Experiences with hearing health care services: What can we learn from online consumer reviews?

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Abstract

Objective: The aim of the study was to examine experiences of hearing healthcare services as described in online consumer reviews.

Design: The study used a cross-sectional design. Online consumer reviews about hearing healthcare services generated from Google.com to an open-ended question "Share details of your own experience at this place" and perceived overall experience (indicated on a 5-point rating scale: "very good" to "very poor") were extracted from 40 different cities across the U.S. The open text contributed a text-corpus of 9,622 unique consumer reviews. These responses were analyzed with the cluster analysis approach using an open source automated text analysis software, IRaMuTeQ, to identify key themes. Association between clusters and consumer experience ratings as well as consumer meta-data (percentage of older adults in the city, region) were examined using the chi square analysis.

Results: The majority of consumers appeared satisfied with their hearing healthcare services, with nearly 95% of consumers reporting "very good" and "good" on the global experience scale. The analysis of text responses resulted in seven clusters within two domains. Domain One (Clinical Processes) included the three clusters: *Administration processes; Perceived benefits;* and *Device acquisition.* Domain Two (Staff and Service Interactions) included the four clusters: *Clinician communications; Staff professionalism*; *Customer service;* and *Provider satisfaction*.

Content relating to *administration processes* was associated with overall rating regarding the hearing healthcare service experience. Consumer's reviews relating to *administration processes* mostly described negative experiences, and these participants were more inclined to provide poorer overall experience ratings. In addition, city characteristics (i.e., percentage of older adults, region) had bearing towards what elements of hearing healthcare services are highlighted more in the consumer reviews.

Conclusions: Consumers comment on a variety of elements when describing their experiences with hearing healthcare services. Experiences reported in most clusters were generally positive, although some concerns in the "clinical process" are associated with lower satisfaction. Employing patient-centered strategies and ensuring patients have good experiences in the areas of concern may help improve both patient experience and their satisfaction.

Key Words

Hearing healthcare services, Patient experience, Patient satisfaction, Consumer reviews, Administration, Hearing loss, Hearing clinic

Background

The ultimate goal of healthcare services is to achieve improved health outcomes (e.g., reduced burden from the disease or condition, or improved health-related quality of life) in patients and their significant others (Mold, 2017). More recently patients' healthcare experiences and self-reported satisfaction are considered important indicators of healthcare service delivery. Self-reported experience and satisfaction are often used interchangeably. Although related concepts, they are independent constructs (Berkowitz, 2016) that should be examined independently. Patient experience includes all engagements between patients and the health care system,

including health care professionals, clinic staff and facilities (Agency for Healthcare Research and Quality, 2016). Patient satisfaction can be defined as an "element of psychological health that influences the results of health and/or medical care" (Gădălean et al., 2011). The patient experience can be assessed by examining the occurrence and frequency of predicted healthcare interactions (for example, availability of parking or provision of useful information). Whereas, patient satisfaction can be measured by examining whether the healthcare occurrence met the patient's expectations. Importantly, while the patient experience and patient satisfaction are important healthcare indicators in their own right, they are both related to clinical effectiveness and patient outcomes (Boulding et al., 2011; Chen et al., 2018; Doyle et al., 2013).

Governments and third-party reimbursement agencies are pushing for inclusion of patient experience and patient satisfaction as key indicators in health metrics. Although there is a move within healthcare to measure and report these constructs, there has been limited work on these aspects in hearing healthcare literature. Some studies within the broad field of audiology relate to understanding the patient experience and satisfaction in people with hearing loss in the context of hearing healthcare services. For example, a large-scale consumer survey in the U.S. has suggested substantial variability in the hearing aid fitting process across providers. Even though there is general clinical consensus among professional societies and consumer advocacy groups important aspects of the fitting protocol are often omitted. This suggests that the expected service quality does not necessarily match best practice recommendations (Kochkin et al., 2010). In an earlier study, Kochkin (2000) reported that consumer concerns related to poor services from hearing care professionals and that hearing aid expectations were not communicated realistically. Another project in Australia examined the communication interactions during initial and rehabilitation planning consultations finding that audiologists typically dominate the

conversation during audiology consultations and rehabilitation planning sessions without taking advantage of the opportunity to develop patient-centered communication and shared decision-making (Ekberg et al., 2014; Grenness et al., 2015a, 2015b) Although observational studies provide insight into clinical practices, they do not subjectively measure the patient experience. There is a paucity of studies that consider how adults with hearing loss experience healthcare services, and the key constructs contributing to a positive or negative hearing healthcare experience.

