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Sudden sensorineural hearing loss: what can we learn from examining Reddit posts?

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Abstract

Background. Many patients with sudden sensorineural hearing loss may seek hearing health information and social support online, although little is known about the online information seeking behaviour.

Objective. The present study aimed to examine the discussions around sudden sensorineural hearing loss in Reddit posts.

Method. A total of 526 Reddit posts about sudden sensorineural hearing loss were extracted and analysed using qualitative and quantitative methods.

Results. The content analysis identified eight main categories. Most of the posts were on topics of: sharing personal experiences (34 per cent), describing symptoms (31 per cent), discussing treatment options (36 per cent) and discussing possible causes (19 per cent) of sudden sensorineural hearing loss. The sudden sensorineural hearing loss Reddit posts varied significantly in terms of linguistic variables when compared to baseline Reddit posts. Reddit posts by individuals with sudden sensorineural hearing loss had significantly higher engagement, higher authenticity and made more references to their body when compared to other users.

Conclusion. The study results provide insights that can be helpful for professionals during clinical interactions.

Introduction

Individuals with sudden sensorineural hearing loss (SNHL) are highly heterogeneous in terms of aetiology, manifestation of symptoms, and the way they manage the traumatic experiences surrounding partial or complete hearing loss.[1] Most of these patients are likely to seek urgent or emergency care from healthcare providers.[2] In addition, many patients may seek hearing health information and social support online via various websites or social media platforms, because of the ease of access to information. Some of these patients may continue to seek online health information even after consultation with healthcare providers. In part, this may be because the patients do not get clear information about treatment options and/or their prognosis.

Despite concern regarding the reliability of online information, especially on social media platforms,[3,4] patients seek health information online and use it in decision making. Often, they also use it as a discussion point during healthcare interactions. For this reason, it is useful for healthcare professionals to examine the content of online health information. In addition to seeking information, many patients also share their experience with healthcare professionals on social media platforms such as Facebook and Reddit. In particular, because of the anonymous nature of Reddit, users are considered to provide more engaging and valuable descriptions about the topic of interest. Examining the natural language from these posts can provide insights into thoughts, emotions and behaviours of users.[5]

The present study aimed to examine the discussions around sudden SNHL in Reddit posts, in order to understand how people with sudden SNHL reach out to others for support (informational, emotional, and so on) when coping with sudden SNHL. The specific aims were: (1) to identify the main categories of online discussions around sudden SNHL using qualitative content analysis; (2) to examine the linguistic aspects of conversations using automated text analysis; and (3) to explore whether the linguistic aspects vary across user categories (i.e. individuals with sudden SNHL *vs* others).

Materials and methods

The study used a cross-sectional design. Conversations about sudden SNHL were collected from Reddit and analysed using automated text analysis software. No ethical

Main Article

Dr V Manchaiah takes responsibility for the integrity of the content of the paper

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approval was required as the data were anonymous in the public domain, and no personally identifiable information was included that might compromise the anonymity or identity of users.[6] The Enhancing the Quality and Transparency of Health Research ('EQUATOR') reporting guidelines were used to report the methods and results of the study.

Data extraction

A search was performed using key words that included 'sudden hearing loss', 'sudden onset hearing loss' and 'sudden sensorineural hearing loss' to identify threads specifically discussing sudden SNHL. Data from these threads were extracted using the Reddit application programming interface with a custom-built script.

This search resulted in a corpus of 996 posts. Of these, 470 posts (47.2 per cent) were excluded as they contained either no information or very limited contextual information (i.e. fewer than five words) about sudden SNHL. The remaining 526 posts were included in further analyses.

These posts were generated from over 20 different subreddit threads, although over 80 per cent of the posts belonged to the following threads: r/hearing (30 per cent), r/YouShouldKnow (15 per cent), r/deaf (11.6 per cent), r/MonoHearing (7 per cent), r/AskDocs (6.3 per cent), r/tinnitus (5.7 per cent), and r/hardofhearing (4.8 per cent). This was the primary dataset for the present study.

Additionally, a reference corpus of 273 580 posts was extracted from the r/AskReddit board, serving as a baseline for comparison.

