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The Introduction and Validation of Arabic Sino-Nasal Outcome Test (A-Snot-22)

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ABSTRACT

Background: the Sino Nasal Outcome Test questionnaire 22 (SNOT-22) is recommended among the validated and published instruments to assess the impact of CRS on the quality of life in adults.

Aim of the work: is to perform translation, cross-cultural adaptation and validation for the Sino Nasal Outcome Test (SNOT)-22 in the Arabic language and. **Methods:** SNOT-22 questionnaire were translated from English to Arabic by two independent native Arabic translators. This was followed by retranslation back from Arabic to English by two independent native English translators, questionnaires were then distributed to patients diagnosed with CRS at the Otolaryngology clinic in King Fahd Hospital of The University and grouped healthy volunteers. **Results:** the study included individuals divided into 104 cases and 110 controls, who reported no Sino nasal disease. Cronbach's alpha was 0.939, while controls scored 0.943 suggesting good internal consistency within the SNOT-22 questionnaire. The SNOT scores for the cases and controls (median (IQR)) were 42.0(25, 58, 25) and 12.5(4, 31, 25) respectively and were compared using a Mann-Whitney test showing a statistically significant difference in the scores between two groups (p=0.000). **Conclusion:** the results indicate that the Arabic version of the SNOT-22 is a valid and a reliable instrument.

Keyword: Chronic Rhino sinusitis, Sino-nasal Outcome Test-22, Arabic language, Quality of life.

INTRODUCTION

Chronic Rhinosinusitis (CRS) is defined as inflammation of the nose and the paranasal sinuses characterized by two or more symptoms, one of which should be nasal blockage/obstruction/congestion or nasal discharge, ±facial pain/pressure, ±reduction or loss of smell more than 12 weeks [(1)]. CRS causes a significant reduction in the quality of life through physical pain and social performance compared to congestive heart failure, back pain and chronic obstructive pulmonary disease [(2, 3, 4)].

The Sino-nasal Outcome Test (SNOT 22) questionnaire is the advanced prototype of previous version, the SNOT 20, which lacks the two items of nasal blockage and changes of taste and smell [(5)]. The Sino-nasal outcome test questionnaire 22 (SNOT-22) is recommended among the validated and published instruments to assess the impact of CRS on the quality of life in adults. The questionnaire contains 22 items graded in 6 levels (0 for no problem, 5 for worst possible symptom) and the final score is obtained by adding scores for items (range: 0 to 110) the greater the score, the worse quality of life [(6)]. SNOT-22 questionnaire is in English and has been translated and validated in several languages including Brazilian, Portuguese [(1,4)], Danish [(2)], Czech [(3)], Persian [(5)] , French [(6)], Greek [(7,8)], Lithuanian [(9)], and Spanish [(10)]. Even though SNOT-22 questionnaire is recommended for its use in CRS, it is not yet available in Arabic [(1)]. By taking account that, an effective translation of SNOT-22 into other languages should consider cultural and linguistic differences; in this study, we aimed to translate, culturally adapt and validate the SNOT-22 questionnaire from English into Arabic [(5)].

METHODS

We performed questionnaire survey SNOT-22 contains 22 questions on CRS related symptoms. Symptom severity is graded zero to five – with zero indicating no problem at all and five indicating the worst possible symptom. We distributed on 104 patients diagnosed with CRS at the Otolaryngology clinic in our hospital and 110 of healthy volunteers. Both groups answered the final draft of the Arabic version of SNOT 22. The study was previously approved by the Hospital's Research Ethics Committee (No:201601133, Date: October 2 , 2016). Translation Validation of the Arabic questionnaire included translation of original SNOT-22 items from English to Arabic by bilingual translators. The translators were instructed to prepare a context for general population, avoiding medical terms .

Inclusion criteria

1- Age range:19-69 years old

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2- Patients that have arabic as their native language and understand the purpose of the study.
3- Meeting the clinical criteria for CRS according to EPOS 2012 [11].

In addition to that , a control group of healthy volunteers without nasal pathology who met all the inclusion criteria except for the nasal pathology was also selected. **The study was done after approval of ethical board of King Fahd University and an informed written consent was taken from each participant in the study.**

The internal consistency was determined for assessing the reliability of the Arabian version of the questionnaire. The Cronbach's Alfa coefficient was calculated for all items at first and then by removing each item at once. The validity was measured in two ways: adding all items to make a total score and then determining the relation of total score item with other 22 items and comparing the total scored among two groups (differential validity). The responsiveness rate of the questionnaire was determined as the feasibility capacity of the questionnaire, showing how many of participants were able to answer the items by their own.

