RESEARCH ARTICLE

Non-surgical chronic rhinosinusitis and quality of life: A Vietnamese perspective

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Abstract

Objective: Evidences which illustrate symptoms of chronic rhinosinusitis (CRS) had negative effects on society and individuals are growing these days. The aims of this study are to assess the quality of life (QoL) of individuals with CRS and to analyze the relationship between socio-demographic as well as clinical factors and the quality of life of patients.

Methods: A cross-sectional and prevalence-based study was conducted from May to July, 2018. We used The Sinonasal Outcome Test-22 (SNOT-22) questionnaire to evaluate the quality of life of patients with chronic rhinosinusitis. In addition, the univariate logistic regression analysis and logistic regression models were used to calculate the Crude odds ratio (OR), adjusted odds ratio (aOR), and 95% confidence intervals (CIs) for factors. Statistical significance was considered as P-value <0.05.

Results: Among 315 participants, about two fifths of them were diagnosed with CRS. The statistical test illustrated that all factors illustrated significant differences. The main exposure variable, CRS, was significantly associated with poor quality of life, with a 78.02-fold increase in the odds of having a good quality of life score.

Conclusion: Our findings have shown that patients with CRS experience a poorer quality of life than healthy controls. The influencing factors included gender, economic status, exercise and nasal discharge.

Keywords: Chronic Rhinosinusitis, Non-Surgical, Quality of Life, Vietnam. (JPMA 69: S-20 (Suppl. 2); 2019)

Introduction

There is a rise of evidence which illustrates the effect of chronic rhinosinusitis (CRS) with regards to symptom severity, reduced productivity and absenteeism to work.[1,2] CRS was defined as a disorder with at least two of following symptoms such as anterior or posterior nasal discharge, nasal congestion, facial pressure/pain, and reduced sense of smell more than three months.[3] According to endoscopic findings, CRS is divided into two subtypes comprising CRS with nasal polyps (CRSwNPs) and CRS without nasal polyps (CRSsNPs). Their differences were in prevalence and severity, immune response, inflammation, and response to treatment.[3,4] When compared with CRSsNP, patients with CRSwNP may have reduced facial pain and/or pressure and sense of smell.[5,6] Major factors which can affect CRS included nasal congestion, nasal discharge or purulence or discoloured postnasal discharge, hyposmia or anosmia, purulence in the nasal cavity, facial pain/pressure, and fever.[7]

The prevalence of chronic rhinosinusitis from epidemiological studies in literature reported in many parts of the world. CRS affects up to 15% of the U.S. population while at least 5% of Canadians suffer from this chronic inflammatory disease.[8-11] A current report of a pilot study in South America showed the prevalence of 16.55% for rhinosinusitis.[12] The European multi-center study found a CRS prevalence of approximately 10.9% in 2011.[13] The prevalence of this disease in the Korean population and Chinese population were about 7% and 8% in 2015 respectively.[14,15] In a previous study, the prevalence of CRSsNP was 2.7% in normal population. The CRSsNP was more frequently seen in patients than in the healthy controls.[16]

Health-related quality of life (HRQoL) was assessed to observed the difference between expectations and experience and was determined that it could be changed by treatment.[17] Besides of diagnosis and symptoms, medical research focuses on the evaluation of a patient's QoL or more specifically, HRQoL over the past two decades.[18]

Informative assessment of QoL for CRS patients illustrates its importance to medical, social and economic fields. The presence of nasal polyps (NP) is positively associated with CRS and considered as a subgroup of CRS.[3] The symptoms of CRS comprise nasal congestion, facial pressure/pain, headache, hyposmia, and anosmia which can be worsened and affect HRQoL considerably.[2] A previous study has shown that CRS may cause decrease in work productivity like other chronic diseases, such as asthma,

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heart disease and diabetes.[19]

The Sinonasal Outcome Test-22 (SNOT-22) has proved to be the highest quality validated patient-reported outcome measure (PROM) among 15 PROMs validated for the evaluation of QoL in CRS adult patients. It was first developed in 1998 with 16 items, later modified to 20 items, and finally to 22 items by adding Two special rhinological symptoms which were nasal congestion and loss of sense of taste and smell.[20] The questionnaire, which had proven its high reliability and validity, was strongly correlated with the general QoL as the 36-Item Short Form Survey.[21]

Chronic rhinosinusitis reduces the QoL of patients.[22] An important relationship between SNOT-22 scores and anxiety and depression scores in CRS patients was conducted.[23] The prevalence of comorbidities in CRS population ranged from approximately 5% to over 40%.[24] Moreover, QoL is a very important aspect of assessing the clinical effects and the healthcare service for CRS patients.[25] In Vietnam, few studies have been conducted regarding CRS. Furthermore, doctors have used different standards for evaluating the degree of symptoms as well as the effectiveness of treatment. Therefore, there is a growing need for a simple, reliable and standardized disease measure to evaluate CRS, taking the patients QoL into account.