Positive patient experiences not only promote good clinical outcomes, but they could also promote good business, through word-of-mouth referrals (Taylor, 2015; Joubert et al., 2017). Where word-of-mouth recommendations traditionally occurred between individuals with a personal relationship, word-of-mouth referrals are now more available and widespread through online consumer review forums (such as Google.com, Yelp.com, Amazon.com). Online consumer reviews are highly influential on consumer online purchasing habits, especially for niche products and services (Lim & Van Der Heide, 2015; Zhu & Zhang, 2010). Although online consumer reviews can be persuasive for those who are looking for products and services, generally they are considered non-commercial as it is written by those who purchased the products and services as opposed to the seller. For this reason, those who are writing the reviews may not have any vested interest in recommending a product or brand, and as such potential consumers believe their reviews to be independent and thus more credible than marketer-generated information (Willemsen et al., 2011).

There is growing interest in healthcare to examine consumer reviews to gain insights into patient experiences and to generate hypothesis. For example, Fan and Lussier (2018) manually

examined consumer reviews about dietary supplements to examine self-reported benefits. Adusumalli et al. (2015) analyzed 103,411 consumer-generated reviews generated from WebMD.com to understand the drug performance and reported that these reviews serve as an orthogonal information source from various stakeholders including consumers, physicians, and drug manufacturers that can support assessment of a drugs' effectiveness. In another more recent study, Ryskina et al. (2020) reported that consumer review and rating about skilled nursing facilities can help predict the rehospitalization rates. This approach of gaining insight into consumer thoughts, emotions, and experiences belongs to a rapidly growing area of research called Consumer Health Informatics (CHI; Demiris, 2016; Ho, 2010). Both qualitative and quantitative methods have been used in analyzing the consumer generated data (e.g., Fan & Lussier, 2018; Manchaiah, Amlani, et al., 2019), although the most efficient methods to analyze free text responses is using the quantitative "topic modelling" (for review see Kherwa & Bansal, 2019; Vayansky & Kumar, 2020). The topic modelling approach has been used in various areas including marketing, humanities, bioinformatics, and more recently in healthcare. Using common statistical method such as factor analysis or cluster analysis, it is possible to statistically draw out underlaying themes of text to make inferences of the data (Boyd, 2017). This approach has been found to be valid and reliable in comparison to qualitative methods and can save thousands of hours in hand coding and analysis of large unstructured text (e.g., reviews in Amazon.com or Google.com). For example, Manchaiah, Amlani et al. (2019) were able to identify the benefits and limitations of direct-to-consumer hearing devices from a topic modeling, cluster analysis of free-text consumer responses from Amazon.com and the results were comparable to qualitative content analysis in the same study.

The current study takes a CHI approach, specifically "topic modeling" analysis, to examine the consumer experience with professional hearing healthcare services by analyzing online consumer reviews generated from Google.com.

Method

Study Design and Ethical Considerations

This study used a cross-sectional design. Secondary data from online consumer reviews on Google.com were analyzed using automated text analysis software. No ethical approval was required as confirmed by the chair of Institutional Review Board (IRB) at Lamar University. This is because the data were publicly available and were anonymous without any personally identifiable information of consumers who provided these reviews. However, responsible principles for online research were considered when analyzing and reporting the data (Ainscough et al., 2018; Eysenbach & Till, 2001).

Data Extraction

Consumer reviews about hearing healthcare services on Google.com was searched in 40 cities across the U.S. (see online supplemental material for details). The cities were chosen based on purposive and maximum-variation sampling methods to include different regions (i.e., Northeast, Midwest, South, West) and also different population size (i.e., 1 million, 500,000 to 1 million, 200,000 to 500,00, and <200,000). Hearing healthcare clinics from each city were searched using various key words such as audiology clinics in "city name," hearing clinic in "city name," hearing aid center in "city name." This search resulted in a list of clinics that were indexed by Google.com. It is likely that reviews may be biased to extreme positive (or negative) reviews if there were a limited number of reviews. To avoid this, only the reviews from clinics with 10 or

more reviews were extracted and included in the analysis. The search yielded hearing healthcare clinics across various settings including independent practices and/or attached to a hospital or ENT practices, which were all included in the data extraction.

The consumer reviews on Google.com included a text-response to an open-ended question "Share details of your own experience at this place" as well as a single rating question on a 5-point scale. The 5-point scale directly follows the open text item and provides no specific prompt. We thus assume that the rating provided by consumers represents their overall experience, described hereafter as the "overall experience rating". The open-text reviews, rating, some information about the clinic (e.g., clinic name, city, URL), and some city-specific meta-data (i.e., region, population, percentage of population over 65 years) were extracted to an excel document for further analysis.

The search resulted in a total of 13,168 individual reviews. Of these, 3,546 reviews had provided only the rating data and did not include any open-text response; these were consequently excluded. The remaining, 9,622 individual consumer reviews were included in the analysis. The reviews may have been written primarily by people with hearing and balance disorders, although some of these may have been written by significant others.

