sinusitis

Review

Promoting Equity When Using the SNOT-22 Score: A Scoping Review and Literature Review

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Abstract: It is established that non-white people experience worse health outcomes than white people within the same population. Equity addresses differences between patient subgroups, allowing needs-based distribution of resources. The use of quality-of-life (QoL) tools to assist clinical decision making such as the SNOT-22 for chronic rhinosinusitis promotes equality, not equity, as quality-of-life (QoL) tools provide the same criteria of symptom scoring across diverse populations. We considered the effects of ethnicity and race on SNOT-22 scores and whether these scores should be adjusted to improve equity. PubMed and MEDLINE provided papers for a scoping review. A combination of the following search terms was used: patient-reported outcome measures (PROM) (OR) quality of life; (AND) race (OR) ethnicity (OR) disparities; (AND) otolaryngology (OR) SNOT-22 (OR) sinusitis. The first study identified no evidence of ethnic variability in SNOT-22 scores. However, the study did not represent the local population, including 86% white people. Other studies identified baseline SNOT-22 disparities with respect to population demographics, gender, and age. Ethnic differences appear to exist in acute sinusitis symptomatology. In other fields both within and outside of otorhinolaryngology, ethnic differences exist with regard to QoL tools. This scoping review identified a paucity of data in rhinology. However, evidence implies some form of correction to QoL scores could help promote equity for non-white patients.

Keywords: otolaryngology; sinusitis; ethnic groups; patient-reported outcome measures; quality of life; social justice

Citation: Weaver, A.; Wood, A. Promoting Equity When Using the SNOT-22 Score: A Scoping Review and Literature Review. *Sinusitis* **2022**, *6*, 15–20. https://doi.org/10.3390/sinusitis6010002

Academic Editor: Sy Duong-Quy

Received: 30 November 2021
Accepted: 13 January 2022
Published: 16 January 2022

1. Introduction

The importance of equity is increasingly recognized and discussed within healthcare generally and within rhinology in particular [1]. Equity in healthcare is defined as "the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically" [2]. The World Health Organization (WHO) explains equity as overcoming and avoiding disparities that infringe on justice and fairness. While equity and equality both target fairness, equality is based on the equal distribution of a commodity within a population, whereas equity is based on unequal distribution to accommodate for differences in need. Therefore, they are fundamentally different principles, potentially at odds with each other. The use of quality-of-life (QoL) tools to facilitate clinical decision making promotes equality, i.e., treating everyone the same. However, if QoL tools do not sufficiently represent different patient groups, their use may prove a potential impediment to equity.

While noting that race and ethnicity are related terms, one's race is the inherited phenotypic attribute of a person. In contrast, one's ethnicity relates to the cultural factors, from a particular group, with which an individual identifies [3].

We have identified, within our New Zealand population, that non-white, minority ethnicities are underrepresented in Public Hospital Rhinology clinics and operating lists [4,5].

This is despite data indicating that non-white populations appear to have a higher burden of rhinologic diseases. While the reasons for this are likely to be multi-factorial [4], we aimed to consider whether the processes that we as rhinologists use, might be contributing to this apparent inequity, and if so, how this might be addressed.

Chronic rhinosinusitis (CRS) is a non-fatal condition, the treatment of which is directed toward managing symptoms [6]. The ability to quantify symptoms through QoL tools is, therefore, of great importance in CRS management and decision making with regard to appropriate treatment options. The WHO defines QoL as "the individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals" [7]. With regard to the assessment of QoL in CRS, the 22-item Sinonasal Outcome Test (SNOT-22) has become the sentinel subjective assessment of disease severity [8], with 3560 articles returned on a Google Scholar search of "SNOT-22" (search performed 4 April 2021).