The main aim of this study focused on the quality of life of individuals with CRS, in terms of the SNOT-22 questionnaire, and to analyze the relationship of social demographic and clinical factors influencing patients with poor QoL.

Patients and Methods

This study was a cross-sectional and prevalence-based study conducted from May to July, 2018, at Ear, Nose, Throat Hospital (ENT Hospital), Ho Chi Minh City (HCMC), Vietnam. ENT Hospital in HCMC is a first-class hospital under the Ho Chi Minh City Department of Health, with a total of 150 inpatient beds.[26] We asked patients who were diagnosed with CRS signs and symptoms according to the International Classification of Diseases Code-10 (ICD10) (J32- Chronic sinusitis) to participate in our study.[27]

Eligible patients were 18 years or above, had CRS and communicate well in the Vietnamese, were willing to participate and were able to provide written consent. Excluded from the study were pregnant women, people who did not finish the full survey, or if they did not want to fill out the survey form.

The control group consisted of healthy people without sinonasal disease. People who recruited in this group were aged above 18 years, not pregnant and no sinonasal disease defined by negative responses on the following questions about getting nasal diseases or taking medications. People who declined to participate were excluded from the study.

In order to obtain the exact information from participants, the questionnaire was practically administered through face-to-face interviews by the research assistants. All members of the data collection team were recruited and trained prior to the study, and wereunaware of the correct answers to the survey questions. The study subjects who met the inclusion criteria and were not eliminated by the exclusion criteria stated above were enrolled at the universities, parks, commercial centers, and elsewhere. Before starting the study, participants were given and explained the study aims, risks, and benefits of joining this study. Once approved, the interviewers collected information through a structured interview with the subjects assisted by a validated questionnaire. The completeness, consistency, and accuracy of the data collection were examined by researchers daily.

In addition, participants were also self-administered via an internet form. This form's content was similar to the paper form that was used in the face-to-face interviews. A link was shared on social network websites and closed at the same time as the face-to-face interviews ended. The study was based on classification questions and excluded those who were not eligible to participated. All eligible patients from May to July 2018 were interviewed. The number of control group was approximately the same as the number of CRS group.

The Psychometric tool used was the SNOT-22 (a disease-specific questionnaire) which has been internationally validated and includes both disease specific and general domains.[20] Each item is scored by using Likert scale (range between 0 and 5) where higher scores depict worse health problems, from 0 = no problem to 5 = problem as bad as it can be. The higher total scores of the SNOT-22 correspond the worse symptom severity and/or daily activities.[28]

The questionnaire was translated from English to Vietnamese, and two native Vietnamese pulmonologists fluent in English translated the Vietnamese versions into English independently, and merged the translated questionnaires. Finally, a professional native English translator reviewed the original and the reverse translated English versions of the questionnaires. During a panel meeting, the authors had a discussion on ambiguous terms and evolved the final Vietnamese version of the questionnaire. Pretest of the questionnaire was carried out in 30 CRS patients to affirm that all participants easily

understood the questions. The responses of these 30 patients were not collected into final data analysis.

Data were collected using a semi-structured questionnaire that included two sections. The first part obtained general information on patients, including age, gender, region, educational level, monthly income, smoking status and exercise. The second part was a QoL assessment using the SNOT-22 tool translated into Vietnamese from the original English version. The average time for completing the questionnaire was approximately 12 minutes. Research nurses assessed CRS patients whether they were eligible or not and invited them to participate in the study. After explaining the study objectives patients were asked to fill in the questionnaire by themselves before receiving drugs from the hospital drugstore. They could ask for help from researcher assistants if they did not understand clearly any question.