Data Analysis

The text data were analyzed using an automated text analysis software, IRaMuTeQ (Version 0.7 aplha 2, 2020). This software works as an interface for open-source R software (Version 4.0.0) for multidimensional text and questionnaire analysis. IRaMuTeQ is also an open-source software (IRaMuTeQ, n.d). A cluster analysis was performed on the text corpus to identify main themes

as reported by consumers. The cluster analysis used a Reinert method (Ratinaud & Marchand, 2012; Reinert, 1983), a divisive hierarchical clustering approach to text analysis (Sbalchiero & Tuzzi, 2017). Text segments are grouped based on co-occurrence of lemmas (i.e., group of words in a single form). This process produces homogeneous clusters (i.e., having text segments with the common pattern of lemmas), yet ensures heterogeneity between clusters. The output is a dendrogram characterizing the clusters (see Figure 1) and text excerpts that are typical representations of the clusters (see Table 2). Within each cluster, the font size of words is proportional to the chi-square value (i.e., larger font size indicating larger chi-square value); however, this comparison is only reliable for comparison with a cluster, i.e. comparisons cannot be made between clusters. This automated text analysis approach generates themes similarly to traditional qualitative content analyses, and is thus a reliable method in analyzing a text corpus (Manchaiah, Amlani et al., 2019). The research team generated names and descriptions of the clusters based on the words and text excerpts, based on consensus (VM, RJB, & DWS).

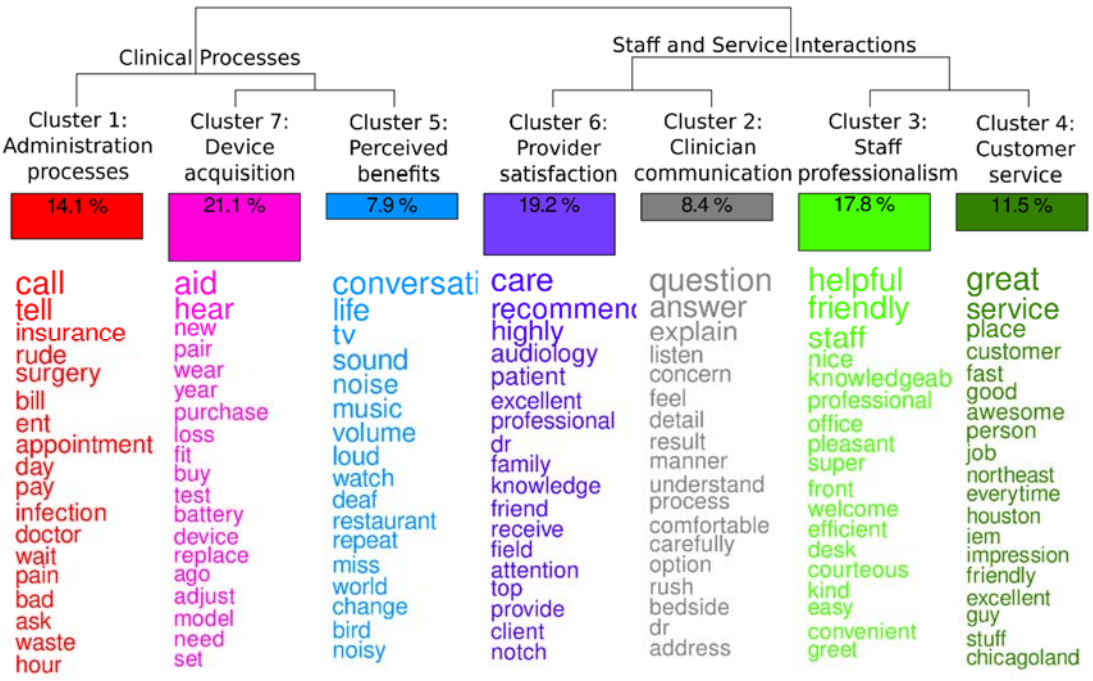

Figure 1. Dendrogram (i.e., classification of clusters), size of clusters as percentage of the text segments, and overrepresented words in each cluster in the hearing health care Google reviews.

Chi-square analyses were performed to examine the relationship between clusters and meta-data, such as the consumers overall experience rating, percentage of population over 65 years, and the region (see Figures 2-4). Clusters that show a chi-square value of 3.84 or more have a statistically significance with a *p*-value of <.05. Interpretation of the graphs is through consideration of the overrepresentation or underrepresentation of individual variables (e.g., consumer experience rating) in each of the clusters. The bars above the midline represent a statistical overrepresentation (a higher proportion), and the bars below the midline represent a statistical underrepresentation (a lower proportion) of each variable in relation to each cluster. The length of the bars indicates the strength of overrepresentation or underrepresentation.

