Public Reporting in Germany: the Content of Physician Rating Websites *

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Keywords
Patient satisfaction, information dissemination, internet, physician rating website, Germany

Summary
Background: Physician rating websites (PRWs) are gaining in popularity among patients seeking quality information about physicians. However, little knowledge is available about the quantity and type of information provided on the websites.

Objective: To determine and structure the quantity and type of information about physicians in the outpatient sector provided on German-language physician rating websites.

Methods: In a first step, we identified PRWs through a systematic internet search using German keywords from a patient’s perspective in the two search engines Google and Yahoo. Afterwards, information about physicians available on the websites was collected and categorised according to Donabedian’s structure/process/outcome model. Furthermore, we investigated whether the information was related to the physician himself/herself or to the practice as a whole.

Results: In total, eight PRWs were detected. Our analysis turned up 139 different information items on eight websites; 67 are related to the structural quality, 4 to process quality, 5 to outcomes, and 63 to patient satisfaction/experience. In total, 37% of all items focus specifically on the physician and 63% on the physician’s practice. In terms of the total amount of information provided on the PRWs, results range from 61 down to 13.5 items.

Conclusions: A broad range of information is available on German PRWs. While structural information can give a detailed overview of the financial, technical and human resources of a practice, other outcome measures have to be interpreted with caution. Specifically, patient satisfaction results are not risk-adjusted, and thus, are not appropriate to represent a provider’s quality of care. Consequently, neither patients nor physicians should yet use the information provided to make their final decision for or against an individual physician.

1. Introduction

Many current health care systems are characterised by inefficiencies, ineffectiveness, over- and under-treatment, and treating rather than preventing complications of chronic disease, and so forth [1]. One reason therefore is a lack of transparency concerning health care provider quality [2]. Creating more quality transparency has become a major challenge in current health care systems in order to improve health care quality [3]. According to the theory of Public Reporting (PR), patients are expected to inform themselves about the quality of participants in the health care system (e.g. physicians, hospitals, health plans) before making decisions and selecting health care providers [2, 4–7]. As a result, high performers might be rewarded by being selected and low performers punished by lack of selection [2, 5, 8, 9]. In the past, several PR instruments have been introduced, evaluated, and further developed; these include the New York State Cardiac Surgery Reporting System (CSRS) [10–17], the Health Care Financing Administration (HCFA) [18, 19], the Scientific Registry of Transplant Recipients [20, 21], California Hospital Outcomes Project (CHOP) [22], California CABG Outcomes Reporting Program (CCORP) [23], Cleveland Health Quality Choice (CHQC) [24], Nursing Home Compare [25], Quality-Counts [26], US News Best Hospitals [27], Assisted Reproductive Technology Success Rates Report [28], and the German Klinikführer Rhein-Ruhr [29].

Currently, physician rating websites (PRWs) are gaining in popularity among patients seeking information about physicians and are supposed to gain even more weight in the future [30]. Contrary to more established PR instruments (see above), PRWs are a consumer-driven alternative [31]. Traditional PR initiatives generally assess the quality of care of health care providers by measuring adherence to clinical guidelines, and some also include information on patients’ satisfaction [3]. However, they remain quite unknown [3] and, thus, have limited potential to steer patients in...
daily practice. In contrast, the major objective of PRWs is to collect and present information about patients’ experience and satisfaction with individual physicians and their practices [3, 31]. As the structure of PRWs is similar to other web-based rating systems (e.g. travel websites) [3], they depend on the participation of patients [31]. Even though PRWs provide a variety of information about physicians, such as address, opening hours, and certification [3], their primary goal lies on rating and discussing physician quality. Further relevance can be assumed for several reasons, such as the increasing number and use of the websites [32], the rapid spread of Web 2.0 services [30] and an increasing interest among health care payers (the largest group German statutory health insurance funds (AOK) has recently set up its own PRW). However, little knowledge is available about the quality and content of existing PRWs (e.g. [3, 33, 34]).

The objective of this investigation is to conduct a comprehensive analysis regarding the content of the most relevant German-language PRWs. Therefore, we analyse which websites patients are likely to be referred to when seeking health information online. Then we examine the type and quantity of information about physicians in the outpatient sector. An overview of which website provides what type and what quantity of information about physicians will be shown.

