n refers to the number of hypotheses (i.e., variables) being tested in our regression models. All statistical analyses were conducted using SPSS version 25.0 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Observed differences were identified as statistically significant if $p < .05$ and highly significant if $p < .001$.

Table 2
User-related information who searched for hospital information on WL (N = 635).

Characteristics	%
What describes you best as a user of WL?	
Patient	56.9%
Family member/friend	18.7%
Referring physician	1.3%
Others (e.g., hospital management)	23.1%
Which are your expectations for your hospital search on WL?	
I want to choose the appropriate hospital	56.2%
I want to elaborate the quality of a specific hospital	56.1%
I want to compare potential hospitals	48.2%
I am searching practical information about a hospital	32.8%
I want to prepare for an encounter with my physician	11.7%
I am interested in the content of WL	8.7%
Others	4.4%
How often have you used HRCs to search for a hospital before?	
Never	35.3%
Once	34.8%
More than once	29.9%
Perceived differences in the quality of care of hospitals	
Big differences	84.4%
Small differences	12.1%
No differences	0.5%
I don't know	3.0%
How far would you be willing to travel to receive treatment in a well-performing hospital?	
–29 kilometers	9.0%
30 - 49 kilometers	19.5%
50–99 kilometers	25.2%
100–199 kilometers	14.5%
200 kilometers and more	31.8%
The percentage of *all patients or family members/friends* (n = 480) who...	
state that is (very) likely to use the information for the upcoming hospital choice[&]	72.1%
state that is (very) likely to use the information during the next encounter[&]	65.8%
have already used HRC for hospital comparison purposes before[§]	63.1%
have already spoken with their physician about the hospital choice[§]	53.8%
have already made their final decision about which hospital to choose prior using WL[§]	35.4%
have undergone the relevant medical procedure before[§]	30.2%
The percentage of *all respondents who have used a HRC before* (n = 411) and...	
have been influenced for choosing a particular hospital (positive impact)[§]	65.7%
have been influenced for choosing to avoid a particular hospital (negative impact)[§]	58.9%
have been influenced (overall impact)[§]	73.7%
The percentage of *all patients or family members/friends who have used a HRC before* (n = 303) and...	
have been influenced for choosing a particular hospital (positive impact)[§]	71.0%
have been influenced for choosing to avoid a particular hospital (negative impact)[§]	64.0%
have been influenced (overall impact)[§]	79.5%

[§] Yes/No question.
[&] 1–5 scale question.

3. Results

Overall, 635 respondents (59% completion rate) participated in the online survey (mean duration 15.57 min, *SD* 7.31). The mean age was 54.29 (*SD* 14.98) years, 378 respondents were female (59.5%), 510 respondents were covered by Statutory Health Insurance (82.5%), and 319 respondents (50.2%) stated they suffered from at least one chronic condition (Table 1). Our surveyed population is representative of typical users of WL ($p > .05$ for each) but could be shown to differ significantly from both the German online and general population.

As presented (Table 2), three-quarters of HRC consumers had either been patients themselves (n = 361) or family members (n = 119). Fifty-six percent of the respondents used the HRC with the intention of choosing the appropriate hospital or determining the quality of a specific hospital. Almost half of all respondents (n = 294) were willing to travel more than 100 km to receive treatment in a well-performing hospital. Besides this, 84.4% perceived big differences in the quality of care of hospitals. Seventy-two percent of all patients or family members/friends stated that it was (very) likely they would use the information for the upcoming hospital choice. Furthermore, 303 respondents (73.7%) who have already used a HRC, confirmed an impact of HRCs on their hospital choice in the past. Regarding only patients or family members/friends who have used a HRC before (n = 303), a slightly higher impact (79.5%) on past hospital choices could be detected.

In our first experimental arm, the respondents were asked to rate the importance of different hospital information items for deriving an overall score. Here, respondents rated patient safety & hygiene (4.62; SD 0.79), procedure-related medical equipment (4.51; SD 0.86), and the numbers of cases treated (4.47; SD 0.89) as most important (supplementary material 2). In contrast, patient satisfaction (3.85; SD 1.09) and travel distance (2.68; SD 1.20) were rated less important. In our second experimental arm, respondents had the opportunity to determine the number and order of hospitals on the HRC. Here, the number of cases treated was the most frequently selected criterion for ordering hospitals (37.9%).