Data analysis

Content analysis and user category

A qualitative content analysis was performed to examine the content of extracted posts. The user category (i.e. individuals with sudden SNHL *vs* all others) was determined by two independent reviewers annotating each post; conflicts were resolved by discussion.

Examination of linguistic aspects

The Linguistic Inquiry and Word Count software[7] was used to analyse linguistic aspects of the text data. This software counts and calculates the percentage of words in a variety of linguistic and psychologically meaningful categories.

In the current study, 11 key linguistic variables identified by the research team were included for further analysis. Linguistic Inquiry and Word Count has high internal reliability and external validity, as noted in several studies.[5,8] A minimum of a five-word count was set for the Reddit posts in the analysis so that the results were not biased because of certain words.

Statistical analysis

SPSS® software was used for statistical analyses. A one-sample *t*-test was performed to compare the linguistic variables for sudden SNHL posts with baseline data. An independent sample *t*-test was performed to examine the difference in linguistic analysis variables among sudden SNHL user categories. A significance level of 0.01 was used. The Cohen's d effect sizes were computed and were interpreted as being of: small effect size (d = 0.2), medium effect size (d = 0.5) or large effect size (d = 0.8).

Results

Review characteristics

A total of 526 Reddit posts were extracted. Of these, 73 were original posts and the remaining 453 were responses to the posts. For the original posts, the median up-vote ratio was 1 (mean = 0.93, standard deviation (SD) = 0.12) with a median up-vote ratio value of 3 (mean = 58.05, SD = 457), suggesting that these posts were quite popular on Reddit. Of the 526 posts, 329 (62.5 per cent) were from people with sudden SNHL and 197 (37.5 per cent) were from others; 'others' included health professionals, the significant others of individuals with sudden SNHL, and users who could not be identified.

Main themes in Reddit posts

The content analysis of sudden SNHL Reddit posts identified eight main categories (Table 1), which highlighted that Reddit users discuss a wide range of issues related to sudden SNHL on this platform. Most of the posts were on topics of: sharing personal experiences (34 per cent), describing symptoms (31 per cent), discussing treatment options (36 per cent) and discussing possible causes (19 per cent) of sudden SNHL. Twelve to 13 per cent of posts were related to seeking or providing information and/or advice. Discussions about prognosis and diagnosis were each noted in less than 10 per cent of the posts.

Linguistic analysis variables in Reddit posts

Table 2 presents the linguistic analysis results of sudden SNHL Reddit posts as compared to Reddit baseline data. The *t*-test results suggest that sudden SNHL Reddit posts varied significantly in all 11 variables when compared to baseline data. Those who provided sudden SNHL posts were more engaged and authentic when compared to baseline users, as noted in the variables of: word count, 'I' words (I, me, my) and authenticity. Sudden SNHL posts had significantly lower social processes and positive emotions, but significantly higher negative emotions, when compared to baseline posts. The sudden SNHL posts had higher cognitive processing, but exhibited less analytical thinking when compared to baseline posts. Finally, as anticipated, sudden SNHL posts had a significantly higher number of words classified as biological (i.e. body, health) and perceptual (i.e. hearing) as compared to baseline posts. These results suggest that sudden SNHL posts on Reddit are markedly different when compared to typical Reddit posts.

Analysis of sudden SNHL Reddit posts across user categories suggested that individuals with sudden SNHL had significantly higher engagement (word count), higher authenticity (based on 'I' words and authenticity) and talked more about their body when compared to other users. Conversely, individuals with sudden SNHL had significantly lower references to others (i.e. social processes) and exhibited less analytical thinking when compared to others, as illustrated in Table 3.