2. Methods

Our investigation consists of four steps: First, we identify PRWs on which patients can rate and obtain information about physicians in the outpatient sector in Germany. Therefore, as previously published (e.g. [31, 34]), we conduct a systematic search from a patient’s perspective and, thus, analyse the PRWs patients are likely to be referred to when looking for physician information online. Second, we collect the information about physicians on the websites using a systematic and structured procedure. Third, we categorise the information items with respect to Donabedian’s structure/process/outcome (SPO) model [35, 36]. Fourth, as the items can focus on the physician, or on the practice as a whole, we put them into the two different groups: 1) physician or 2) practice.

2.1 PRW Search

As mentioned above, we used a patient’s perspective to seek physicians online. Since most internet users start with a search engine when looking for health information online [37, 38], we also proceeded in that manner. After identifying ten key words in the German language, we conducted an online search. Search terms from previously published papers were used (e.g. [31, 34]) and further expanded upon (Table 1 provides an overview of the key words). We conducted the searches in the two most commonly used search engines, according to market share. Thus, the search was carried out using the search engines Google and Yahoo (market share is reported to be 90% and 3%, respectively [39]). Subsequently, after putting in one key word into one search engine, the first 50 hits (five result pages) were analysed. This should reflect the behaviour of most internet users, as 70% of search engine users look at two result pages or less [40]. Thus, a total of 1,000 hits were analysed. By examining the hits, we investigated whether the search engine recommended a PRW to the seeker. Due to the fact that we put in ten key words in the two search engines, one PRW could reach up to 20 points. Then, we opened the link to each hit and carefully examined the information provided with respect to our defined inclusion criteria (see below).

We defined several inclusion criteria for a website to be considered relevant for our investigation. First, patients must have the opportunity to assess the quality of care received from their physician. Consequently, doctor registers were excluded. Second, the yellow pages and other similar websites (such as Qype.com, city24.de or 11880.com), on which users could solely give a comment in a text field were not taken into account. Third, websites providing information for only a specific indication (e.g. cancer, diabetes, or stroke) were also excluded. Only websites with an open range of indications were considered relevant. Finally, we did not include websites on which rating systems and/or results are provided from other websites.

2.2 Information Item Description

After identifying the websites, we listed all information items available on the PRWs in order to assess the quantity of available information items. In this context, an information item represents a specific information aspect, such as address, scientific publications, or languages spoken. On every website we checked at least one hundred physician profiles to collect available information items. Furthermore, we

<table>
<thead>
<tr>
<th>No.</th>
<th>German key words (entered in search engines)</th>
<th>English key words (not entered in search engines; translation for English publication only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Arztsuche</td>
<td>Physician search</td>
</tr>
<tr>
<td>2</td>
<td>Arzt bewerten</td>
<td>Rate my physician</td>
</tr>
<tr>
<td>3</td>
<td>Arztbewertung</td>
<td>Physician rating</td>
</tr>
<tr>
<td>4</td>
<td>Arzt empfehlen</td>
<td>Recommend a physician</td>
</tr>
<tr>
<td>5</td>
<td>Arztempfehlung</td>
<td>Physician recommendation</td>
</tr>
<tr>
<td>6</td>
<td>Arzt finden</td>
<td>Find a physician</td>
</tr>
<tr>
<td>7</td>
<td>Ärzteverzeichnis</td>
<td>Physician registry</td>
</tr>
<tr>
<td>8</td>
<td>Online Arztbewertung</td>
<td>Online physician rating</td>
</tr>
<tr>
<td>9</td>
<td>Arztbewertungsportal</td>
<td>Physician rating website</td>
</tr>
<tr>
<td>10</td>
<td>Guter Arzt</td>
<td>Good physician</td>
</tr>
</tbody>
</table>
investigated what type of information could be added or provided by the physicians themselves on these websites. Standard, as well as premium profiles of physicians were taken into account. When analysing questionnaires to assess patient experience, we counted every question as one item each. Text fields in which patients could report on anything they wanted were counted as one information item.