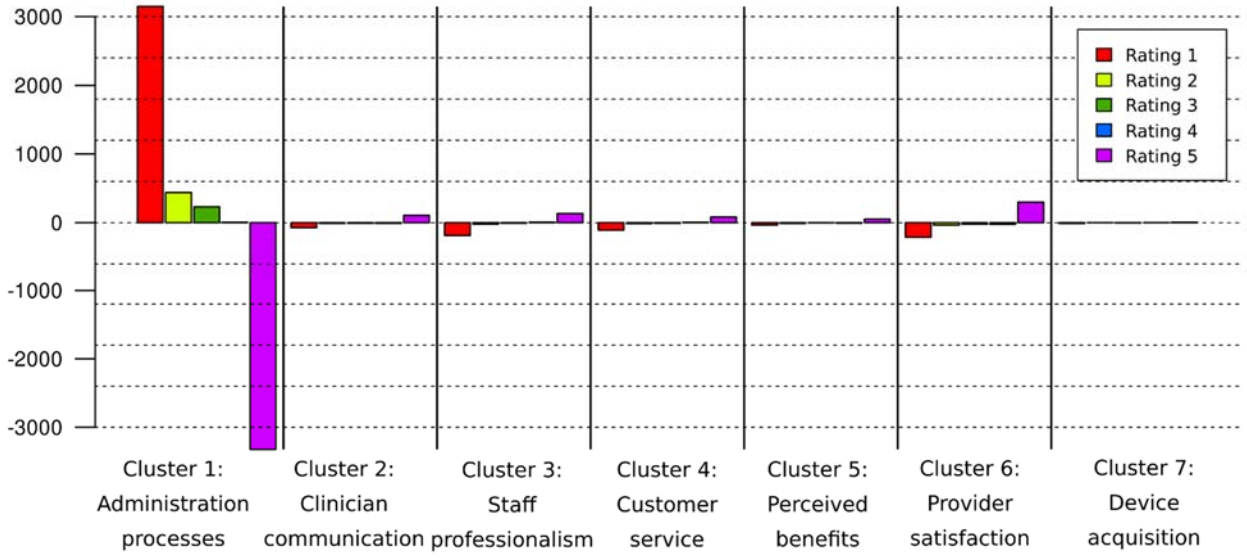

Figure 2. Association between clusters and consumer's overall rating.

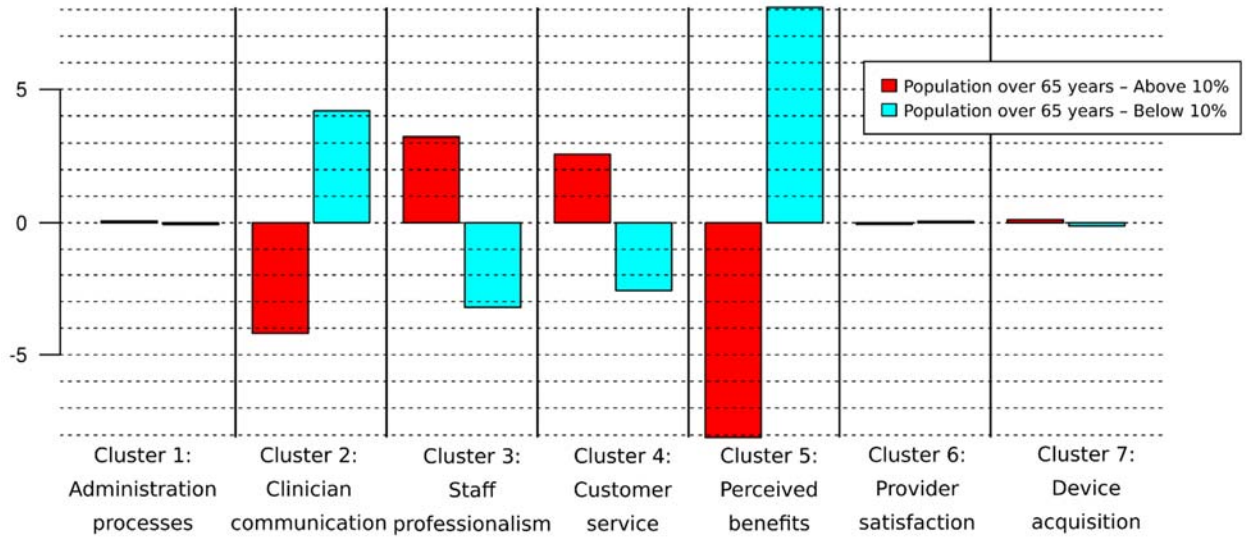

Figure 3. Association between clusters and percentage of older population in the city.