Given the importance of the SNOT-22 score in surgical decision making for CRS patients and apparent inequities in the provision of treatment, we wished to investigate the effects of race and ethnicity on the SNOT-22 QoL tool and whether the total SNOT-22 score should be adjusted for patient race or ethnicity when used for clinical decision making. We hypothesize that in the context of comparable disease burden, non-white groups record lower total SNOT-22 scores.

2. Methods

A scoping review technique found peer-reviewed journal papers that met the following inclusion criteria: (1) published between 2010 and 2021; (2) written in English; (3) involved preoperative symptom reporting; (4) provided details of patient demographic; (5) specifically discussed the impact of demographic on symptom scoring in otorhinolaryngology diseases. The following bibliographic databases identified relevant documents from 2010 to 2021: MEDLINE and PubMed. Exclusion criteria included (1) studies published before 2010; (2) papers without English translation; (3) papers that did not compare demographic disparities on symptom scores in otorhinolaryngology disease. The initial search occurred in January 2021 and was repeated in August 2021 to ensure new relevant data were included. The below search strategy was created by one reviewer in collaboration with the Waikato Clinical Campus Librarian. The studies were identified using the selection criteria above.

Search Terms:

1. Patient-reported outcome measures (PROM) (OR) quality of life;
2. (AND) race (OR) ethnicity (OR) disparities;
3. (AND) otolaryngology (OR) SNOT-22 (OR) sinusitis.

The search was followed by analyzing the title, abstract, and subject headings to identify papers that met the study criteria. Reference lists of the identified papers were scanned for similar articles, generating a further literature review. Two reviewers determined the relevance of the studies prior to inclusion into the study. To prevent biased studies influencing data outcomes, the demographics of the studies' local population were compared with the study populations. Reference number five was included as a local preprint publication.

3. Results

Following the method, PubMed identified 1444 papers without using the quality-of-life search term, and MEDLINE/OVID identified 30 papers from the above search.

There was a paucity within the literature explicitly related to PROMs and ethnic/race disparities, and even fewer for the SNOT-22 specifically. A publication on chronic rhinosinusitis identified that less than 10% of American studies provided information on minority-specific demographics when discussing ESS surgical outcomes. It also identified minority populations made up less than half the national census estimates receiving ESS [9].

(1) Results discussing ethnicity/race SNOT22 scores at the time of diagnosis of CRS

One relevant study, at a tertiary rhinology clinic in Boston, Massachusetts, indeed discussed influences of the recruited population demographics. The conclusion was made that there was no evidence identified of disparity between ethnic and racial groupings to their SNOT-22 scores. The population included 300 adult patients with CRS. The study analyzed the patients' symptom scores (SNOT-22 and EuroQol 5-dimensional visual analog scale), age, race, ethnicity, smoking status, medication usage, and comorbidities. The racial groupings for the study cohort were classified as "white" (281 patients), "Black or African American" (5 patients), or "other" (14 patients). The ethnicity groupings were classified as "non-Hispanic" (246 patients), "Hispanic" (9 patients), and "declined to respond" (45 patients). The relatively small groups meant the confidence intervals were large (and therefore reported no statistically significant difference). However, on multivariate analysis, "non-white and/or Hispanic" patients recorded a SNOT-22 score of −2.2 (−11.5 to 7.0), compared with "white, non-Hispanic" patients [10].

Further studies identified within the scoping review attempted to compare disparities in SNOT-22 scores for race and ethnicity, indicating that minority populations have increased SNOT-22 scores at the time of CRS diagnosis. Kuhar et al. (2019) reported that African American patients had higher SNOT-22 scores, compared with white patients (50.7 vs. 1.5, $p < 0.022$). It was also noted, however, that histologic measures of disease severity including eosinophils per high power field, polypoidal disease, subepithelial disease, hyperplastic/papillary changes, and fibrosis indicated a more significant disease burden within the African American population [11]. Similarly, the same pattern of increased SNOT-22 scores at the time of diagnosis was described in Hispanic patients, compared with non-Hispanic patients (55 vs. 37, $p < 0.001$), by Levine et al. (2021). Hispanics, however, also had objective evidence of more severe CRS, such as the presence of nasal polyps (RR = 2.5; 95% Cl: 1.0–5.9), neo-osteogenesis, extended procedures, and tissue eosinophilia [12].

