

Prevalence of nasal obstruction and its impact on quality of life in Saudi Arabia

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ABSTRACT

Purpose/Background: Nasal obstruction is a significant issue influencing the patient's quality of life. Chronic nasal obstruction is frequently associated with other symptoms such as headache, sleep disturbance, and daytime sleepiness. This study aims to investigate the prevalence of nasal obstruction in Saudi Arabia and examine its effect on patients' quality of life. **Methods:** This is a cross-sectional study conducted in Saudi Arabia. Data were collected using a self-administered combination of two previously validated questionnaires (the NOSE scale and the WHOQOL-BREF) translated into Arabic. The Mann-Whitney test was used to investigate the association between nasal obstruction prevalence and the participants' QOL. **Results:** The study included 1039 participants from different regions of Saudi Arabia. The prevalence of nasal obstruction was 60.3% among the participants. Several factors significantly affected the prevalence of nasal obstruction, including sex, suffering from a chronic disease, having a family member with nasal obstruction, and using medications ($P < 0.001$ for all factors). A better score was shown in the four domains of the WHOQOL-BREF questionnaire by the participants who had no nasal obstruction: the physical health domain, psychological health, social relationships, and environment ($P < 0.001$ for all factors). **Conclusions:** Quality of life is affected by nasal obstruction. The subjective assessment is essential in evaluating the severity of nasal obstruction disease. It is recommended that healthcare providers use subjective tools combined with objective tools to assess the degree of nasal obstruction severity.

Keywords: Nasal obstruction, NOSE scale, quality of life, Saudi Arabia

Introduction

Nasal obstruction is a feeling of discomfort that may be associated with other symptoms such as headache, irregular sleep, and a poor health-related quality of life (QOL).^[1,2]

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The subjective assessment of obstructive nasal symptoms can be conducted using the nasal obstruction symptom evaluation (NOSE) scale^[3] and the WHOQOL-BREF scale.^[4,5]

The prevalence of nasal obstruction has not been extensively studied in the general population. It has been assumed that up to one-third of the population has some nasal obstruction due to septal deviation.^[6] In Sweden, one-quarter of surveyed people suffered from nose complaint, including obstruction, sneezing, and discharge.^[7] In French patients with rhinosinusitis,

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nasal obstruction was seen in 66% of patients.^[8] In 2018, a study conducted in Northern Saudi Arabia revealed that nasal obstruction is prevalent during the period of 2014 to 2016, generally as the presentation of having deviated nasal septum.^[9]

Prior research has shown a reduction in quality of life (QoL) with nasal obstruction disorders. Besides, relieving of nasal obstruction has led to substantial improvement in QoL (QoL).^[10]

In Saudi Arabia, the prevalence of nasal obstruction and its effect on patients' quality of life is not clearly defined. Therefore, this study aims to investigate the prevalence of nasal obstruction in Saudi Arabia and to examine the nasal obstruction effect on the QOL of patients.

Subjects and Methods

Study design

This was a cross-sectional, observational, population-based, survey-based study. The data were collected between August and September 2022 using a Google form that was shared with the population in Saudi Arabia through social media platforms (e.g. Twitter, Instagram, Linked-in, and WhatsApp).

Study population

All adult populations from Saudi Arabia were eligible to participate in this study.

- Inclusion criteria: Adult males and females living in Saudi Arabia.
- Exclusion criteria: Adults not willing to participate in the study.

Sample size

It was calculated using the Raosoft online sample size calculator; considering a marginal error of 5%, a confidence level of 95%, and maximum uncertainty (50% of positive responses), a minimum of 377 participants from the Kingdom of Saudi Arabia were needed to be included in this study.

Data collection

Data were collected using a self-administered combination of two previously validated Arabic questionnaires (the NOSE scale^[11,12] and the WHOQOL-BREF^[5,13]).