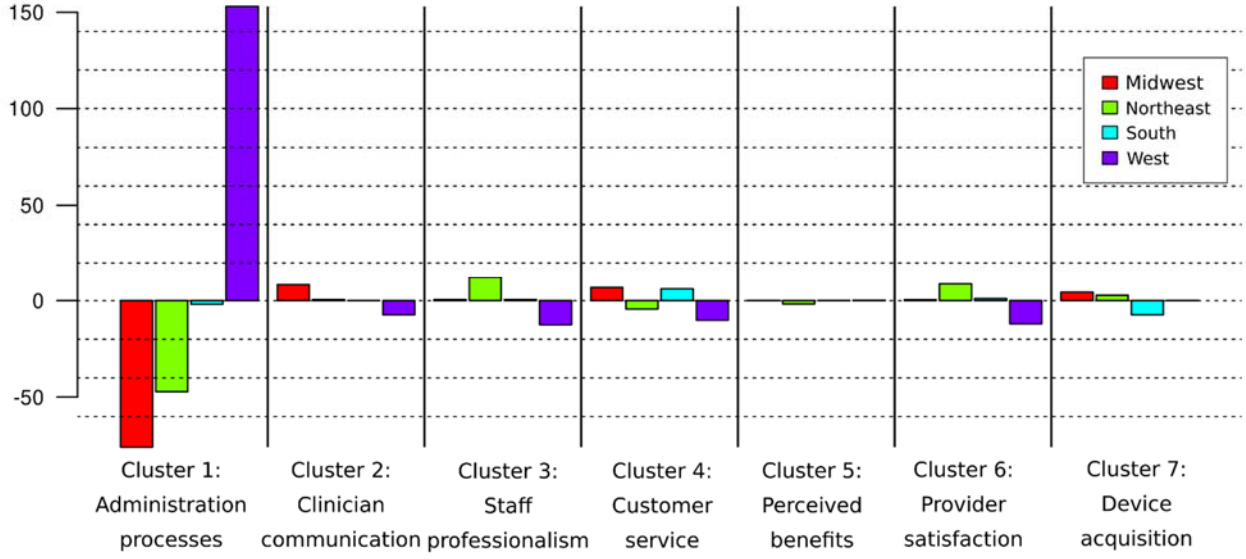

Figure 4. Association between clusters and regions.

A more detailed description of the cluster analysis and also chi-square analysis using the IRaMuTeQ software has been provided in recent open-access publications (see Manchaiah et al., 2018; Manchaiah, Amlani et al., 2019)

Table 1: Consumer review characteristics

Meta-data	n	%
Region		
▪ Northeast	1,018	10.6
▪ Midwest	1,609	16.7
▪ South	3,832	39.8
▪ West	3,163	32.9
Population		
▪ >1 million	3,990	41.5
▪ 500,000 to 1 million	3,217	33.3
▪ 200,000 to 500,000	1,620	16.9
▪ <200,000	795	8.3
% of population over 65 years		
▪ 10% and below	2,243	23.3
▪ Above 10%	7,379	76.7
Overall consumer experience rating		
▪ 1 = Very poor	359	3.7
▪ 2 = Poor	82	0.9
▪ 3 = Average	75	0.8
▪ 4 = Good	279	2.9
▪ 5 = Very good	8,827	91.7

Results

Consumer Review Characteristics

This study included a total of 9,622 consumer reviews about their experiences receiving professionally offered hearing healthcare services. The mean number of reviews were 240.6 (median = 159, range = 35 to 662). The reviews were distributed across the U.S. regions, cities with different sized populations, and different population demographics as illustrated in Table 1.

The majority of consumers provided high overall experience ratings relating to their hearing healthcare services, with nearly 95% of consumers reporting “very good” or “good” on the overall experience rating.

Main Themes in Consumer Reviews Based on Cluster Analysis

The cluster analysis yielded seven clusters within two domains (Figure 1). Names of each cluster and example text segments are provided in Table 2. Here, the clustering configuration is determined entirely by the text analysis software, whereas the names of these clusters were determined by the authors. The seven clusters included:

- Cluster 1 – Administration processes (included 14.1% of texts): This concept describes administration processes relating to booking, paying and attending appointments. Insurance was one of the commonly used words, along with words relating to negative experiences or emotions, including “rude,” “infection,” “wait,” “pain,” and “bad.”
- Cluster 2 – Clinician communications (8.4% of texts): This concept described interaction with and/or qualities of the hearing healthcare clinician relating to communication, such as providing information and explanations, asking and answering questions, demonstrating effective listening skills. These statements were mostly positive in nature, and described qualities and interactions positively contributing to the therapeutic relationship.
- Cluster 3 – Staff professionalism (17.8% of texts): This cluster described the professionalism of staff, and were mostly positive. Staff were typically described as knowledgeable, friendly, and helpful.