Data was analysed by SPSS for Windows, version 22.0 (SPSS Inc., Chicago, USA). For the demographical and clinical characteristics of study participants, descriptive analysis was undertaken with the number and percentage for categorical variables while a Chi-square test was calculated to make comparisons. Each domain and total scores were calculated for a single participant. The total score of the SNOT-22 of below or equal 7 was considered as good QoL and a score of above 7 as bad QoL.[29] The percentage of patients with good QoL in each category of CRS was measured. To make comparisons between patients with good QoL scores in the CRS and non-CRS due to each category, the Chi-square test was used, while independent samples t-test was used to compare the difference between the mean SNOT-22 scores and each domain score of individuals with and without CRS. To determine the factors associated with poor quality of life, univariate logistic regression analysis and logistic regression models were conducted to measure the crude odds ratio and adjusted odds ratio (aOR) as well as 95% confidence intervals (CIs) for factors. Statistical significance was considered as $P < 0.05$.

Ethical approval was given by ENT Hospital HCMC. Participants were informed of their right to give up the survey at any time without any adverse effect on their access to healthcare. Written informed consent was obtained from all participants before the questionnaire survey. The data collection was only used for research purposes.

Table-1: Socio-demographic characteristics of CRS patients in ENT Hospital HCMC and control group.

Characteristics	CRS (n=123)		No CRS (n=192)		Total (n=315)		P-value (*)
	n	(%)	n	(%)	n	(%)	
Age (years)							
18-35	43	35.0	75	39.1	118	37.5	0.71
36-59	60	48.8	85	44.3	145	46	
> 60	20	16.2	32	16.6	52	16.5	
Region							
Urban	93	75.6	170	88.5	263	83.5	<0.01
Rural	30	24.4	22	11.5	52	16.5	
Gender							
Male	43	35.0	90	46.9	133	42.2	0.04
Female	80	65.0	102	53.1	182	57.8	
Education							
Illiterate	35	28.5	32	16.7	67	21.3	0.03
Primary	30	24.4	67	34.9	97	30.8	
Secondary	23	18.6	45	23.4	68	21.6	
Tertiary	35	28.5	48	25.0	83	26.3	
Monthly income (USD)							
< 250	65	52.8	62	32.3	127	40.3	<0.01
≥ 250	58	47.2	130	67.7	188	59.7	
Smoking							
No	92	74.8	172	89.6	264	80.6	<0.01
Yes	31	25.2	20	10.4	51	19.4	
Exercise							
No	26	21.1	142	74.0	168	53.3	<0.01
Yes	97	78.9	50	26.0	147	46.7	

*Chi square test, confidence level at 95%.

Table-2: Clinical characteristics of CRS patients and healthy group.

Characteristics	CRS (n=123)		No CRS (n=192)		Total (n=315)		P-value (*)
	n	(%)	n	(%)	n	(%)	
Quality of life on SNOT-22							
Good	4	3.3	139	72.4	139	44.1	<0.01
Poor	119	96.7	53	27.6	176	55.9	
History of nasal surgery							
No	100	81.3	175	91.1	275	87.3	0.01
Yes	23	18.7	17	8.9	40	12.7	
Nasal discharge							
No	35	28.5	182	94.8	217	68.9	<0.01
Yes	88	71.5	10	5.2	98	31.1	
Number of CRS symptoms							
0	5	4.1	125	65.1	130	41.3	<0.01
1	3	2.4	45	23.4	48	15.2	
≥ 2	115	93.5	22	11.5	137	43.5	

*Chi square test, confidence level at 99%.

Table-3: Bivariate analysis for socio-demographic and clinical factors associated with quality of life (QoL).

Characteristics	Good QoL (n=143)	Poor QoL (n=172)	cOR (95% CI)	P-value (*)	aOR (95% CI)	P-value (**)
Gender						
Male	74	57	1.00	<0.01		<0.01
Female	69	115	0.46 (0.29-0.73)		0.39 (0.20-0.79)	
Monthly income (USD)						
< 250	50	77	1.00	0.08		
≥ 250	93	95	1.51 (0.96 -2.38)			
Smoking						
No	137	127	1.00	<0.01		<0.01
Yes	6	45	0.12 (0.05 - 0.30)		0.13 (0.05- 0.37)	
CRS						
Yes	4	119	1.00	<0.01		<0.01
No	139	53	78.02 (27.43 - 221.93)		46.36 (14.50 -148.23)	
Exercise						
No	110	58	1.00	<0.01		0.11
Yes	33	114	0.15 (0.09 - 0.25)		0.55 (0.27 -1.14)	
Region						
Urban	128	135	1.00	<0.01		0.40
Rural	15	37	0.43 (0.22 - 0.82)		0.65 (0.24 -1.77)	
Nasal discharge						
No	136	81	1.00	<0.01		0.20
Yes	7	91	0.05 (0.02 -0.10)		0.45 (0.14 -1.50)	

cOR: Crude odds ratio
aOR: Adjusted odds ratio
CI: Confidence interval
Confidence level at 99%.