Nasal Obstruction Symptom Evaluation Scale (NOSE): The NOSE scale was designed to evaluate the nasal obstruction's influence on the quality of life. It contains five items scored with a 5-point scale (0–4), in which 0 represents “not a problem” and 4 “severe problem.” The total score of NOSE is calculated by multiplying the raw score by 5, ranging from 0 to 100.^[11] The internal consistency of the Arabic version of the NOSE questionnaire was assessed using Cronbach's test, which showed an α value of 0.932 in patients and 0.911 in the control individuals, confirming good internal consistency of the scale.^[12]

WHO's QOL scale (WHOQOL-BREF): This instrument is derived from the WHOQOL-100. The WHOQOL-BREF questionnaire contains two items from the Overall QOL and General Health and 24 items of satisfaction that are divided into four domains: Physical health with seven items (Domain1), psychological health with six items (Domain2), social relationships with three items (Domain3), and environmental health with eight items (Domain4). The point values for the questions were summed corresponding to each domain as (1 = Not at all, 2 = Not much, 3 = Moderately, 4 = A great deal, and 5 = Completely) except for questions 3, 4, and 26, which are negatively phrased items. Then, the scores were transformed to a 0- to 100-point interval according to guidelines.^[5] The finalized version of the questionnaire was pretested among 20 participants to solve any obstacles. The internal consistency of the Arabic WHO-QOL BREF questionnaire was tested in a previous study where good internal consistency (Cronbach's $\alpha = 0.92$) for the questionnaire, and its four domains was observed.^[13]

Statistical analysis

The normality of numerical data was tested. If normally distributed, data were statistically described in terms of mean \pm SD, whereas the median and IQR were used to describe categorical data. Frequencies (number of participants) and valid percentages were used for categorical variables.

Chi-square or Fisher's exact test was performed for categorical variables between the subgroups. *P* values less than 0.05 were considered statistically significant. The Mann–Whitney test was used to investigate the association between nasal obstruction prevalence and the participants' QOL. Furthermore, the Kruskal–Wallis test was used to explore the association between nasal obstruction severity and the participants' QOL. All statistical calculations were performed using the SPSS program (IBM Corp, Armonk, NY, USA), release 26 for Microsoft Windows.

Results

In total, 1039 subjects from different regions in Saudi Arabia filled out the questionnaire, and their complete characteristics are shown in Tables 1-3. The largest proportion (31.6%) were from the northern region, followed by the southern region (17.8%), the western region (17.4%), the eastern region (16.6%), and the central region (16.5%). The majority of the participants who completed the questionnaire were Saudi (94.1%), females (64.5%), aged from 18 to 30 years (63%), and had a family member with nasal obstruction (41.5%). Approximately 79.8% of the participants had a university degree or higher, about half were single, and 66.1% suffered from chronic diseases. Out of 33.8% of the participants mentioned that they had a nasal obstruction, and nearly half of the participants reported using medications to treat several diseases.

Participants reported the findings associated with nasal obstruction, congestion (as a result of allergic rhinitis, sinusitis,

Table 1: Socio-demographic characteristics of the participants

Parameters	Category	Count (n=1039)	Percentage
Age (years)	18 to 30	655	63
	31 to 40	162	15.6
	41 to 50	143	13.8
	51 to 60	62	6.0
	>60	17	1.6
Gender	Female	670	64.5
	Male	369	35.5
Nationality	Non-Saudi	61	5.9
	Saudi	978	94.1
Marital status	Divorced	33	3.2
	Married	390	37.5
	Single	602	57.9
	Widowed	12	1.3
Educational level	Primary school	12	1.2
	Preparatory school	15	1.4
	Secondary school	183	17.6
	University or higher	829	79.8
Employment status	Non-employed	179	17.2
	Retired	47	4.5
	Student	418	40.2
Medication use	Employed	395	38
	Using medications	579	55.7
	Not using medications	460	44.3

Table 2: Disorders related to nasal obstruction among participants

Parameters	Category	Count (n=1039)	Percentage
Have allergic rhinitis	Yes	321	30.9
	No	718	69.1
Have Chronic sinusitis	Yes	166	16
	No	873	84
Suffering from nasal obstruction	Yes	351	33.8
	No	688	66.2

or cold and flu episodes), and deviated septum were the major causes of nasal obstruction (72.4% and 28.8%, respectively). More details are described in Table 4.