We could determine a significant decline in the proportion of HRC consumers who selected the dominating hospital with an increasing level of complexity for any of the three designs (Table 3). The quality of the hospital choice eroded with an increasing level of complexity for the basis report card design ($p < .001$), the tailored HRC incorporating an additional composite measure ($p = .002$), but also when consumers had the opportunity to tailor the HRC by determining the number and order of hospitals ($p = .038$). In contrast, there were no significant differences in the results for selecting the dominating hospital between tailored and non-tailored HRC. The impact of complexity on the choice of the dominating hospital was consistent and significant in all of our models (Table 4). Even after accounting for participant demographics, health-related information, perceived differences in the quality of care and maximal travel distance, those presenting with a high (OR: 0.25; 95% CI: 0.16-0.39, $p < .001$) or middle-level complexity (OR: 0.57; 95% CI: 0.37-0.87, $p < .05$) in the decision-making process were significantly less likely to select the dominating hospital. By contrast, tailoring of the HRC could not be shown to be significantly associated with the choice of the dominating hospital (p>.05 each).

4. Discussion

Based on our findings, HRC consumers differ from the national online population and the national population in general. We could see that HRC consumers tend to be of higher age, are more likely to be female, have higher educational levels, are more likely to suffer from chronic conditions, and have a lower health status. Comparing our findings with previous studies, [6,37] HRC consumers are also more likely to be aware of quality-of-care differences between individual hospitals than the population in general. For example, in a study surveying a representative United States online sample [6], 42% of all respondents perceived big differences in quality of hospital care and 34% perceived small differences. In contrast, we found that 84% of HRC consumers perceived big differences and only 12% perceived small differences in the quality of care of hospitals. Additionally, we could determine that two-thirds of HRC consumers (64.6%) had not yet made her/his final hospital decision. Thus, most HRC consumers are still indecisive about where to seek treatment and might be likely to be responsive to the hospital information. In this context, more than 70% of the respondents in our study confirmed an impact of HRC on their hospital choice in the past or their upcoming hospital choice what is in line with previous findings [6,37]. Based on this, one might assume that public reporting has an impact on hospital choice; this is somewhat contrary to results from systematic reviews [3,10,11]. However, the most recent Cochrane Review also concluded that the existing evidence base was inadequate for deriving strong policy implications, due to limitations in the underlying literature in such areas as the setting of the studies, health conditions examined, type of performance data, and the mode of data publication [11].

We investigated the specific role of complexity on the comprehension of hospital quality information. First, we could confirm previous findings from a choice experiment with individual doctors [16] and other studies [38,39] that decision-making quality erodes with an increasing number of hospitals. Our regression models confirmed the complexity of the decision-making process as the dominant predictor for the choice of the dominating hospital. This result does not seem to be very surprising, since we know from literature that cognitive overload [40,41], a high level of necessary attention [42], dissatisfaction with the decision-making process [41], or resignation behavior [43] may lead to worse decisions [16,38,39]. On the other hand, there are also factors that would justify a larger number of providers, such as the greater probability of finding a provider that matches personal preferences, [41] consumers feeling better informed and in control of the decision [41] and, as well, greater satisfaction and motivation [38,41]. Nevertheless, our findings seem to be important for future work on (re)designing HRCs. Thus far, HRCs vary tremendously regarding the number of hospitals being presented for consumers. For example, in the United States, Quality Check initially show data on twelve hospitals, Hospital Compare on twenty hospitals; the Leapfrog Group and U.S. News compare all possible hospitals within a certain region. NHS choices in England and WL in Germany initially present ten hospitals, KiesBeter in the Netherlands and Spitalfinder in Switzerland display all possible hospitals within a certain region. In sum, several well-known report cards seem to report about at least ten hospitals, up to an unlimited number of hospitals.