(2) Demographic disparities identified in SNOT22 score—not related to ethnicity/race

A cross-sectional study in Brazil identified disparities in SNOT-22 scores for gender and age. Although these are disparities within the same ethnicity and race, this study implies that differences between subgroups may impact PROMS, irrespective of disease severity. There was a statistically significant ($p = 0.005$) difference of two points in the baseline SNOT-22 scores between genders. Men without CRS had a baseline SNOT-22 score of 7, compared with women, whose baseline score was 9. Age over 60 years also indicated a significantly lower score of 7, compared with the younger age groups scores of 8–10 [13].

(3) Ethnic variability in sinonasal symptoms

The same group in Boston has studied ethnic disparities in symptomatology and presentation in the context of acute rhinosinusitis (ARS). They performed a retrospective study of 1,632,826 visits to hospital emergency departments (EDs) where ARS was diagnosed. Compared with white patients, Black ($p = 0.038$) and Hispanic patients ($p = 0.019$) presenting to EDs were less likely to complain of typical sinonasal symptoms. Hispanic patients also reported less typical ARS symptoms such as cough, sputum production, head cold, or flu-like symptoms [14].

(4) Ethnic variation in symptom reporting in otorhinolaryngology

The literature review identified that within other otorhinolaryngology (ORL) fields, studies have identified ethnic disparities in the self-reporting of symptoms. For example, in a study of 5236 women of child-bearing age, the objective measure of hours slept was compared with self-reported trouble sleeping. Women from minorities experienced fewer nights of adequate sleep than white women. However, white women had statistically significantly increased odds of reporting trouble sleeping than minority populations, with an adjusted odds ratio (OR) of 0.47 and 0.29, compared with Black and Hispanic women, respectively. This is still evident when controlling for hours slept [15].

Ethnic/racial disparities in patient-reported outcome measures have also been noted in laryngology. After controlling for influential demographics including education, income, and health insurance, minorities' self-reported voice problems had decreased OR, compared with white Americans, with African Americans reporting an OR of 0.83 and Hispanics 0.63 and remaining minorities at 0.69, compared with white adults [16].

(5) Ethnic variation in symptom reporting outside of otorhinolaryngology

There are ethnic inequities in symptom reporting and QoL surveys in multiple medical fields, for instance, in HIV symptom management. The literature review identified Black non-Hispanics were significantly underreporting "fatigue, depression, muscle aches, anxiety, difficulties with memory and concentration" with compared to other ethnicities [17].

4. Discussion

It is essential to identify limitations in QoL measures with regard to whether they contribute to current health inequities. If our hypothesis is correct that minorities with CRS are under-reporting symptoms on SNOT-22 surveys, white people may be preferentially prioritized for intervention over minority populations, thus contributing to health disparities that unjustly harm minority populations. Although not directly addressing our question around race and ethnicity, it has been identified that different groups within society do report different mean SNOT-22 scores [13].

It is well established that some non-whites suffer worse health outcomes than white people. In our New Zealand population, many studies have shown worse health outcomes for the indigenous Māori population, compared with non-Māori. In a literature review, a study was identified in which Māori was significantly less likely to be offered chemotherapy than non-Māori and was more likely to experience delays within the first eight weeks before chemotherapy. Another study discussed in this review found Māori women were significantly less likely to receive pain relief during labor; furthermore, doctors of European ethnicity spent 17 % less time with Māori patients than other ethnic groups [18]. Recent studies in our department demonstrated a significant under-representation of minority ethnicities in rhinology clinics and operating theatres [4]. The reasons for such ethnic disparities are likely multi-factorial [4] but may include that disease burden in non-white populations is relatively under-represented when QoL is quantified.

