DEVELOPMENT OF A DOCTOR RATING CRITERIA FOR A MEDICAL TOURISM PORTAL

Sumate Perm Wonguswa
University of Colorado Denver, mate.permwonguswa@ucdenver.edu

Jiban Khuntia
University of Colorado Denver, jiban.khuntia@ucdenver.edu

Dawn Gregg
University of Colorado Denver, dawn.gregg@ucdenver.edu

Gaurav Chandra
GlobeMD, gaurav.chandra@globemd.com

Seth Sheiner
GlobeMD, seth.sheiner@globemd.com

See next page for additional authors

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Permwonguswa, Sumate, University of Colorado Denver, Colorado, USA, sumate.permwonguswa@ucdenver.edu
Khuntia, Jiban, University of Colorado Denver, Colorado, USA, jiban.khuntia@ucdenver.edu
Gregg, Dawn, University of Colorado Denver, Colorado, USA, dawn.gregg@ucdenver.edu
Chandra, Gaurav, GlobeMD, Colorado, USA, gaurav.chandra@globemd.com
Sheiner, Seth, GlobeMD, Colorado, USA, seth.sheiner@globemd.com
Swaminathan, Venky, GlobeMD, Colorado, USA, venky.swaminathan@globemd.com

Abstract

Lack of information prior to medical tourism visits is a significant issue in meeting the expectations of patients. A global portal with doctor rating systems plausibly can bridge this gap. Doctor rating comparisons can help to reduce the information asymmetry in medical tourism. This study proposes a set of standards for doctor rating criteria for a medical tourism portal. A model has been developed to investigate the interaction effect of doctor rating systems with trust in an intermediary and information quality on willingness to travel abroad for treatment. Hypotheses were then empirically evaluated using an experiment. Implications and contributions of the study are discussed.

Keywords: Medical Tourism, Online Portal, Doctor Rating System, Medical Tourism Platform.

1 Introduction

Medical tourism has emerged as an option to manage health and well-being. Medical tourism refers to the travel of patients to foreign countries, mostly from developed countries to developing countries, with the primary purpose of having a medical treatment (Crooks et al., 2010; Cortez, 2008; Horowitz et al., 2007). People are driven to seek treatments in foreign countries due to the high cost of treatment in host countries, long waiting lists for the procedures, and cost-effectiveness resulting from economic disparities – resulting in saving up to 25-75% (Patients Beyond Borders, 2015), and the drive to achieve better health irrespective of the location of treatment (Connell, 2006; Garcia-Altes, 2005). In addition, some medical procedures such as cosmetic dental surgery, are not covered by insurance in countries like the UK and Australia, leading to the growth of medical tourism (Smith, Álvarez and Chanda, 2011). Some patients are also seeking information about and prefer alternative non-invasive procedures to the evidence-based care provided in their own countries. Moreover, the availability of the Internet, and globalization trends make both patients and providers aware of the medical facilities available in other countries, providing options to avail the alternative care (Smyth, 2005). As a result, the medical tourism has grown rapidly with patients from developed countries such as the United States spending $38.5 billion in 2014 and projected to be over $58.6 billion in 2017 (Patients Beyond Borders, 2015).

Irrespective of the growth in the medical tourism industry, a number of concerns lead people to perceive medical tourism as high risk (Smith, Álvarez and Chanda, 2011). The main risk is the disparities
in the quality of care across countries. There are concerns that the quality of care received abroad may be lower than that offered domestically. Second, after the procedure is performed, a lack of follow-up care if there are complications is a major challenge. Current physicians and providers across countries do not share medical reports, nor do they communicate to mitigate the follow-up concerns (Dunn, 2007; Turner, 2007). The third concern is that there is no set of bi- or multi-lateral law or systems to address or claim for the errors during the procedures, or to address malpractice during the visit. Finally, the lack of information flow between doctors across countries makes continuity of care more difficult (MacReady, 2007). These concerns lead to the criticism that the medical tourism industry is only driven by cost-arbitrage rather than a real information- or systemic-care based strategy that is needed for patients (Turner, 2007).

In this context, there is a suggestion that online health platforms can reduce the information asymmetry in medical tourism by collecting and comparing procedure-based information, and making it available to patients to support informed decisions (Martinez et al., 2008). Although in the long term bi- or multi-lateral agreements or regulations may be solutions to problem associated with quality, accountability and continuity of care, in the short term such widespread agreements are unlikely (MacReady, 2007). Thus, online medical tourism portals are needed to support patient decision making, and it is the current premise of this study.