Results

Of the 315 participants, about two fifths of them were diagnosed with CRS. Most of the participants lived in urban areas. More than half of them were female and had monthly income above $250. One-fourth were current smokers and had received 12 years of education. Nearly half of them were in the 36-59 age group and exercised three times a week. There was no important difference related to the distribution of age and exercise. The two groups of patients differed in distribution in many demographical characteristics, such as gender, education, monthly income and smoking criteria. Participants without CRS had a trend to have higher income compared to those with CRS (Table-1).

Table-4: Baseline SNOT-22 domain scores by CRS and no CRS groups.

Domains	CRS (n=123)		No CRS (n=192)		P-value (*)
	Mean score	SD	Mean score	SD	
SNOT 22	42.90	18.24	6.24	3.10	<0.01
Nasal symptoms	14.09	6.12	1.91	1.68	<0.01
Extra nasal symptoms	7.75	3.37	0.73	1.13	<0.01
Ear and facial symptoms	9.83	4.41	0.54	0.99	<0.01
Psychological symptoms	10.41	6.99	3.11	1.71	<0.01
Sleep symptoms	8.96	5.33	1.59	1.92	<0.01

Note: (*): Independent samples t-test, confidence level at 95%.

In clinical characteristics, the two groups of patients illustrated only one similar pattern: most of them had not had nasal surgery. Only 4 CRS patients reported on SNOT-22 that they had good quality of life compared with 139 of non-CRS. There were 115 (93.5%) patients diagnosed with CRS having more than one symptom while 125 (65.1%) non-CRS patients had no symptoms. The statistical test showed that all factors illustrated significant differences between the two groups (Table-2).

Univariate logistic regression and logistic regression models were applied to explore which factor related poor QoL due to CRS. Only monthly income did not affect quality of life. Women were more likely to have poor QoL than men. Patients with below $250 monthly income showed a trend of having a 1.51-fold increase in the odds of poor QoL when compared to those that had monthly income above $250. Other variables related to increased poor QoL were region, nasal discharge, and exercise. The main variable, CRS, was highly associated with poor QoL, with a 78.02-fold increase in the odds, compared to a good quality of life score. After adjustment for confounders, there was a significant risk of poor QoL for patients with CRS (46.36-fold increase in the odds) compared to those without CRS. The risk of poor QoL increased significantly with gender and smoking status. Participants who were currently non-smokers had 0.13-fold increase in the adjusted odds of poor QoL in comparison with smokers or ex-smokers (Table-3).

Overall, the SNOT-22 and each domain scores of patients with CRS were higher than those without CRS, indicating the poorer QoL among these patients. The mean SNOT-22 score of CRS patients was 42.9 ± 18.2 while that of patients without CRS was 6.2 ± 3.1. The domains of nasal symptoms gaining the highest mean scores were (14.1 ± 6.1) among CRS patients, while the highest among those without CRS was psychological symptoms (3.1 ± 1.7). The domain gaining the lowest mean scores for patients with CRS was extra nasal symptoms (7.8 ± 3.4), whereas ear/face symptoms were lowest among the domains in the non-CRS group. The p values calculated from statistic tests were all significant (p<0.01)(Table-4).

Discussion

The results illustrate a significant difference in the QoL between patients with CRS and the healthy people without this disease, which illustrate the important impact of CRS on the QoL of these patients. These results also explored the relationship between health-related QoL and related factors by collecting information on QoL from CRS and control populations. It may lead to a conclusion that CRS patients had similar and substantially impaired QoL compared to the control population.

The SNOT-22 scores can show a clear difference between the patients with sinus diseases and those without one.[30] This study used the SNOT-22 questionnaire to access the differences between two groups by comparing the mean SNOT-22 scores of 123 CRS patients and those of 192 non-CRS subjects. The results showed that there was a statistically significant difference between CRS patients (42.9 ± 18.2) with those of normal ones (6.2 ± 3.1) (p<0.001, Table-4). Gillett et al.[29] defined the "normal" SNOT-22 score by the median score of 7 in a group of 116 healthy participants. In this study, the median score of CRS patients was 42.9, and the figure for the control group as 6.2, slightly below the value in the study of Gillett et al.[29] This bias might depend on the geographical area of study and the criteria of the control group.