To reflect the actual availability of the information items on the websites, every information item was awarded one point except for those which were not available for all physician entries on each website. For example, on the website Jameda one can find integrated results from an external assessment carried out by the magazine Focus; but, this ranking is not related to every German physician; it only represents a subsample. In this case, the information item was not awarded a full point, but rather a half point.

Second, we categorised the information items based on Donabedian’s structure-process-outcome-model [35, 36]. This approach has been used as a basis for defining quality in medical care [41]. It is widely believed that good structure increases the likelihood of good process, and good process increases the likelihood of good outcome. But, it is important to mention that these relationships have to be established before any component of structure, process, or outcome can be used for quality assessment [41]. According to Donabedian, the structure denotes the attributes of the settings in which care occurs and includes attributes of material and human resources. These aspects can influence the probability of good performance [42]. However, it does not guarantee that good care will be received [41]. Process quality is delivered on basis of the uno-actu-principle of service [43]. This means that the care provider and the client perform the service together. Therefore, the quality of the entire team (i.e. health care providers, patient) is considered to be relevant [44]. It examines whether the right steps are being taken to deliver high-quality care [45], but does not show whether health status has been improved. The outcome denotes the effects of care [36] and can be defined as the direct consequence of the care for the health and welfare of individuals and of society [42, 46]. Therefore, they are regarded as the most appropriate measurements for quality assessment [42]. The information item patients’ satisfaction/experience can be interpreted as an outcome measurement as well, because it shows attitudes and satisfaction levels of treated people, but we handled it separately to get a more detailed result.

In the third step, we assigned the information items to the subject matter, i.e. either to the physician personally, or to the practice as a whole, according to the websites providing the information. When a clear statement was available such as “quality system for the practice was obtained in 2009”, the decision was quite clear. When no clear distinction was made, we determined which category it was more likely to be related to. For example, on the website die-arztempfehlung.com, the question was, “The relationship between my treatment and my [out-of-pocket] expenses is very good?”. Here, no clear connection was made. However, the entire question complex referred to the physician himself, as it is stated, “Questions about Dr. Smith”. In this case, we assigned the question to the “physician” category. If no clear decision could be made, we assigned it to the category “practice”.

Two authors carried out the search process independently. In cases where no consensus about inclusion of a website could be reached, a third author was consulted.

Table 2: Results of the search (date: 01/09/2010)

<table>
<thead>
<tr>
<th>Position</th>
<th>Website</th>
<th>Website found with keyword on Google.de/Yahoo.de (1 = website found with keyword, 0 = website not found)</th>
<th>Found by keywords in total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Jameda (<a href="http://www.jameda.de">www.jameda.de</a>)</td>
<td>1;1 1;1 1;0 0;0 0;1 1;1 1;0 1;1 1;1 1;1</td>
<td>15</td>
</tr>
<tr>
<td>2</td>
<td>Docinsider (<a href="http://www.docinsider.de">www.docinsider.de</a>)</td>
<td>1;0 1;1 1;1 0;0 0;0 0;0 1;1 1;0 0;0</td>
<td>10</td>
</tr>
<tr>
<td>3</td>
<td>Imedo (<a href="http://www.imedo.de">www.imedo.de</a>)</td>
<td>1;1 0;0 0;0 1;1 1;1 1;0 1;1 0;0 0;0 0;0</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>Esando (<a href="http://www.esando.de">www.esando.de</a>)</td>
<td>0;1 1;0 1;1 1;0 0;1 0;0 0;1 1;0 1;0</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Die Arztempfehlung (<a href="http://www.die-arztempfehlung.com">www.die-arztempfehlung.com</a>)</td>
<td>0;0 1;0 0;1 1;1 1;1 0;1 0;0 0;0 0;0</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>Medführer (<a href="http://www.medfuehrer.de">www.medfuehrer.de</a>)</td>
<td>0;0 1;0 1;0 0;0 0;0 1;0 0;0 1;1 1;1</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Sanego (<a href="http://www.sanego.de">www.sanego.de</a>)</td>
<td>0;0 1;1 1;0 0;0 0;0 0;1 0;0 0;0 1;0 0;0</td>
<td>5</td>
</tr>
<tr>
<td>8</td>
<td>Arztauskunft (<a href="http://www.arzt-auskunft.de">www.arzt-auskunft.de</a>)</td>
<td>1;1 0;1 0;0 0;0 0;0 1;0 0;0 0;0 0;0</td>
<td>4</td>
</tr>
</tbody>
</table>