Comparison of online ratings and reviews is not new to healthcare systems, although they have not been implemented in a global scale. Portals such as RateMDs.com, healthgrades.com, do rate and review doctors. Some report that 72% of Internet users have searched for health information online during 2011-2012 and that the online search and information consumption behaviors of Americans are increasing (PEW Research Center, 2015). The availability of prior information is becoming a prerequisite for patients to make an informed choice on treatment avenues. For example, much of the information on doctors’ background and details on practice are available across websites and portals, and patients are making their choices of a doctor based on this information. The examples of success in other sectors show that people choose restaurants, movies, consumer products, and books based on what they read on the Internet (Chevalier and Mayzlin, 2006; Godes and Mayzlin, 2004; Jin and Leslie, 2003; Mudambi and Schuff, 2010), and therefore, it is likely that many will research their doctors on the Internet as well. Furthermore, doctor report cards implemented in the past echo that patients would like to weigh the ratings in their decision making process (Dranove and Sfekas, 2008; Jin and Sorensen, 2006).

In healthcare industry, there are numerous healthcare social networking portals which create a vast amount of online information about doctors and healthcare options but do little to reduce information asymmetry. Some websites (i.e. BoardCertified.com, Healthcare.com) report the overall doctor rating while others report with multiple ratings (i.e. HealthGrades.com, RateMDs.com, Vitals.com). For those presenting multiple ratings, different rating criteria are often used and therefore, it can be difficult for patients to gather all necessary information, compile, and reconcile them to make the most informed decision. In medical tourism, where patients seek for medical treatment across geographical boundaries, this issue becomes more complicated and more important. The relevant information includes international issues in addition to medical concerns, hence, a higher degree of information asymmetry can be expected.

To the best of the authors’ knowledge, there is no standard doctor rating system that provides all relevant and useful information for patients. The objective of this study is to develop an appropriate set of doctor rating criteria to reduce information asymmetry in medical tourism. A proposed doctor rating system has been designed, developed, and evaluated through sorting and categorization procedures. The resulted doctor rating criteria were then used as a component in the experiment designed to investigate the interaction effects of doctor rating systems with trust in intermediary and information quality on willingness to travel abroad for treatment. Result, implications, future research and limitations are discussed.
2 Background and Theory

Existing literature points to several limitations of electronic portals or social websites for health care related communications. Moorhead et al. (2013) point out that quality concerns, lack of reliability of information, and blurred lines between content producer and user are three major limitations of current health care portals. In addition, “information overload” and a “lack of validity of the information” are also cited as big challenges to the use of the social media for meaningful purposes (Adams, 2010). Finally, a lack of guidelines may lead to the public not correctly applying information found online to their personal health situation, possibly leading to an adverse health impact or consequences (Freeman and Chapman, 2007). Therefore, guidelines for creating effective doctor rating criteria are needed to address these issues.

We propose a conceptual model for this study which suggests that the rating type interacts with trust in the intermediary and information quality to influence willingness to travel abroad for treatment. The conceptual model is presented in figure 1.

![Conceptual model](image)

Figure 1. Conceptual model

Trust is needed in uncertain and risky situations (Grabner-Kräuter and Kaluscha, 2003), especially in online environments (Gefen and Straub, 2004) where individual trust has been found to increase willingness to transact (Bhattacherjee, 2002; Lim et al., 2006). Furthermore, in the context of online marketplaces, trust in an intermediary increases trust in the seller community as a whole and facilitates online transactions (Pavlou and Gefen, 2004). The proposed portal is considered to be an online marketplace supporting medical tourism. Patients come to the portal with the purpose of exploring information about the services available in foreign countries, the quality of services, and other related information. These information will be used in their decisions about whether to buy these services and from whom. Therefore, in a medical tourism context, trust in the intermediary refers to a patient’s trust in a third party medical tourism marketplace, more specifically, the medical tourism portal that provides information about health providers in foreign countries, other information related to treatment abroad (i.e. transportation, cost, environment), and that also facilitates the medical tourism transactions. Since prior research suggests that trust in intermediary increases trust in provider community, as a whole, and increases overall willingness to transact (travel abroad for treatment in this context), we hypothesize that:

Hypothesis H1: Trust in the intermediary is positively associated with willingness to travel abroad for treatment.