Table 1: SINO-NASAL OUTCOME TEST (SNOT-22) questionnaire (English version)

Considering how severe the problem is when you experience it and how often it happens, please rate each item below on how "bad" it is by circling the number that corresponds with how you feel using this scale: □

	No Problem	Very Mild Problem	Mild or slight Problem	Moderate Problem	Severe Problem	Problem as bad as it can be	5 Most Important Items
1. Need to blow nose	**0**	**1**	**2**	**3**	**4**	**5**	□□
2. Nasal Blockage	**0**	**1**	**2**	**3**	**4**	**5**	□□
3. Sneezing	**0**	**1**	**2**	**3**	**4**	**5**	□□
4. Runny nose	**0**	**1**	**2**	**3**	**4**	**5**	□□
5. Cough	**0**	**1**	**2**	**3**	**4**	**5**	□□
6. Post-nasal discharge	**0**	**1**	**2**	**3**	**4**	**5**	□□
7. Thick nasal discharge	**0**	**1**	**2**	**3**	**4**	**5**	□□
8. Ear fullness	**0**	**1**	**2**	**3**	**4**	**5**	□□
9. Dizziness	**0**	**1**	**2**	**3**	**4**	**5**	□□
10. Ear pain	**0**	**1**	**2**	**3**	**4**	**5**	□□
11. Facial pain/pressure	**0**	**1**	**2**	**3**	**4**	**5**	□□
12. Decreased Sense of Smell/Taste	**0**	**1**	**2**	**3**	**4**	**5**	□□
13. Difficulty falling asleep	**0**	**1**	**2**	**3**	**4**	**5**	□□
14. Wake up at night	**0**	**1**	**2**	**3**	**4**	**5**	□□
15. Lack of a good night's sleep	**0**	**1**	**2**	**3**	**4**	**5**	□□
16. Wake up tired	**0**	**1**	**2**	**3**	**4**	**5**	□□
17. Fatigue	**0**	**1**	**2**	**3**	**4**	**5**	□□
18. Reduced productivity	**0**	**1**	**2**	**3**	**4**	**5**	□□
19. Reduced concentration	**0**	**1**	**2**	**3**	**4**	**5**	□□
20.Frustrated/restless/irritable	**0**	**1**	**2**	**3**	**4**	**5**	□□
21. Sad	**0**	**1**	**2**	**3**	**4**	**5**	□□
22. Embarrassed	**0**	**1**	**2**	**3**	**4**	**5**	□□

SNOT-20 Copyright 1996 by Jay F. Piccirillo, M.D., Washington University School of Medicine, St. Louis, Missouri SNOT-22 Developed from modification of SNOT-20 by National Comparative Audit of Surgery for Nasal Polyposis and Rhinosinusitis Royal College of Surgeons of England.

Statistical analysis

Statistical method: Analysis was performed by the SPSS softwarepackage for Windows (Statistical Package for SocialSciences, version 12.0, SPSS Inc., Chicago, IL, USA). P value < 0.05 was considered significant.

RESULTS

In this study, two different groups were tested for the validation of SNOT-22 translated into Arabic. Characteristics of patients diagnosed with CRS group versus Control group in terms of Gender, age and smoking are interpreted in Table 2.

Table 2: characteristics and habits of patients diagnosed with CRS versus Control group

Variable	Cases		Controls	
	n	%	n	%
Sex				
Male	99	90	64	61.5
Female	11	10	40	38.5
Age mean(SD)	23.81(8.64)		36.63(14.0)	
Smoking				
Yes	18	16.4	11	10.6
No	92	83.6	93	89.4

The total Cronbach's Alpha score of 22 items is a good indicator of the group the subject belongs (**Table 3**). The differentiate validity of this version was accessed by comparing the total scores in both groups. Results of all studies summarizing group subjects' mean SNOT-22 scores are shown in Table 3.

Table 3: Summary of Cronbach's Alpha score of the studied 22 items

Disease Status	Cronbach's Alpha	No. of Items
No	0.943	22
Yes	0.939	22

The mean score for each one of the items either for patients or for controls is shown in Table 3. In the first assessment, the mean SNOT 22 score for the cases group was 44.0865 with a standard deviation of 25.89940 and a median of 42.00 On the other hand, in the control group; the mean score was 19.6818 with a standard deviation of 20.12481 and a median of 12.5000 (**Table 4**).

The validity of the questionnaire was measured with the Mann–Whitney U test, comparing the difference in the total scores between cases and controls. The median (percentiles 25, 75) score for cases was 42.0000 (25, 58, 25) and 12.5000 (4, 31, 25) for controls, finding the difference to be highly significant with p=0.001(**Table 4**).

Table 4: common symptoms among the two groups based on SNOT variables

	Cases	Control
n	104	110
Mean (SD)	44.0865 (25.89940)	19.6818 (20.12481)
Median	42.000	12.5000
Percentiles 25,75	25.0000, 58.2500	4.0000, 31.2500

Cronbach's alpha was 0.939 and 0.943 in CRD diagnosed and Control group respectively (**Table 5 and Table 6**).