Search Terms: 1) Arztsuche (physician search), 2) Arzt bewerten (rate my physician), 3) Arztbewertung (physician rating), 4) Arzt empfehlen (recommend a physician), 5) Arztempfehlung (physician recommendation), 6) Arzt finden (find a physician), 7) Ärzteverzeichnis (physician registry), 8) Online Arztbewertung (online physician rating), 9) Arztbewertungsportal (physician rating website), 10) Guter Arzt (good physician)
Again, two investigators judged the websites independently of each other and the results were compared and discussed afterwards. Each identified item was visually documented by using the software QSR NVivo Project 9. Results were then exported into IBM SPSS Statistics Version 19 to carry out the final evaluations.

### 3. Results

#### 3.1 Relevant PRWs

According to our search procedure, a PRW could receive up to 20 points (see above). Table 2 shows the final results of the search.

In total, we found eight websites on which patients can search and rate their physicians; this result is consistent with a previous investigation completed with an analogous intention [31]. The highest number of findings was documented for the websites Jameda (N = 15) and Doc insider (N = 10). One less (N = 9) was documented for the website Imedo and Esando. The number of the findings can be interpreted as a reflection of the likelihood that a randomly selected patient would discover one of the PRWs. There are more PRWs available, but defined inclusion criteria (see above) led to the exclusion of several websites (e.g. Medfriend, Bleibgesund service, Netdoctor, and Onmeda).

#### 3.2 Quantity, Quality Dimension, and Subject Matter of the Information

In sum, we identified 139 different information items, 67 are related to the structural quality, 4 to process quality, 5 to outcomes, and 63 to patient satisfaction/experience. As mentioned above, patients’ satisfaction/experience is handled separately as a fourth category to get a more detailed result. See supplementary Web material for the complete list of items and corresponding categorisation.

The dominant presence of structural quality information is not surprising, as information concerning structural quality can be obtained through common data providers (physician registry, yellow pages etc.). The items name, address, telephone number, map, fax, Email, link to homepage concern the general setting of the practice. Furthermore, one can get information such as board certified medical specialities, languages spoken, continued education of the physicians and the nurses, number of patients treated, additional medical functions, scientific publications, and medical services offered. Further structural aspects are the building and its facilities, car parking, accessibility for disabled people, and consultation hours [36, 41, 46–49]. Furthermore, personal information items [50] about physicians were also placed within this dimension. We have observed only four aspects concerning process quality; these are waiting time for an encounter, waiting time within the practice, and regular patient education programs [44, 49, 51]. Besides this, we placed two items in the outcome dimension: recommended by colleagues concerning either the research quality, clinical skills, and recommended by patient organisations [49]. All of these items are third party judgements of the performance of the observed practices, together with the presence of a certified quality management system. Further items such as medical parameters, respective mortality rates, symptoms and complaints of the patient, adherence to therapy, social equity and restoration, physical disability and rehabilitation [36, 41, 44, 47–49, 52] were not found. As mentioned above, the information item, patients’ satisfaction/experience, can be interpreted as an outcome measurement, as it shows attitudes and satisfaction of treated people, but is handled separately here. Websites provide a wide range of questions so that patients can assess the received quality of care. It is noteworthy that we could not find a published article that describes the validation of any questionnaire used on the websites. Due to the fact that questionnaires differ from each other, we counted a large number of items. Thereby, 103 information items were awarded a full point and 36 information items with half a point (see our scoring procedure above).

Regarding the overlap between the sets of questions that appeared on the PRWs, it can be shown that most items are available on one specific website. Thus, one should be aware of the focus of the different websites and have in mind that other websites can provide additional information that might be of interest. Ninety-two information items are available only on a single website. Most of them refer to structural quality or patient experiences. Additionally, four out of five outcome measures are reported once. The languages spoken by the physician is only available on two websites. By contrast, there are only six information items which can be found on all of the assessed websites, namely board certified medical specialities, name, address, telephone number, number of ratings, and patient ratings. On seven websites, one can find a map and free-text opinions. Fax number, consultation hours and a link to the homepage are reported on six websites.