In contrast, we could not determine an impact of tailoring HRCs to the comprehension of hospital quality information. The main reason for this may be found in the way we presented both tailoring options. Although we implemented one question for deriving a composite measure and two questions relevant to determine the number and order of hospitals prior to the hospital choice task, respondents might not have noticed a large difference compared with the basis version of WL. For example, the composite measure in our study was presented in addition to the already existent information next to the hospital name, and was thus placed in a fashion similar to that of Hospital Compare. (Here, an overall rating is presented next to general hospital information, distance, emergency services, and hospital type [44]). Future studies should evaluate whether the replacement of previously published information by the composite measure leads to different findings. One might assume that the replacement would have a larger impact

Table 3
Overview of the selection of the best hospital (in %) (N = 1270 experiments, equals 635 finisher) (p value was calculated using one-way Analysis of variance (ANOVA) test and Tukey post hoc test).

Selection of the best performing hospital	Report card design: basis version (N = 635)	Customized report card design I: composite measure (N = 295)	Customized report card(N = 340) design II: number of hospitals and ordering	p*
Low complexity decision making (N = 451)	87.5	87.3	86.0	.887[1]; .998[2]; .881[3]; .938[4]
Middle complexity decision making (N = 407)	78.4	83.0	78.0	.613[1]; .636[2]; .997[3]; .669[4]
High complexity decision making (N = 412)	68.3	66.1	77.0	.366[1]; .950[2]; .450[3]; .393[4]
p#	<.001[1]; .024[2]; <.001[3]; .066[4]	.002[1]; .666[2]; .001[3]; .022[4]	.038[1]; .029[2]; .024[3]; .674[4]	

* [1] all three groups, [2] basis vs. CM, [3] basis vs. NO; [4] CM vs. NO.
\# [1] all three groups, [2] low complexity vs. middle complexity, [3] low complexity vs. high complexity; [4] middle complexity vs. high complexity.

Table 4
Logistic regression models predicting likelihood of selection of the best performing hospital based on the complexity of decision making and different design types (N = 1270).

	Choice of the best performing hospital			
	Model 1 *OR (95% CI)*	Model 2§ *OR (95% CI)*	Model 3$ *OR (95% CI)*	Model 4& *OR (95% CI)*
Complexity of decision making	**	**	**	**
Low complexity decision making (N = 451)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Middle complexity decision making (N = 407)	0.57 (0.41;0.80)*	0.52 (0.34;0.79)*	0.55 (0.36;0.84)*	0.57 (0.37;0.87)*
High complexity decision making (N = 412)	0.35 (0.24;0.50)**	0.26 (0.17;0.39)**	0.25 (0.16;0.38)**	0.25 (0.16;0.39)**
HRC design types				
Report card design: basis version (N = 635)	1.00 (ref)	1.00 (ref)	1.00 (ref)	1.00 (ref)
Customized report card design I: composite measure (N = 295)	1.06 (0.74;1.52)	1.05 (0.68;1.61)	1.08 (0.70;1.69)	1.11 (0.71;1.73)
Customized report card design II: number of hospitals and ordering (N = 340)	1.05 (0.73;1.48)	0.91 (0.61;1.36)	0.88 (0.59;1.33)	0.87 (0.58;1.31)
Statistical model details	$\chi2(4) = 34.211$ R^2 =.043; p=<.001	$\chi2(13) = 68.622$ R^2 =.107; p=<.001	$\chi2(16) = 67.814$ R^2 =.111; p=<.001	$\chi2(22) = 75.686$, R^2 =.123; p=<.001

Note:
* p < 0.05.
** p < 0.001 [Bonferroni correction was applied to account for the bias of repeated testing effects. Adjusted p-values were calculated to test for significance by setting the significance cut-off at α/n for each model (N = 2 Model 1, N = 7 Model 2, N = 9 Model 3, N = 11 Model 4).].
§ Model 2: Adjusted for demographics (age, gender, marital status, education, health insurance) [Education*].
$ Model 3: Adjusted for demographics, health related demographics (chronic conditions and health status) [Education*].
& Model 4: Adjusted for demographics, health related demographics, perceived differences in the quality of care and maximal travel distance.

on comprehension of the HRC, since it decreases the amount of information. Again, Hospital Compare might serve as a case study, since the composite measure compiles up to 57 quality measures into a single star rating [44]. Also, U.S. News initially presents one summary score for several specialties, incorporating outcomes and experience, key programs, services and staff, as well as professional recognition instead of detailed information [45,46]. Taken together, we suggest that providers of HRCs might focus on decreasing the level of complexity, rather than providing tailored report cards, to effectively influence choice-making behavior.