There are four major dimensions of information quality: accessibility, contextual, representational, and intrinsic quality (Webb and Webb, 2004). Among these dimensions, this study focuses on contextual (completeness and relevance), representational quality (understandability and interpretability), and
intrinsic quality (accuracy) of the data since they are relevant to the design of the proposed doctor rating systems. The accessibility quality is beyond the scope of this study as we are not examining how a patient might access the medical tourism portal. Hence, the information quality in this study covers the adequacy, relevance, understandability, and accuracy of the data presented in the proposed doctor rating systems.

Perceived information quality has been found to indirectly influence intention to transact online (Kim, Ferrin and Rao, 2008). Web site quality and reputation systems help reduce the effect of negative perceptions about the safety of online transactions (McKnight, Choudhury and Kammar, 2002) and hence increase the willingness to transact. Information quality has been used as a measure for web site evaluation (McKinney, Yoon and Zahedi, 2002; Loiacono, Watson and Goodhue, 2007; Gregg and Walczak, 2010). Web site quality, including information quality, influences intention to transact (Gregg and Walczak, 2010). Intention to transact and willingness to transact are related constructs, with willingness to transact being a necessary precursor to intention to transact. For example, a person may be willing to transact but may not have a real intention to transact. Since medical procedures are generally of much higher risk than traditional online transactions for goods and services, it is necessary to investigate whether findings related to purchasing a product on eBay or Amazon hold true in the medical tourism context. Therefore, we posit that information quality will have an influence on willingness to transact in the medical tourism domain, and test the hypothesis:

**Hypothesis H2:** Information quality is positively associated with willingness to travel abroad for treatment.

Rating systems have been used on many e-Commerce web sites (Chevalier and Mayzlin, 2006; Gregg and Walczak, 2008). Online ratings, one of the most common forms of electronic word of mouth, are often used as an important indication of reputation which can be positive, neutral, or negative (Ambée and Bui, 2011). Comparably, rating systems are expected to be an important criterion in promoting trust to the users of medical tourism portal. Doctor rating systems provide important information that helps users in making decision whether or not to go abroad for medical treatment.

In addition, some researchers have found that the design of the reputation system scale impact the users’ ability to understand and use reputation systems data (Gregg, 2009). Therefore, we posit that the doctor rating system directly affects willingness to travel abroad for treatment, and to some level, doctor rating system moderates the effects of trust in intermediary and information quality on willingness to travel abroad for treatment. Hence, our hypotheses are:

**Hypothesis H3:** Detailed doctor rating is positively associated with willingness to travel abroad for treatment.

**Hypothesis H4:** The effect of trust in intermediary on willingness to travel abroad for treatment is stronger when the detailed ratings are used than when the single overall rating is used.

**Hypothesis H5:** The effect of information quality on willingness to travel abroad for treatment is stronger when the detailed ratings are used than when the single overall rating is used.

### 3 Research Method

#### 3.1 Development of the Rating System from Existing Practice

The focus of the rating system in this study is to fulfill the information asymmetry gap by providing both objective and subjective ratings for clinical, administrative and overall care of the providers. To design an appropriate rating system for medical tourism context, we followed a structural approach involving five steps: (1) reviewing 52 existing rating sites in healthcare context, (2) screening of the sites to finalize 42 sites with 169 rating criteria, (3) removing duplicate rating criteria to reach 117 criteria, and categorizing them into 14 categories, (4) judging the criteria through a systematic process to reach an intermediate categorization (details are omitted here for brevity), and (5) refining the catego-
ries and sub-categories to come up with the final rating system (see Figure 2). The final outcome was a totally agreed upon 21 criteria by 2 judges and 6 differently categorized criteria by all judges. Fleiss’ Kappa was calculated instead of Cohen’s Kappa as the former supported more than 2 raters while the latter supported only 2 raters (Fleiss, 1971; Zaiontz, 2014). Fleiss’ Kappa was 0.8 indicating that there was substantial agreement among the judges (Landis and Koch, 1977).

Figure 2. Rating categories

3.2 Sample and Data Collection

In order to evaluate the proposed rating system, the data were collected using a scenario-based experiment (Rosenthal and Rosnow, 1991). We first developed a prototype of a website to illustrate the proposed rating system on the medical tourism portal for evaluation of the proposed rating system. Prototype screens have been created for a fictitious doctor, Dr. Pat. The name Pat has been chosen because it may be male or female so that we can rule out gender bias. Generally, the screen displays the doctor’s name, specialty, gender (shown as unknown), hospital, address, contact information, languages spoken, a short biography, and rating. The page included ratings by prior patients. The hospital name and address were also fictitious and deliberately designed to be in Costa Rica as it is among the most popular destinations for medical tourism (Medical Tourism Index, 2014). Two variations of rating systems have been created; one with single overall rating and another with the proposed detailed rating system consisting of all rating categories in Figure 2.