Regarding the information items in more detail, we ascertained that 51 information items focus, as a subject matter of the information, on the physician himself/herself. Besides the name and publications in scientific journals, completed continued education courses, various languages spoken, or demeanour with patients may be listed. Recommendations from colleagues concerning either the research quality or the clinical skills are also available. Comparing the items provided, with respect to personal and professional infor-

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**Table 3** Overview of provided information items according to Donabedian’s structure/process/outcome model

<table>
<thead>
<tr>
<th>Weight</th>
<th>Structure</th>
<th>Process</th>
<th>Outcome</th>
<th>Patient satisfaction</th>
<th>Total (absolute)</th>
<th>Total (in %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>11</td>
<td>2</td>
<td>3</td>
<td>20</td>
<td>36</td>
<td>25.9%</td>
</tr>
<tr>
<td>1.0</td>
<td>56</td>
<td>2</td>
<td>2</td>
<td>43</td>
<td>103</td>
<td>74.1%</td>
</tr>
</tbody>
</table>

Total 67 4 5 63 139 100.0%
mation, as previously done [50], only one item (the name of the physician) can be placed within the personal information category. Information available on US websites, such as social networking (e.g. Facebook, LinkedIn), blog (e.g. Blogger, Xanga websites), donations (e.g. political campaign, religious contributions), religious (religious affiliations, events), family (e.g. invitations to children’s parties), hobbies (e.g. running club, book club homepages), or financial items (e.g. financial purchase or sale of land or business) are not reported on German websites at all. Consequently, 88 information items concern the practice as a whole. These include standard features like the address, telephone number, and a map showing the surroundings. The consultation hours might be accessible, possibly including information about weekend or (late) evening consultations. The item accessibility for disabled people might provide information about an entrance at ground level, an available elevator, or stair-free access. Further information items concern the existence of a pharmacy nearby, access by public transit, possible cooperation with patients’ organisations, patient’s opinions, as well as information about quality management.

3.3 Comparison of the PRWs

In the following section, we present the results regarding the assessment of the information items that are provided on the PRWs. First, we compare the achieved total points for all websites. One can see that the website Arztauskunft has the highest result in the overall score and has integrated the most information items on its website (Table 5). Information about 61 items is available, most of them concerning structural quality. However, there is still potential for improvement. Especially, items concerning process quality and outcomes could be integrated (e.g. adherence to evidence-based guidelines). Nevertheless, this website achieved by far the highest score of all PRWs. Medführer and Jameda reached the positions second and third with 35 and 34 points, respectively. For the website Medführer we counted the highest amount of information items on patient satisfaction, but the website lacks information on other dimensions. Jameda has the most items within the outcomes dimension, but they are not

Table 4 Frequency of appearance of similar information items on the websites (subdivided by Donabedian’s structure/process/outcome model)

<table>
<thead>
<tr>
<th>Number of appearances among the 8 websites</th>
<th>Structure</th>
<th>Process</th>
<th>Outcome</th>
<th>Patient satisfaction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>40</td>
<td>2</td>
<td>4</td>
<td>46</td>
<td>92</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>1</td>
<td>1</td>
<td>10</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>4</td>
<td>5</td>
<td>63</td>
<td>139</td>
</tr>
</tbody>
</table>

Table 5 Number of provided information items and given points (subdivided by Donabedian’s structure process outcome model)

<table>
<thead>
<tr>
<th>Website</th>
<th>Structure</th>
<th>Process</th>
<th>Outcome</th>
<th>Patient satisfaction</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Full point</td>
<td>Half point</td>
<td>Full point</td>
<td>Half point</td>
<td>Full point</td>
</tr>
<tr>
<td>Arztauskunft</td>
<td>49</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Medführer</td>
<td>7</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Jameda</td>
<td>14</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Imedo</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Docinsider</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Sanego</td>
<td>11</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Die Arzttempfehlung</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Esando</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Median</td>
<td>13.5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Minimum</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maximum</td>
<td>49</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>
available for every physician, so some of them were scored with half a point. This is due to the fact that the information was only available for a subset of physicians that were included in surveys of the German magazine Focus (Focus-Arztinformationen). The least amount of items was integrated by the providers of the website Esando which achieved 13.5 points. Additionally, the website scored lowest in all of the four categories. Thus, if one is solely interested in getting as many information items as possible, Arztauskunft would be the most appropriate PRW. Esando is highly unlikely to be helpful for a patient seeking information about the quality of a physician. If one is simply concerned about the quantity of information items, he or she may use the websites in the same order as shown in Table 5.