After interpreting the results of the NOSE scale questionnaire, it was estimated that the prevalence of nasal obstruction was 60.3% among the participants. Moreover, regarding nasal obstruction severity, approximately half of the participants had moderate (30 to 50) and severe (>50) nasal obstruction. Full details are in Figures 1 and 2.

By comparing the associated factors with the prevalence of nasal obstruction [Table 5], no statistically significant differences were found except for male gender, having a chronic disease, using concomitant medications, and having a family member with nasal obstruction that was associated with a significantly higher prevalence of nasal obstruction ($P < 0.001$).

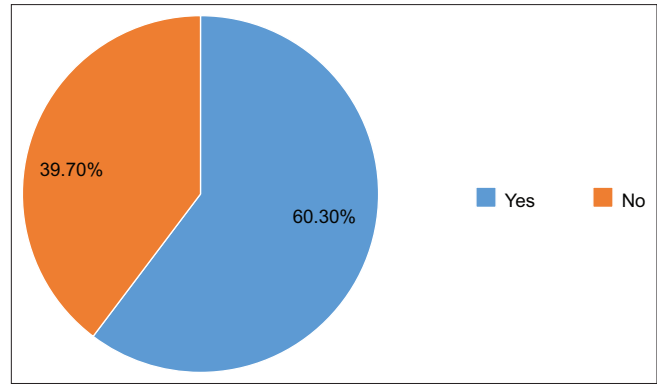


Figure 1: Prevalence of nasal obstruction

By comparing the participants' answers regarding having nasal obstruction or not with the results of the NOSE Scale, approximately half of the participants who reported they did not have nasal obstruction actually had a nasal obstruction on NOSE Scale (43.6%).

By comparing the total score of the four domains of quality of life with the prevalence of nasal obstruction, all participants who did not have nasal obstruction had a higher score than those who had nasal obstruction ($P < 0.001$). Full details are described in Table 6.

By comparing the severity of nasal obstruction with the total score of the four domains of quality of life, there were significant differences among the four domains of the quality of life with the nasal obstruction degree ($P < 0.001$), Table 7.

Discussion

This study aimed to assess the prevalence of nasal obstruction in Saudi Arabia and to investigate the nasal obstruction effect on patients' quality of life. The study enrolled 1039 participants from diverse regions of Saudi Arabia and revealed a prevalence of nasal obstruction at 60.3% among the participants. Noteworthy factors influencing the occurrence of nasal obstruction included gender, presence of a chronic illness, familial history of nasal obstruction, and medication use ($P < 0.001$ for all factors). Participants without nasal obstruction displayed superior scores across four domains of the WHOQOL-BREF questionnaire: physical health, psychological health, social relationships, and environment ($P < 0.001$ for all factors), which indicated that nasal obstruction detrimentally impacts individuals' quality of life. Subjective evaluations play a pivotal role in assessing the severity of nasal obstruction. It is advisable for healthcare providers to employ a combination of subjective and objective tools to gauge the degree of nasal obstruction severity since the nose and the nasal airway are complex structures.^[14]

Our study used the NOSE Scale, a disease-specific tool used to measure nasal obstruction. The questionnaire is short and

Table 3: Comorbidities among participants

Parameters	Category	Count (n=1039)	Percentage
Have asthma	Yes	79	7.6
	No	960	92.4
Have cardiovascular diseases	Yes	11	1.1
	No	1028	98.9
Have hepatic diseases	Yes	5	0.5
	No	1034	99.5
Have hyperlipidemia	Yes	37	3.6
	No	1002	96.4
Have skin sensitivity	Yes	58	5.6
	No	981	94.4
Have diabetes mellitus	Yes	78	7.5
	No	961	92.5
Have hypertension	Yes	87	8.4
	No	952	91.6
Have thyroid gland disorders	Yes	44	4.2
	No	995	95.8
Have kidney diseases	Yes	11	1.1
	No	1028	98.9
Have cancer	Yes	11	1.1
	No	1028	98.9
Have psychological disorders	Yes	23	2.2
	No	1016	97.8
Have immunodeficiency disease	Yes	9	0.9
	No	1030	99.1