Overall, we could see relatively high comprehension scores for all designs in our study compared with previous findings [14,16,17,19,37]. In our opinion, there are two possible explanations for this finding. First, it may have to do with the design of the HRC. However, the HRC in our study is relatively similar (in terms of presentation of the data and the amount of information) to the adapted version of the Hospital Compare website, which was applied in a similar study, where only 51% of the respondents selected the dominant hospital [14]. Second, and probably more likely, the comprehension may be attributable to the study sample and its characteristics. As shown, we invited HRC consumers at the point of seeking hospital quality information. Thus, all participants were online users who might be relatively familiar with using HRCs. For example, 63.1% of all respondents stated that they had used an HRC before; this is higher than that found in other studies [6]. Literature has furthermore demonstrated an association of education and hospital choice quality [14,17,19,37]. As shown, the educational level of our sample was relatively high; this might also have contributed to the high comprehension results.

As with any study, there are several *limitations* that have to be taken into account when interpreting the results of our study. First, it is important to mention that there are further approaches for tailoring report cards, such as tailoring based on age, gender, or ethnicity. For our study, we chose to evaluate two promising approaches based on previous findings. (For example, Zwijnenberg and colleagues demonstrated that most participants had no interest in information tailored based on age, gender, or ethnicity [32]). Second, we presented the composite measure in addition to and not instead of already existent information on the HRC. This could have led to limited attention from the consumersṕerspective. The latter approach could have led to different findings. (See a study of Cerully investigating how presenting quality scores at different levels of aggregation affects patients' clinician choices [47]). Third, the results about the impact of HRCs on hospital choice were calculated based on the responses of HRC consumers. As shown, those results differ from studies applying alternative designs under real conditions when analyzing empirical data regarding the impact; they thus should be interpreted with caution. Fourth, one major shortcoming of this study that we only applied one variable to operationalize complexity; that is the number of hospitals presented on the report cards (5, 10, or 15 hospitals). We did not use further variables which also could have been used to measure complexity, such as the amount of information presented for each hospital. Finally, we have to strengthen the fact that the external validity of our findings is limited [48]. This is mainly due to the selection bias in our study, since we surveyed a sample of users of the hospital report card Weisse Liste. Even though our surveyed population is representative of typical users of WL it could be shown to differ significantly from both the German online and general population. This has to be taken into account when trying to apply our findings and conclusions to other settings.

5. Conclusions for health policy makers

In sum, this study provides insights into consumers of HRC at the point of seeking hospital information. HRC consumers tend to be of higher age, are more likely to be female, have relatively high educational levels, are more likely to suffer from chronic conditions, and have a lower health status. HRC consumers are also more likely to be aware of quality of care differences across hospitals. Those characteristics might explain, at least to some extent, the relatively high comprehension results for hospital choices in our study. Besides this, two- thirds of HRC consumers had not yet made her/his final hospital choice, and thus were likely to be responsive to the hospital information presented on the HRC. The majority of the respondents in our study confirmed an impact of HRC on their hospital choice in the past, and stated they were (very) likely to use the information for their upcoming hospital choice. We could confirm previous findings that decision-making quality erodes with an increasing number of hospitals being presented on an HRC. Even though tailoring of information is viewed as a promising strategy, we failed to determine the superiority of tailoring HRC by either incorporating an additional composite measure or providing the opportunity to determine the number and order of hospitals. Nevertheless, alternative approaches of presenting composite measures might lead to different findings. Thus, it should not be taken for granted that tailoring helps consumers make better choices; rather, it should be carried out with caution. Finally, providers of HRCs might focus on decreasing the level of complexity, rather than providing tailored report cards, to effectively influence choice-making behavior.

Declaration of Competing Interest

None.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.healthpol.2019.07.013.

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