US minority populations also experience similar inequities. The National Health Interview Survey identified that white adults with CRS had an increased likelihood of receiving specialist appointments and intervention than minority populations [9]. A retrospective study of 1344 adults with CRS showed that African Americans who underwent operations showed greater objective severity of refractory CRS [19]. Another study of 4337 patients identified that African Americans and Hispanic patients had higher requirements for urgent operations for sinusitis ($p = 0.003$ and $p < 0.001$, respectively) [20], presumably representing lower access to elective care.

Our scoping review highlighted a paucity of data regarding the effect of race and ethnicity on SNOT-22 scores. Although the Bergmark (2018) study was commendable in its intentions, this data had significant limitations. First, considering racial groupings, 93.7% of the study population identified as white, in a city where recent census data show that 44.4% are white [21]. This implies a high risk of selection bias. Although some power calculations were performed, ethnicity and racial groupings of the size reported would appear liable to a type 2 error, noting that a non-significant trend toward lower QoL scores was reported in non-white patients. Finally, the groupings assessed—namely, white vs. non-white and Hispanic vs. non-Hispanic, cannot be considered generalizable to all ethnic and racial groupings. Based on this one study, and noting its limitations, it seems inappropriate, therefore, to generalize that ethnicity does not impact total SNOT-22 scores.

Two articles report higher total SNOT-22 scores within minority populations at presentation. However, they also identify that the disease burden was substantially higher in those groups. Thus, the comparison of SNOT-22 scores does not identify if minority populations with equivalent CRS severity under-report on total SNOT-22 scores [11,12].

Data from other fields both within and outside of ORL indicate that ethnic variabilities exist regarding self-reporting of symptom burden with symptoms relatively underrepresented by non-white populations. It seems reasonable to hypothesize, therefore, that using the SNOT-22 score or other QoL measures in rhinology contributes to inequitable treatment of non-white populations. Unfortunately, however, we are unable to prove or disprove this hypothesis.

The described study of ARS patients may be limited by an inaccurate diagnosis of ARS in the ED setting, owing to differential diagnoses such as migraine. However, it does raise the possibility that there may be ethnic and racial variation within the various SNOT-22 domains, as well as with respect to the total SNOT-22 score, meriting further study.

In summary, the literature discussed in this review identifies ethnic variability in symptom reporting. However, there are no conclusive data to prove or disprove our hypothesis. Research is required to identify ethnic variations in total SNOT-22 scores but also within the domains of the SNOT-22 score. Ideally, a large prospective study with ethnic and racial groupings representative of the local population should be performed. This would ideally be a multi-centered or even multi-national study. This study may face challenges owing to the inadequate referral of non-white patients to tertiary centers, generating selection bias. Objective measures such as the Lund-Mackay score (LMS) or endoscopic scores could be used as comparators.

5. Conclusions

While our scoping review has indicated a paucity of data in rhinology related to ethnicity and QoL tools/PROMS, evidence from other population subgroups and fields of medicine cast doubt on the effectiveness of the SNOT-22 tool to assess the severity of CRS equitably in non-white populations. Without the use of a correction, the use of QoL tools such as the SNOT-22 may contribute to white patients preferentially being offered intervention. In the pursuit of more equitable practice, further study is merited in this field.

Author Contributions: Conceptualization, A.W. (Andrew Wood); methodology, A.W. (Abigail Weaver); validation, A.W. (Andrew Wood) and A.W. (Abigail Weaver); data curation, A.W. (Abigail Weaver); writing—original draft preparation, A.W. (Abigail Weaver) and A.W. (Andrew Wood); writing—review and editing, A.W. (Andrew Wood); visualization, A.W. (Abigail Weaver); supervision, A.W. (Andrew Wood). All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Data are available through MEDLINE and PubMed using the references below.

Conflicts of Interest: The authors declare no conflict of interest.

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