The target population for this study was people who intend to consider medical travel but may or may not have done so until now. The sample was recruited from social networks. The survey link was shared on author’s and co-authors’ walls on Facebook and all friends were asked to share the survey link on their walls. This recruitment method could be considered as the snow ball technique. Almost all responses (96.92%) were from the United States (as can be identified by their IP addresses) while only 2.2% was from Thailand and 0.88% from Taiwan. It can be argued that the population on social networks may be younger than the target market for medical tourism. In fact, target markets for medical tourism are varied and covers wide range of age. Four out of eight top specialties sought by medical travelers are cosmetic surgery, dentistry, reproductive, and weight loss (Patients Beyond Borders, 2015), with the dentistry as the most popular followed closely by cosmetic surgery (Pollard, 2007) and fertility as the fast-growing market (Pollard, 2015). Patients seeking these specialties can be of any age. Most of our sample (97.8%) are between 18 to 50 years old, which is a good representatives of the target population. To prevent selection bias, the subjects were randomly assigned into control and treatment groups using a single web address (URL) which evenly redirected to either the page with single overall rating or the page with detailed ratings. The group exposed to a page containing the doc-
tor’s information with single overall rating is the control group and the group exposed to a page containing the doctor’s information with detailed ratings is the treatment group. At the end, manipulation checks were included in the survey and demographic information were collected as control variables.

3.3 Operationalization of Variables

Measurement items from prior research were adopted and slightly adapted to fit the context of our study. All items were measured using seven-point Likert scale. Multiple item scales were used to ensure reliability and validity of the instruments. Trust in intermediary was measured using five items adapted from Pavlou and Gefen (2004), Awad and Ragowsky (2008), and Cyr et al. (2009). Information quality was measured using five items adapted from McKinney, Yoon and Zahedi (2002), and Gregg and Walczak (2008). Willingness to travel abroad for treatment is actually the willingness to transact in medical tourism transaction. While the term willingness to transact can be applied to any context, willingness to travel abroad for treatment is specific to medical tourism context. Therefore, willingness to travel abroad for treatment was measured using four items adapted from Bhattacherjee (2002), and Lim et al. (2006). Furthermore, rating system was directly controlled to be either single overall rating or detailed ratings.

To handle potential confounding factors, the survey also captured demographic data and other factors including gender, age, education, ethnicity, experience with treatment abroad, frequency of using Internet, and experience with doctor rating web sites. To prevent an individual’s bias from the ethnicity of the doctor, we control for the ethnicity of doctor being used in the experiment. We also conducted a pilot with 16 respondents to ensure the instructions and items were clearly understood. We then made appropriate modifications to the survey accordingly.

4 Results

The minimum sample size requirement for PLS is 10 times the number of items (indicators) in the most complex model (Gefen, Straub and Boudreau, 2000). Our most complex model consisted of 23 indicators, and hence the minimum sample size was 230. Our sample size of 227 was very close to 230 and could be considered as large enough for PLS. From the descriptive statistics shown in table 1, univariate normality could be assumed from the data set. In addition, the inter-correlation between variables were below 0.7, except for the relationship between trust in intermediary and information quality; however, the inter-correlation of 0.71 was still very close to the threshold. Table 2 showed internal consistency (Cronbach’s Alpha) of 0.95 for trust in intermediary (TR), 0.91 for information quality (IQ), and 0.95 for willingness to travel abroad for treatment (WT). All of which were much higher than the suggested threshold of 0.7 (Gefen, Straub and Boudreau, 2000; Zhu et al., 2004). Table 2 also showed that loadings of the indicators on their underlying constructs were higher than the suggested threshold of 0.7 (Goodhue, Lewis and Thompson, 2006). Discriminant validity can be observed in two ways: (1) when the indicators load much higher on their underlying construct than on the others, and (2) when average variance extracted (AVE) is higher than 0.5 and the square root of AVE is higher than inter-correlations between the underlying construct and all other constructs (Chin, 1998; Pavlou, 2003; Karahanna, Agarwal and Angst, 2006). The two conditions for AVEs for all constructs were satisfied as shown in table 1. Hence, discriminant validity could be observed. Crossloadings from table 2 also showed that all indicators loaded highly on their underlying constructs and not on other constructs. This pattern demonstrated high convergence validity and high discriminant validity.