Discussion

The present study used a mixed-method design to examine social media (Reddit) posts about sudden SNHL in order to gain insights into the type of narrative discourse surrounding this topic. The qualitative content analysis identified eight themes, suggesting that the sudden SNHL Reddit posts relate

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Table 1. Content analysis of Reddit posts on sudden sensorineural hearing loss

Category	Posts (% (*n*))	Example (verbatim)
Personal experiences	34.2 (180)	I just recently got diagnosed with SSNHL on the left ear (you never know about it until it you get it), and I feel pretty bummed. The first and the second doctor that I went to both said partial recovery with treatment is possible (I'm taking corticoids and anti-inflammatories), but they couldn't give me concrete examples of recovery
Symptoms	30.8 (162)	I have been getting vertigo recently last couple months. I didn't even think about that
Causes	19 (100)	I was told vertigo can cause seeming hearing loss. Something to do with the equilibrium
Diagnosis	4.4 (23)	I just got back from the doctors. And they are sending me to yet another doctor. But the hearing test was better today. Mild to severe hearing loss in my left ear and just mild hearing loss in my right. And Meniere's is still suspected
Treatment	36.1 (190)	I already take a diuretic. And allergy meds. I need to go back for further testing to confirm it. Before they decide to give me steroids
Prognosis	9.5 (50)	Temporary hearing loss occurs for a short period of time and then revert back to normal. If not taken care in early stages it can become worse and lead to permanent hearing loss. Proper treatment and medication is needed
Seeking information &/or advice	13.1 (69)	I was just wondering if anyone has ever had experience with this? I still don't have my hearing back and there's still ringing in my ear. I'm so perplexed by this as well as many people around me since it happened so suddenly and I'm also very young (23f)
Providing information &/or advice	12 (63)	I'd recommend getting a white noise maker or having some sort of general noise going on in the background. The ringing absolutely feels worse when it's quiet, because it's so much more noticeable. If you have noises going on in the background, it'll be a little easier to deal with. Do your best to just keep your mind off the ringing - if you let it settle into background noise (easier said than done lol), it'll be less noticeable and less annoying

Each post may have commented on multiple elements. The table presents how many posts of the 526 posts had content in these categories. SSNHL = sudden sensorineural hearing loss; f = female

Table 2. Linguistic variables in Reddit sudden SNHL posts and baseline data

Dimension & its description	Reddit group (mean ratio value (SD))		*T*-test results		
	Baseline	Sudden SNHL	*T*-value	*P*-value	Effect size: Cohen's d
Engagement & authenticity					
– Word count: degree to which users engage in topic by providing descriptions of views & experiences	35.2 (55.9)	102.2 (122.6)	12.5	<0.001	0.7
– 'I' words (I, me, my): used when people are looking inward & being self-reflective, & correlate with honesty, anxiety & self-consciousness	5.15 (6.2)	6.26 (4.8)	5.6	<0.001	0.2
– Authenticity: algorithm based on series of deception studies, & correlates with language of telling truth	47.4 (38.2)	65.3 (33.9)	12.1	<0.001	0.49
Social & emotional dimensions					
– Social processes: degree to which users are thinking about social connections & talking about others	10 (9.2)	8.2 (5.8)	−7.16	<0.001	0.23
– Positive emotions: degree to which people express positive emotions	3.7 (5.7)	2.7 (2.9)	−7.96	<0.001	0.22
– Negative emotions: degree to which people express negative emotions	1.7 (4.9)	3.0 (2.7)	10.8	<0.001	0.33
Cognitive dimensions					
– Cognitive processes: degree to which users rely on cognitive terms (e.g. think, understand, because) to work through or convey opinions	12.8 (9.6)	13.7 (6.0)	3.49	0.001	0.11
– Analytical thinking: degree to which users think about topic in a detached, professional way	48.7 (34.7)	44.8 (27.4)	−3.25	0.001	0.12
Biological & perceptual dimensions					
– Body: degree to which users talk about their body	1.1 (3.2)	1.7 (2.0)	6.2	<0.001	0.22
– Health: degree to which users talk about their health	0.68 (0.24)	2.3 (2.8)	13.4	<0.001	0.81
– Hearing: degree to which users talk about their hearing	0.84 (2.7)	4.9 (3.7)	25.2	<0.001	1.54

SNHL = sensorineural hearing loss; SD = standard deviation

to various elements, including sharing personal experiences, discussing symptoms, discussing treatment options, and seeking or offering information or advice on managing the condition.