With regards to our structure-process-outcome-patient satisfaction dimensions, results can be depicted as follows: Most information is given about structural quality, on average 19.38 items are reported on the websites. Nevertheless, regarding the differences between the websites, we can observe a large gap between the highest (Arztauskunft, N = 49) and the lowest (Esando, N = 9) amount of items provided on the websites. The second highest score of 24 items was achieved by the website Imedo. Esando scored last with a total score in this dimension of nine information items. The average number of information items for patient satisfaction is 12.63 and thus much lower than that of structural quality. The highest score was achieved by Medführer, reporting 24 information items and, once again, Esando scored lowest. Furthermore, one can see that the results for both process quality and outcomes are very low, less than one information item is shown on average on the websites (0.88 for process quality and 0.75 for outcomes). This is an unsatisfactory result since information items concerning outcomes would support patients most, as they are regarded as the most appropriate measurements for quality assessment [42]. Taken together, the websites provide information on 33.63 information items on average. When taking into account our scoring procedure (see above), the resulting final score of 31.25 information items is somewhat lower.

Depending on their expectations and needs, information seekers may have preferences when choosing a PRW. The website Arztauskunft would be the first choice for information about structural quality; it presents twice as many information items as most other websites. But, information about process quality and outcomes is hardly available. Thus, patients looking for information on these dimensions would better search information on other websites, such as Docsider or Sanego, especially if the focus is on process quality. Both of them achieved a score of two information items. To find information on outcomes, Arztauskunft and Jameda would be the most appropriate websites. Two items are given on the website Arztauskunft, the next one is Jameda with 24 information items (in fact three information items, but they are only available for a small subset of physicians, thus only weighed half). The most attention to patient satisfaction/experience is paid by the website of Medführer; it is by far the leading website in this dimension (N = 24 information items). Jameda reached the second highest score of 16 points through 23 information items with 14 only available for a physician subset (Fig. 1).

![Fig. 1](Total points and type of information categories on the PRWs (Note: If an information item is not related to every German physician, but only to a subsample, it was awarded half a point; see above))
4. Discussion and Conclusion

4.1 Discussion

The purpose of this investigation was to determine and structure the quantity and type of information about physicians in the outpatient sector provided on German-language PRWs. The results show that a wide variety of information is available on the websites such as address, publications and patient experience. It is noteworthy that the websites report a very different amount of information items. The results range from 61 down to 13.5 items. Nevertheless, it remains unclear whether the information is useful for patients seeking a physician for several reasons:

1) We cannot say that the more items provided on a PRW the better, but rather, it depends on the value of each information item. To determine the value, it has to be investigated whether there is a positive link between the information and the physician's quality of care. For example, when seeking a good physician for diabetes treatment it is unlikely that the item "address" or "fax" will reflect the quality of the physician. Instead, it might be more useful to know for what percentage of patients with diabetes the glycosylated haemoglobin (HbA1c) measure was taken, what percentage had reached an HbA1c of less than 8, or the number of patients with a structured exercise training program [52]. When taking into account this kind of information, one must be aware of where the information is coming from. The data might be more reliable if it derives from a physician's practice information system in contrast to such medical information provided directly from individual patients. Moreover, it is not very likely that at least a large proportion of patients would be able to answer such detailed medical questions correctly.

2) When reporting about outcome measures such as patient satisfaction, complication or mortality rates, risk-adjustment methods become crucial in eliminating the underlying differences in case-mix among physician practices [53]. That means that both patient (e.g. age, morbidity, pre-existing conditions) and illness characteristics have to be considered. Otherwise, the results might not represent a provider's quality of care, but more the severity of the cases. That can lead to the result that healthcare providers who take care of sicker patients tend to have poorer outcomes than healthcare providers who take care of healthier patients. None of the websites accomplish that requirement. Thus, it is unlikely that the results shown for outcome measures allow an assessment of the physician's quality of care.