Table 4: Findings associated with nasal obstruction

Parameters	Count (n=1039)	Percentage
Nasal polyps	11	3.1
Adenoids hypertrophy	54	15.4
Inferior turbinate hypertrophy	38	10.8
Nasal congestion	254	72.4
Deviated septum	101	28.8

simple to fill out and places little burden on the respondent. In addition, it is dependable, genuine, and adaptable in clinical status. It may also be used in conjunction with generic or global quality-of-life measures to evaluate the relative effects of a specific disease on several aspects of overall quality of life.^[11]

Our study results revealed that approximately two-thirds of the participants in Saudi Arabia had a nasal obstruction. Likewise, in a study in Saudi Arabia conducted by Alanazy S *et al.*,^[15] the prevalence of nasal obstruction among the participants was slightly higher than our findings (75.5%). On the difference, the prevalence of nasal obstruction in an American study was 98% among the participants.^[16]

Furthermore, we compared the answers of the participants regarding suffering from nasal obstruction with the NOSE Scale results. Approximately half of the participants who perceive themselves as not having nasal obstruction actually exhibit nasal obstruction when evaluated using the NOSE Scale. These results assumed the importance of objective

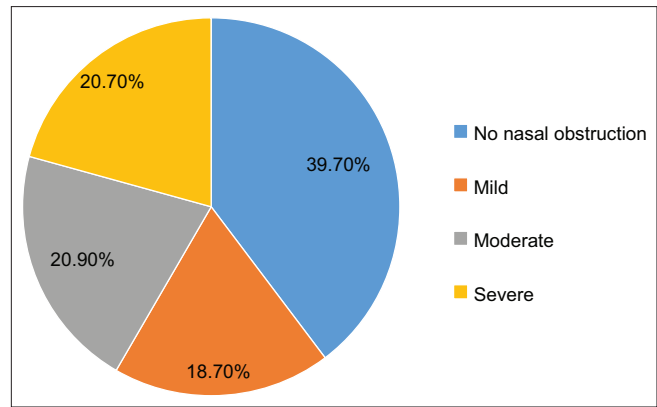


Figure 2: Severity of nasal obstruction

evaluations with one of the assessment-validated tools in disease diagnosis.

Turbinate hypertrophy, internal or external nasal valve collapse, and septal abnormalities, congenital or acquired, are some anatomic reasons for nasal blockage. The presence of foreign objects inside the nose and benign or cancerous tumors are uncommon causes of nasal blockage. Allergic rhinitis (AR; IgE-mediated) and nonallergic rhinitis, including inflammatory, infectious (viral or bacterial), hormonal, autonomic, drug-induced, systemic disease linked, or occupational reasons, are among the physiological causes of nasal blockage.^[17] Our findings showed that the participants mentioned that congestion (as a result of allergic rhinitis, sinusitis, or cold and flu episodes) and deviated septum were the major causes of nasal obstruction.

The patient's physical or mental state, ability to concentrate, level of stress, and ability to work may all be impacted by nasal obstruction at work or school. These issues could have a negative impact on the patients' lives and have an effect on their health and social well-being does not always get better even after nasal surgery.^[18-21]

Concerning the NOSE scale, 18.70% of participants had mild nasal obstruction, 20.9% had moderate nasal obstruction, and 20.7% had severe nasal obstruction. In another study in the USA, only 11% of the patients had mild nasal obstruction, most (63%) patients had severe nasal obstruction, and 24% mentioned moderate nasal obstruction.^[16]

Moreover, the results of our study estimated that the nasal obstruction affected the participants' quality of life, and the participants who did not suffer from nasal obstruction showed significantly higher scores on the quality of life assessment. Our result indicates that nasal obstruction may negatively impact the quality of life.