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Table 3. Linguistic analysis across user categories

Linguistic variable	User category (mean ratio value)		*T*-test results		
	Sudden SNHL*	Others†	*T*-value	*P*-value	Effect size: Cohen's d
Word count	121.7	69.6	4.8	<0.001	0.46
'I' words (I, me, my)	8.5	2.47	17.4	<0.001	1.59
Authenticity	80.3	40.3	15.9	<0.001	1.38
Social processes	6.5	10.9	−9.2	<0.001	0.75
Positive emotions	2.8	2.4	1.6	0.11	0.1
Negative emotions	3.1	2.9	0.53	0.59	0.07
Cognitive processes	13.7	13.8	−0.17	0.87	0.002
Analytical thinking	41.4	50.9	−3.98	<0.001	0.35
Body	1.87	1.27	3.3	0.001	0.3
Health	2.3	2.4	−0.7	0.48	0.03
Hearing	4.8	4.9	−0.33	0.74	0.03

*$n = 329$; †$n = 197$. SNHL = sensorineural hearing loss

Our results are consistent with those of studies that examined other health conditions such as psychological disorders. For instance, Silveira Fraga *et al.*[9] suggested that requesting and offering help is frequently noted in online interactions. In addition, previous qualitative studies have found that individuals with sudden SNHL exhibit ambivalence and denial during early stages of their condition, and seek information and advice via various sources. However, once they accept the condition, they look for solutions to life adjustments, as noted in this study.[10]

The natural language analysis using an automated text analysis method is a quick and powerful way of examining open-text data such as social media posts. The linguistic analysis showed that Reddit posts about sudden SNHL had significantly lower positive emotions and significantly higher negative emotions when compared to baseline data, which may be a result of users describing their frightening symptoms and disturbing experiences.[2] It is also interesting to note that sudden SNHL posts had higher references to their body, health and hearing when compared to baseline data. They also had fewer content categories (i.e. diagnosis, treatment, prognosis), suggesting that users are probably describing their condition with the intent of seeking medical information, rather than seeking social support. Moreover, based on the user category analysis, it is evident that individuals with sudden SNHL tend to talk more about their body and less about social processes when compared to other users.

Again, these observations strengthen the argument that individuals are sharing and/or seeking medical information on social media. Overall, these results suggest that people with sudden SNHL may experience psychological disturbances as a result of their condition, which can be identified through examination of the natural language of these individuals. Furthermore, healthcare professionals may gain valuable insights about patients' point of view by examining social media posts about health conditions.

Study implications

Examining the social media posts about traumatic health conditions such as sudden SNHL may provide insights about this population, which are helpful in supplementing clinical studies. The structured patient-reported outcome measures used in clinical examination are often developed by healthcare professionals and may not cover aspects relevant to individual patients. However, open-text responses provided by patients, especially anonymously as in Reddit posts, may contain information that is most relevant to their experience. For this reason, we believe that the current study results provide insights that can be helpful for professionals during clinical interactions, as well as when building successful online interventions to support individuals with abrupt-onset conditions such as sudden SNHL.

Advantages and limitations of study

To the authors' knowledge, the present study is the first to examine social media content on sudden SNHL. The anonymous nature of Reddit discussions may provide a more ecologically valid discussion about the condition. However, this is also a limitation of the study, as not knowing the user demographic limits the generalisability of the findings. Moreover, word counting approaches such as Linguistic Inquiry and Word Count may ignore factors like context and intended audience, although they are shown to provide surprisingly clear insights into a person's psychology.[11]

- Many sudden sensorineural hearing loss (SNHL) patients seek hearing health information and social support online, but little is known about such behaviour
- Content analysis identified eight categories, on topics of: sharing personal experiences, describing symptoms, and discussing treatment options and possible causes
- Sudden SNHL Reddit posts varied significantly in linguistic variables when compared to baseline Reddit posts
- Sudden SNHL posts were more engaged and authentic, with higher negative emotions, but had significantly lower social processes when compared to baseline posts
- Findings suggested that sudden SNHL individuals had higher engagement, higher authenticity and talked more about their body compared to other users
- Conversely, sudden SNHL individuals referred to others less and exhibited less analytical thinking when compared to others

Data availability statement. The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interests. None declared

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