3) The results of our study do not reflect the current development state of the websites. As shown in another study [54], little contribution has been made by patients on the websites. To date, the largest number of total ratings can be found on the website Jameda (N = 603,000) and Docinsider (N = 450,000). Arzttauskunft and Imedo reported to have about 150,000 and 73,000 ratings available on their websites, respectively. Compared to the total number of physicians in the German outpatient sector (approximately 150,000 [55]), the number is still low on most websites. For the website Jameda, an average of approximately four evaluations per physician can be tracked. On the website Imedo the average is less than one evaluation per physician. It is challenging to determine a minimum number of ratings necessary before publication is carried out, but the current approach should be regarded sceptically, since publication starts from the first evaluation. Due to the fact that anyone can rate any physician, abuse is not unlikely (in either a both positive or a negative sense) and could skew the result for a physician [34]. Another study drew the conclusion that reliability estimates for outcome measures generally improve with an increase in the number of evaluations, but can vary across different indications [56]. Furthermore, it has to be taken into account that a large percentage of physicians are still without any evaluation and that the number of evaluations results from a small number of physicians with a high number of ratings [54]. Regarding the number of physicians having at least one rating, Docinsider has the largest amount (N = 79,000). Jameda and Imedo reported to have 60,000 and 54,000 rated physicians, respectively [54].

4) All of the websites lack a great deal of relevant information, which could be included. That information could refer to more disease specific information with respect to process and outcome measures, such as how many patients with diabetes are treated by a physician or what percentage of diabetes patients has been referred to an ophthalmologist for receiving recommended care. Furthermore, most websites do not integrate available information such as scientific publications which could easily be implemented by e.g. counting the number of publications on medical databases (e.g. Medline). Inclusion of such would increase the value for patients, once a sufficient number of ratings have been given.

5) To assess the usefulness of the information provided, results can be compared with a recently published study dealing with information preferences of German patients when seeking a hospital [57]. The results of the study show that patients are mainly seeking structural information items (e.g. educational background, services offered) rather than process or outcome measures. According to these results the regarded PRWs do provide indeed some useful information. However, further results of the study demonstrate that patients prefer objective outcome measures (e.g. mortality rates) to subjective information such as patient experience/satisfaction. When taking into account these results, impact of the websites might be limited. Further research is needed to prove that assumption.

There were several limitations to this study. First, a verification of the information items provided was not made. For example, we did not investigate whether the address or phone number shown for a physician were correct. Second, assignment of some information items to the categories is not always absolutely certain; for example the item “recommended by patient organizations” was put in the outcome group for the following two reasons: 1) Patient recommendation/satisfaction is seen to be an outcome parameter, as well. Thus, recommendations by patient organizations might be in this group too; it could be seen as “common” sense by many patients. 2) In a previously published work...
[49] recommendations made by physicians (from the outpatient sector) were categorized as an outcome measure. These two arguments led us to the conclusion that it might fit into the outcome group. Third, it was not the objective of this paper to develop or discuss quality standards in order to determine the quality of a PRW (for more on this, see [58]). However, we discussed some important issues in this context. Fourth, we did not assess the quality of the websites in terms of usability, additional services, timeliness of data or whether the websites meet patient expectations on health-related websites [59]. Fifth, the investigation regards only PRWs from Germany; websites from other countries were not taken into account. A comparison of these would provide additional knowledge. Finally, we analysed those PRWs patients are likely to be referred to when looking for health information online. So it might be possible that these PRWs were only found because they have e.g. good marketing or pay search engines for the marketing. Consequently, important new sites which are not very popular right now were not taken into account.

4.2 Conclusion

We showed that a broad range of information is available on German PRWs. However, it remains unclear whether the information is appropriate to reflect the quality of care provided by the physicians. As mentioned above, results concerning patient satisfaction and outcome measures are not risk-adjusted at all. Therefore, they cannot be regarded as reliable. Thus, neither patients nor physicians should make their final decision for or against a physician. The information provided does not sufficiently take into account differences in case-mix among physician practices. Not to mention, a higher number of ratings is necessary on the websites; current rating numbers cannot fulfill this requirement. To increase the usefulness of PRWs, further development is necessary.

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