To our knowledge, most previous studies assessed the nasal obstruction severity associated with the outcome of surgeries or with one of the disease causes.^[22-25]

Table 5: Factors affecting the prevalence of nasal obstruction

Factors	Categories	Nasal obstruction		P
		No nasal obstruction (≤10)	Nasal obstruction (15–100)	
Sex	Male	111 (30.1)	258 (69.9)	<0.001*
	Female	302 (45.1)	368 (54.9)	
Education	University degree or higher	328 (39.7)	501 (60.4)	0.810
	Doesn't hold a university degree	85 (40.5)	125 (59.5)	
Age	≤50 years	383 (39.9)	577 (60.1)	0.737
	>50 years	30 (38)	49 (62)	
Nationality	Saudi	389 (39.8)	589 (60.2)	0.947
	Non-Saudi	24 (39.3)	37 (60.7)	
Marital status	Un-married	249 (38.4)	400 (61.6)	0.240
	Married	164 (42.1)	226 (57.9)	
Employment status	Non-employed	266 (41.3)	378 (58.7)	0.191
	Employed	147 (37.2)	248 (62.8)	
Have chronic diseases	No	319 (46.4)	368 (53.6)	<0.001*
	Yes	94 (26.7)	258 (73.3)	
Anyone from your family has nasal obstruction disease	No	318 (52.3)	290 (47.7)	<0.001*
	Yes	95 (22)	336 (78)	
Medication use	No	303 (52.3)	276 (47.7)	<0.001*
	Yes	110 (23.9)	350 (76.1)	

Table 6: Nasal Obstructive prevalence and Quality of Life domains

Factors	Category	Total score of		P
		Median	Interquartile Range	
Domain 1 (Physical health)	No nasal obstruction	81	31	<0.001*
	Nasal obstruction	63	27	
Domain 2 (Psychological health)	No nasal obstruction	75	25	<0.001*
	Nasal obstruction	63	31	
Domain 3 (Social relationships)	No nasal obstruction	75	44	<0.001*
	Nasal obstruction	56	37	
Domain 4 (Environmental health)	No nasal obstruction	75	25	<0.001*
	Nasal obstruction	63	25	

Table 7: Nasal obstruction severity and quality-of-life domains

Factors	Category	Total score of		P
		Median	Interquartile range	
Domain 1 (Physical health)	No nasal obstruction	81	31	<0.001*
	Mild nasal obstruction	69	32	
	Moderate nasal obstruction	56	81	
	Severe nasal obstruction	56	25	
Domain 2 (Psychological health)	No nasal obstruction	75	25	<0.001*
	Mild nasal obstruction	69	87	
	Moderate nasal obstruction	56	31	
	Severe nasal obstruction	56	25	
Domain 3 (Social relationships)	No nasal obstruction	75	44	<0.001*
	Mild nasal obstruction	69	31	
	Moderate nasal obstruction	56	38	
	Severe nasal obstruction	56	37	
Domain 4 (Environmental health)	No nasal obstruction	75	25	<0.001*
	Mild nasal obstruction	69	25	
	Moderate nasal obstruction	63	31	
	Severe nasal obstruction	63	25	

The study lacks a correlation between the subjective and objective diagnoses, and the results depended on the participants' points of

view. Furthermore, there is no strong attention to the symptoms that may be the reason for nasal obstruction.

Conclusions

Quality of life is affected by nasal obstruction and correlates with its severity, including physical, psychological, social, and environmental domains. The subjective assessment is essential in evaluating the severity of nasal obstruction disease. It is recommended that healthcare providers use subjective tools with objective tools to assess the degree of nasal obstruction severity. Further awareness programs regarding subjective tools will be valuable in nasal obstruction diagnosis and treatment decisions.

Ethical approval

The study was approved by the ethics committee at Taif University (approval number 44-019, September 4, 2022).

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Key message

The prevalence of nasal obstruction in Saudi Arabia and its association with patient's quality of life.

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Conflicts of interest

There are no conflicts of interest.

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