Table 5: Cronbach' alpha results for all symptoms for the CRS diagnosed group

Disease status (Yes)	Cronbach's Alpha if Item Deleted	Disease status (Yes)	Cronbachs Alpha if Item Deleted
Cleaning	0.937	Smell-taste reduction	0.937
Obstruction	0.936	Sleep difficulty	0.934
Sneeze	0.937	Midnight wake up	0.935
Runny nose	0.937	Not enough sleep	0.936
Cough	0.938	Wake up tired	0.934
Throat discharge	0.937	Fatigue	0.934
Thick mucus	0.937	Low production	0.934
Ear pressure	0.936	Low concentration	0.934
Dizziness	0.937	Restless	0.936
Ear pain	0.936	Sad	0.934
Face pain	0.938	embarrassed	0.936

Table 6: Cronbach' alpha results for all symptoms for the Control group

Disease status (NO)	Cronbach's Alpha if Item Deleted	Disease status (NO)	Cronbachs Alpha if Item Deleted
Cleaning	0.942	Smell-taste reduction	0.941
Obstruction	0.940	Sleep difficulty	0.939
Sneeze	0.942	Midnight wake up	0.939
Runny nose	0.942	Not enough sleep	0.939
Cough	0.942	Wake up tired	0.940
Throat discharge	0.941	Fatigue	0.938
Thick mucus	0.941	Low production	0.939
Ear pressure	0.942	Low concentration	0.940
Dizziness	0.941	Restless	0.939
Ear pain	0.943	Sad	0.940
Face pain	0.942	embarrassed	0.942

DISCUSSION

The development of health-related measures of quality of life, allows us to have a better understanding of the impact of health interventions in our patients. Measuring the impact caused by the disease and the therapeutic measures applied to it, from the patient's perspective, it is probably a better reflect of this situation when compared to the evaluation done only from the physician's point of view.

Measuring instruments are usually scales or questionnaires that can be quantified and averaged getting an overall score. Moreover, patients are able to assess how the disease affects to different aspects of their life. Currently, there are several specific instruments to assess rhinosinusitis impact over patient's quality of life. Based on the published literature, EPOS 2012[11] consensus recommends using the following tools to measure results: SNOT-22 or RSOM-31 in adults with chronic rhinosinusitis, SNOT-16 in adults with acute rhinosinusitis, SN-5 in the pediatric population with chronic rhinosinusitis and S-5 in pediatric population with acute rhino sinusitis.

The responsiveness rate of 97% showed the intelligibility and feasibility of all items. The reliability is the ability of an instrument to produce constant results in constant situations. Stability is a key element in reliability, not influenced by time or individual's characteristics. SNOT-22 was developed and validated in English [12], it has already been translated and adapted to other languages such as Danish[2], Czech [3], Swedish [13], Chinese [14] Lithuanian [9], Portuguese [1,4], Persian [5] and Greek [7,8] nevertheless, it has not been adapted and validated for Arabic- Speaking patients until now. The translation, cross-cultural adaptation, and validation of the Arabic version of the SNOT-22 questionnaire were carried out following the generally accepted methodology as described by Koller *et al.* [15].

Internal consistency can be measured with Cronbach's alpha index. Cronbach's alpha index can estimate whether a set of items measure the same construct or theoretical dimension; as closer to 1 the index, the greater the internal consistency of the questionnaire items. A ratio above 0.7 is considered acceptable, above 0.8 is considered good and more than 0.9 is excellent [16, 17]. An excellent reliability score (0.97) and a good internal consistency core (In cases, Cronbach's alpha was 0.939 and in control was 0.943) therefore, we can consider the internal consistency of the questionnaire as excellent.

Like reliability, there are some ways to estimate validity of instruments. In this study, the validity of this version of SNOT 22 questionnaire was tested by Arabic correlations and its ability to differentiate patients from healthy volunteers the validity of the questionnaire was measured with the Mann–Whitney U test, comparing the difference in the total scores between cases and controls. The median (percentiles 75 -50-25) score for cases was 42.0000 (31.25-12.50-4.0) and 12.5000 (58.25-42.0-25.0) for controls, finding the difference to be highly significant with p=0.000.

We prepared a valid and reliable version of the instrument for future use. Measuring the health-related quality of life in patients in ENT

departments needs more thorough evaluation, considering symptoms relief and disease-free duration. The Arabic version of SNOT 22 questionnaire is a valid and reliable instrument for being used in accessing quality of life in patients with Sino nasal diseases in Arabic-speaking individuals.

CONCLUSION

In conclusion the results indicated that the Arabic version of the SNOT-22 questionnaire is a valid and reliable instrument for accessing Sinonasal diseases in Arabic speaking people. With good internal consistency, excellent reproducibility, validity, and responsiveness for assessing the quality of life in Arabic-speaking patients with chronic

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