- Cluster 4 – Customer service (11.5% of texts): This cluster described the customer service experience, and were mostly positive. These statements referred to the speed/efficiency, affordability and overall positive experiences with service received.
- Cluster 5 – Perceived benefits (included 7.9% of texts): This cluster described the personal benefits gained from obtaining hearing devices. Participants described aspects of improved hearing and communication in a wide variety of situations, including in quiet and in noise, conversing with others in small and large groups, as well as enjoying nature sounds and music.
- Cluster 6 – Provide satisfaction (19.2% of texts): This concept described participants satisfaction with the services received, with the majority of entries describing that they would highly recommend their service provider with supporting reasons.
- Cluster 7 – Device acquisition (21.5% of texts): This cluster described the acquisition of hearing aids, including the process of selecting the appropriate device and device features, learning how to use and manage it, as well as the benefits and/or challenges experienced.

The seven clusters represent two domains: (i) Clinical processes (43.5% of texts); and (ii) Staff and service interactions (56.5% of texts). The domain "clinical processes" includes the three themes: *Administration processes; Perceived benefits; and Device acquisition.* They describe the process involved in finding a hearing healthcare clinic, making appointments, third-party reimbursements, process of acquiring hearing devices, and the benefits noticed from hearing healthcare services. The domain "staff and service interactions" included the four themes: *Clinician communications; Staff professionalism; Customer service;* and *Provider satisfaction*. They describe the users experience in terms of communication with front office staff,

communication with hearing healthcare professionals, professionalism experienced during their interactions with office staff and hearing healthcare professionals, customer service experiences, and also their satisfaction with the hearing healthcare services in general.

Table 2: Example of a text segment for each cluster in the hearing aid reviews.

Clusters	**Example of a text segment**
Cluster 1: Administration process	**unprofessional office** staff over a **month** and my **insurance** has not been **billed multiple phone calls** to this **office** and no **luck decided** to make a **payment** and **submit** the **claim** myself was **told** i would be **emailed** a receipt **invoice received** nothing also expensive i had an **accident** and was **hit** in my **ear** i **called** and **asked** if they took my **insurance** yes they did so i made my **appointment** and was **told** it was a **simple exam** and no co **pay** as of yet the **lady** then **told** me my **appointment** was **being** moved anyway because the **doctor called** out that **day** well when i **called** in a **panic** to **let** them **know** i was **running** 10 **minutes** behind they didn't say anything about the **doctor** not **being** in and moving my **appt**
Cluster 2: Clinician communications	**Dr** D is an outstanding audiologist before suggesting a brand **type** of **hearing** aids she asks good **questions listens carefully** to the **answers** and **explains** her **evaluation** of my **hearing test** 5 years ago and every **time** he needs adjustment she was always very **patient dr** X **listens** to your **concerns** and takes the **time** to **answers** your **questions** and **explains** everything on every **visit** i did have many **questions** and he **answered** those and helped **explain** my **hearing test results** to myself and my husband i never **felt rushed** and he was **kind** and **patient**
Cluster 3: Staff professionalism	**professional front office staff** very **friendly** and **helpful timely** appointment no **wait** time Dr x was **warm** understanding and very **knowledgeable** needed two hearing devices **love** them and the ability to hear

	very **friendly** and **knowledgeable staff** that made me feel **extremely comfortable** and eased my anxiety x was **extremely helpful** in coordinating my insurance coverage and x made the **entire** examination testing and product demonstration a very **pleasant** and **professional experience** i found my **experience** to be very **helpful** the **staff** is **professional friendly knowledgeable** and caring and i thank them for their help very **efficient friendly** service shielas **amazing** the **front office staff** is very **helpful** i can finally hear
Cluster 4: Customer service	**love** this **place** would recommend to anyone they always are **super nice** and very attentive **great customer service** **great place** to get your hearing aids **great customer service** will coming back for my next set **great service great people** very attentive to your needs they work hard to make your equipment work best for you definitely a **great place** to go for personable individualized care highly recommend
Cluster 5: Perceived benefits	i can **hear** my friend who **mumbles** a **lot** can **carry conversations** without asking **people** to **constantly repeat** themselves have the **tv volume lower** and **enjoy music** more while **understanding** the **lyrics** you can **talk** on your **cell phone** while **hearing** the **conversation** through your **hearing** aids you can **control** the **volume** on your **television** by using an **app** on your **cell phone** your **quality** of **life** is so **greatly improved** my **hyperacusis** went **down** so much that i can **play music** on my **laptop** and **turn** it up **high even** my **tv** is once again **being** used and the **volume control** is no **longer dusty** as i can **raise** the **sound level** up to a **normal** amount or **even** further
Cluster 6: Provider satisfaction	i have been going to associated **audiology** for 8 **years** and have been very **pleased** at the **excellent service** and **medical care** that i have **received** as a **patient** their staff is very tuned into **solving** your hearing problems i **highly recommend** their **services**