<table>
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<th></th>
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<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>S.D.</th>
<th>Skewness</th>
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<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
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<td>1.00</td>
<td>7.00</td>
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<td>1.66</td>
<td>-.05</td>
<td>.94</td>
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<tr>
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<td>4.07</td>
<td>1.44</td>
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<td>.55</td>
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Table 1. Descriptive statistics and inter-correlations

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<th>TR2</th>
<th>TR3</th>
<th>TR4</th>
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<th>WT</th>
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<td></td>
<td>0.632</td>
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<td>0.958</td>
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<th>IQ3</th>
<th>IQ4</th>
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<td>0.944</td>
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<td>0.917</td>
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</table>

Number of observations = 227.
The elements in the matrix diagonals represent the square root of AVEs.

Table 2. Crossloadings and internal consistency

Figure 3. Estimated model
The model was first estimated without interaction effect; the effects of TR and IQ on WT were .2891 and .3627 at p < 0.01 while the effect of Rating System (RT) on WT was not significant. In the second step, the interaction effects were then added into the model; the direct effects of TR and IQ were .5241 and .3268 at p < 0.01 while the direct effect of RT (.4524) became significant at p < 0.1 and the interaction effect between TR and RT was -.6308 at p < 0.01. Finally, three control variables were added into the interaction effect model. As a result in figure 3, the effect of TR on WT was .5292 at p < 0.01. Hence, H1 was strongly supported. The effect of IQ on WT was .2952 at p < 0.05. Hence, H2 was moderately supported. The effect of RT on WT was .4212 at p < 0.1. Hence, H3 was supported. The interaction effect between TR and RT on WT was -.4663 at p < 0.05). Hence, H4 was moderately supported. However, the interaction effect between IQ and RT on WT was not significant. Hence, H5 was not supported. Among the control variables in the model, the effect of age and ethnicity on WT were .1840 and -.1710, highly significant at p < 0.01 while gender was not significant. The $R^2$ of WT was 0.466. In another word, medium proportion (46.6%) of variability in WT could be explained by the model.

5 Discussion and Conclusion

The objective of this study is to investigate the interaction effect of doctor rating systems with trust in an intermediary and information quality on willingness to travel abroad for treatment in medical tourism context. We proposed a model and tested hypotheses using an experiment. The findings show that all hypotheses were supported except the one that suggests the interaction of rating type on information quality.

We found that when detailed ratings were presented, the effects of trust in intermediary and information quality on willingness to travel abroad for treatment are significantly higher than when single overall rating was presented. This finding supported the inclusion of the proposed rating system into the design of the proposed medical tourism portal. The result sheds some light to the practical world. There are plenty of doctor rating web sites, each with different rating systems. Some sites have only overall single rating system while some sites have multiple rating systems covering more details of the same doctor. The question is that, among these different doctor rating systems, which one is good and which one is bad? This study answers this question by applying design science research in designing an appropriate set of doctor rating systems and validating it in the context of medical tourism. The result provides insight to medical tourism agencies, portals, and providers for what patients are expecting from the doctor rating systems on their sites. Eventually, when the proposed doctor rating system has been adopted by many web sites, the patients will enjoy the benefits in terms of comprehensiveness of the rating and comparability among rating of the same doctor on different web sites. Another point is that the proposed rating system and criteria can be used as standard rating system not only for medical tourism web sites, but also for general doctor rating web sites.

There are some limitations to this study. The limited sample size was largely drawn from the general U.S. population. This may pose limitation to the generalizability of the results. Further studies should be designed to include medical tourism patients and sample from other countries in order to strengthen the generalizability of the findings. In addition, the practical validity of findings of this study can be tested using a real implemented project. There are possibly other differentiating factors within the ratings (such as subjective vs. objective, direct vs. indirect questions) that may influence the willingness to travel abroad for treatment. Future studies may also explore patterns of engagement and empowerment of patients with a medical tourism portal, both before and after treatments.

To conclude, there has been a strong need to reduce the challenge of information asymmetry in medical tourism process. Till now, mediation services have been rare in this space; those currently available do not meet the demand of providing accurate and reliable information. By using the rating system proposed in this paper, providers can help patients get accurate and reliable information, and as a consequence, patients can make informed decision about their treatment options before making a commitment to travel abroad for treatment. Results of this study suggests that a platform that incorporates
detailed doctor and administrative ratings will improve a patient’s trust in the medical tourism portal and their willingness to travel abroad for treatment.

References