Generally, individuals with CRS experience poorer QoL compared to healthy ones.[31-33] The results from this study also illustrate the same that HRQoL of patients with CRS is poorer, than that of the normal group. The nasal domain dominated the mean score among CRS patients, followed by psychological symptoms. Browne et al. found the highest mean score in CRS patients to be in the nasal symptom domain, followed by the mean psychological score, similar to our study and a study conducted in Uganda.[20,34] Non-CRS group had highest scores in the

psychological domain while another two domains, nasal symptoms and sleep symptoms, were also greatly affected. Mean scores and trends in the SNOT-22 domains for non-CRS individuals varied from study to study because the non-CRS groups were from diverse backgrounds.[20,34,35]

Factors Related to CRS Patients

A strong relationship between smoking status and poor QoL in CRS patients was illustrated in the results of this study. The relationship between smoking status and the prevalence of sinusitis was also observed from a study conducted in Europe (OR:1.91; 95% CI: 1.77-1.05).[13] This association could be also discovered in Canada for female (OR: 1.57; 95% CI: 1.24-1.99), whereas the risk is likely to increase in active smokers (OR: 1.67; 95% CI: 1.18-2.37) and in former smokers (OR: 1.20; 95% CI: 0.90-1.60). Although this negative effect could not be found in Brazil and in male in Canada (adjusted OR: 1.24; 95% CI: 0.9-1.7%), the majority of the investigations showed that the smoking behaviour is a risk factor of CRS.[12,36] However, the relationship between smoking status and endoscopic sinus surgery (ESS) patients have been less measurable.[37] In a previous study, continuing to smoke after ESS did not influence the QoL indexes; however, higher smoking volume may be associated with worsening postoperative endoscopic scores at more than six months follow-up.[38] Another study with 2 to 9-year period indicated that smoking did not influence the preoperative symptoms, but could lead to a higher rate of revision surgery (20% smokers vs 7% non-smokers).[39] In a post-surgical study of accessing QoL, there was less improvement in smokers after ESS in a dose-dependent manner.[40] The findings of these studies suggest that smoking behaviour could have a negative effect on patients after ESS. Possible mechanisms affecting QoL may potentially derive from the microbial alteration and tobacco-mediated stimulation of sinonasal microbial biofilms.[41,42] Smoking can be an immunosuppressive factor by changing toll-like receptors and inhibiting IL-8 and human B-defensin, which promote clearance of gram-negative and gram-positive bacteria.[43]

The results from this study also illustrate that there is a more significant risk of poor quality of life for female patients with CRS as compared to male patients. A study conducted in the UK reported that women had higher scores than men in two types of CRS. Nasal domain was the most significant factor affecting male and female patients while that for female patients was this domain, which followed by the emotional domain in both genders.[44] Other studies from North America and England also illustrated that men increased positively with the prevalence of CRSwNP, whereas women have higher rates of CRS without NP.[45-47] Similarly, another study conducted in a 10-year period cohort of primary care patients found that men accounted for up to 54% of patients with CRSwNP.[48] In contrast, other studies conducted in Europe, Korea, and Taiwan showed there was no difference in the prevalence of CRS by gender.[13,15,49,50]

Clinical characteristics as symptoms of chronic sinusitis may illustrate high risk of poor QoL. From the multivariate analysis result, poor HRQoL was found to be significantly associated with demographical factors such as gender and smoking status. CRS patients had 46 times poorer QoL compared to those without the disease. The results agree with the outcome of other studies using SNOT-22 among CRS patients.[31-34]

Limitations

Some limitations of the present study must be considered. First, by including ICD-10 code J32, there could be a possibility that several cases with otherwise unspecified rhinosinusitis were also included but may not be considered as the true nature of CRS. This could mean that the impact of CRS among patients might differ greatly. Second, because the SNOT-22 questionnaire was not validated in Vietnam, a professional translator was used, meaning that language may have a minimal effect on the results obtained in the Quality of life assessment. Third, due to lack of treatment information, the analysis could not calculate other potential covariates and confounders, such as body mass index, years of taking CRS medications and other possible risk factors for CRS as well as comorbidities. The relationship between CRS patients and healthy individuals should be analysed deeper in future studies. There is a rising need to further clarify the concept of factors that affect QoL of people suffering from CRS.

Conclusion

Our study has shown that those with CRS experience poorer quality of life than healthy controls. Additionally, some demographic factors such as gender, monthly income, exercise and nasal discharge were strictly associated with poor QoL of patients. Based on the quality of life assessment outcome proper treatment strategies should be built up in low-to-middle income countries like Vietnam.

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