	this is one of the best **service experiences** ever while **receiving** a hearing test **dr** X provides **excellent services straight** forward **advice** and really **cares** for her **patients** we **highly recommend dr** X **dr** X is **extremely knowledgable** and answered all of my questions he **thoughtful** toward of all of his **patients** and **genuinely cares** about their hearing needs i would **highly recommend** him to both **friends** and **family**
Cluster 7: Device acquisition	we took a **pair** of **hearing aids starkey cros** i200 **models** that we **purchased** used on **ebay** like **new** dr X inspected **programmed fit** the **aids** into my **wife** s **ears** she hasn't **heard** out of one in 35 **years** the **new digital devices offer** several **features** not **found** in the **old style aids** such has dual **microphones** and noise reduction **technology** we **tested** a **pair** of **hearing aid devices** that she **thought** would serve my needs and we **discussed** the **specifics** of **programming** i **recently purchased** a **new pair** of **hearing aids** it took me a while to **decide** which **set** to **purchase** they were very patient with me and **encouraged** me to **wear** each **set** for a **few days** before making my **final decision**

Association Between Clusters and Overall Experience Rating

Associations between the cluster and consumer's overall experience ratings revealed overrepresentation of user rating 1 (very poor experiences) and underrepresentation of rating 5 (very good experience) for the cluster *Administration processes* (Figure 2). This suggests that the administration process (e.g., booking appointment or processing third party reimbursement through front office or administration staff) can influence a consumer's perceived overall experience.

Association Between Clusters and Meta-data

Associations between the cluster and the percentage of older persons in the city (below 65 years vs 65 years and above) suggested that cities with higher percentage of 65 years and above were overrepresented in clusters *Staff professionalism* and *Customer service*, and underrepresented in clusters *Clinician communications* and *Perceived benefits* (see Figure 3). The exact opposite pattern of associations were noted with consumer reviews from cities with a higher percentage of persons below 65 years of age. These results suggest that consumers with different ages may focus on different elements of the hearing healthcare service when providing online reviews.

Associations between clusters and the regions suggested an overrepresentation of West region in cluster *Administration*, whereas the regions Midwest and Northeast were underrepresented (see Figure 4). Generally, the *Administration* cluster included more negative reported issues. These results suggest that the consumers in the West region discussed administration issues more often in their reviews than consumers from other regions. Although the reason for this is unclear it could be that consumers in this region have higher expectations and/or hearing healthcare clinics in the West region may presented with more issues related to the administration process.

Discussion

The current study examined the hearing healthcare experience by analyzing online consumer reviews from Google.com. Insights from the patient experience may help hearing healthcare professionals tailor their service delivery to focus on what the patient values and what may improve the overall patient experience.

The extraction of online consumer reviews suggested that most of the audiology clinics were based in medium to larger cities (i.e., over 90% clinics in cities with over 200,000 population). These results are consistent with a recent study demonstrating that audiologists in the U.S. tend to be located in metropolitan counties with higher median household incomes (Planet, 2019). The majority of consumer reviews were positive, with nearly 95% of consumers providing an overall experience rating of "very good" or "good." We are not aware of previous studies examining the patient (or consumer) experience relating to hearing healthcare services (or providers), although hearing aid users have reported a high satisfaction towards their hearing device (Hougaard & Ruf, 2011; Kochkin, 2014) and hearing healthcare providers are reported to play a key role in obtaining these positive ratings (Kochkin, 2002).

A text excerpt from an audiology tutorial highlighted that "*Patient satisfaction is no longer contained to just the interaction with the audiologist. It extends to the entire experience—the staff, the service, the product, and other factors. Many practices fail to capitalize on one of the primary components of the patient experience—office design*" (Jacobs, 2016, pp. 316). In addition, few studies have examined the consumer perspective of the hearing healthcare experience. Market research shows that one in five (39%) consumers visit multiple hearing clinics prior to purchasing a hearing aid (Kochkin, 2002). The top influencing factors in choosing a hearing clinic relate to the consumers interactions with professional staff; the convenience of the location of the clinic; the price of services and devices; and positive word-of-mouth advertising. Another recent study investigated consumer's perspectives on the quality of the hearing healthcare services that they received via self-report survey (Hendriks et al., 2017). Important aspects of quality care identified by consumers translated into seven themes: clinic facilities, staff conduct and expertise, arrangement of appointments, waiting times, patient

participation and effectiveness of treatment. These observations emphasize that hearing healthcare professionals need to consider broader aspects (e.g., front office training) of their practice to support positive patient experiences.

Results of the current study, based on examination of textual responses, are consistent with previous studies that point to barriers and facilitators consumers may typically face in their hearing healthcare journey. Consumer reviews were generally concerned with two main issues (a) clinical process, and (b) staff and service interactions. Also, six of the seven clusters included mainly positive reports towards hearing healthcare services with negative reports only related to "administration processes" (e.g., booking, paying and attending appointments). Recent studies have highlighted that audiologist's communication with patients and families need to be improved (Ekberg et al., 2014; Grenness et al., 2015a, 2015b; Manchaiah, Bellon-Harn et al., 2019). Recommendations include learning to manage uncertainty within challenging clinical encounters instead of avoiding it (Watermeyer et al., 2020). However, the current study demonstrates that interaction with administration staff (e.g., front office, billing) is important to facilitate a positive patient experience. Support staff can be trained by offering courses such as Ida Institute's "Patient-centered care for support staff" (Ida Institute, n.d) that may help improve the administration process and interaction within the hearing healthcare clinic. A recent qualitative study suggested that hearing healthcare patient trust is influenced by their preconceived service expectations as well as the clinical environment (Preminger et al., 2014). Key elements highlighted in the current study should be incorporated by hearing healthcare professionals to encourage patient trust and support positive experiences.

Exploratory examination of associations between clusters and meta-data included interesting results. The cluster describing “administration processes” appears to be a key driver of the overall rating scale. Specifically, consumer-reported experiences relating to administration processes tended to be negative. Consumers in the West region discussed administration issues more often in their reviews when compared to consumers from other regions. Although the reason for this is unclear it could be that consumers in this region have higher expectations, clinics in this region may have complex administration process, and/or hearing healthcare clinics in the West region may have more issues in terms of administration process. This analysis also indicates that cities with a higher or lower percentage of older adults (below 65 years versus 65 years and above) have different emphases in consumer reviews. For instance, reports from cities with a higher percentage of persons 65 years and older were more represented on clusters of “clinician communications” and “perceived benefit.” Consumer reports from cities with higher percentage of adults younger than the age of 65 years were overrepresented in the clusters of “staff professionalism” and “customer service.”

Overall, these results suggest that consumers generally report positive of hearing healthcare service experiences. However, the analysis of text responses does highlight some issues including the administration process that can be improved. Findings point to office management as an important element of consumer experience. Consumers’ evaluation of healthcare (including hearing healthcare) will become increasingly important due to a move towards patient-centered practice (Hendriks et al., 2017). Hearing healthcare providers should therefore be encouraged to measure consumer (or patient) satisfaction of their services to anticipate and address potential concerns to improve their experience and satisfaction.

Clinical Implications

The current study results shed light on the elements of their experiences with hearing healthcare services that are important with several practical implications. First, results from this study may provide useful discussion points for courses on practice management in audiology training programs. Secondly, audiologists and hearing healthcare companies may use study results to better shape patient engagements based on identified contributors to positive hearing healthcare experiences. Third, knowledge generated in this study may also be useful in developing a marketing strategy (i.e., using elements that relate to positive experience and high satisfaction when developing key messages). On the other hand, the study also has theoretical implications for healthcare in general. A systematic approach to soliciting responses from a large consumer population would support innovation and discovery in hearing healthcare consumer behavior (Fan & Lussier, 2018). Consumer reviews can be seen as early evidence towards products and services before stronger evidence from clinical studies become available.

Study Limitations and Future Directions

The study is the first of its kind to use online consumer reviews to gain insights about patient experiences and patient satisfaction towards hearing healthcare services. As the text responses were driven by what is important to consumers unlike clinical studies in which the topic of discussion is influenced by the clinician/researcher, ecological validity of the data can be considered higher than traditional researcher derived surveys (Plaza et al., 2019). Despite this major advantage, the study had several limitations. First, Google.com does not solicit reviews to any particular users, although it is a common practice for business to encourage their customers to leave a review in online platforms such as Google.com which may have resulted in some sampling bias. Second, those who choose to leave a review may vary from general population

(e.g., younger, more tech savvy, more educated, have either positive/negative experience and have the urge to express it in some way) which may have further contributed to a sampling bias. Third, although the cluster analysis provides a quick and reliable way to gain rapid insights about the data, it may fail to identify some subtle themes (Manchaiah, Amlani et al., 2019) for which a thematic content analysis may be more appropriate. Fourth, this cross-sectional design only captures experience at a point in time and does not account for how experiences change over time. Finally, there was no demographic information (e.g., age, gender, degree of hearing loss) about consumers who wrote these reviews which limits its generalizability.

Future studies should focus on drawing samples from clinical population, gathering key demographic and audiological data, and also collecting some potentially gathering some data about experience and satisfaction using standardized questionnaires in addition to the open-text responses. Examining the text data with all other components listed above may provide results that are more clinically meaningful and are generalizable.

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