

Definitions of Chronic Obstructive Pulmonary Disease and Chronic Obstructive Pulmonary Disease Exacerbation: A Modified Delphi Survey

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Abstract

Background: The Global Initiative for Chronic Obstructive Lung Disease (GOLD) update 2023 proposed new definitions of chronic obstructive pulmonary disease (COPD) and COPD exacerbation. However, an agreement on the definitions has not been made, either internationally or domestically. This study aimed to reach an agreement between experts on the new definitions of COPD and COPD exacerbation in South Korea.

Methods: A modified Delphi method was used to make an agreement on the definitions of COPD and COPD exacerbation proposed by the GOLD update 2023. We performed two rounds of the survey including 15 Korean experts on COPD, asthma, and tuberculosis.

Results: More than two-thirds of the experts agreed on 12 of the 13 statements related to the definitions of COPD and COPD exacerbation in the two rounds of the survey. The experts agreed on the definitions of COPD and COPD exacerbation that should be revised in line with the definitions proposed by the GOLD update 2023. However, the experts showed an uncertain opinion on the statement that the definition of COPD includes patients with persistent airflow obstruction due to bronchiectasis.

Conclusion: Based on this Delphi survey, experts' agreement was made on the definitions of COPD and COPD exacerbation proposed by the GOLD update 2023.

Keywords: Definition; Chronic Obstructive Pulmonary Disease; Exacerbation



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Introduction

Recently, a new definition of chronic obstructive pulmonary disease (COPD) was proposed by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) update 2023¹. Before the new proposal of definition, the previous definition of COPD consisted of four components: firstly, long-term exposure to gas and dust; second, chronic respiratory symptoms of dyspnea, cough, and sputum; third, persistent airflow obstruction; lastly, chronic bronchitis, chronic bronchiolitis, and emphysema². Among the four components of COPD definition, the first component of long-term exposure to gas and dust was proposed to be removed in the new definition of COPD by the GOLD update 2023. When we adopt the new definition of COPD, we can expand the concept of COPD with the inclusion of various conditions in which a patient does not have any history of exposure to gas and dust. However, an agreement on the new definition of COPD has not been made internationally or domestically.

In addition, the new definition of COPD exacerbation was also proposed by the GOLD update 2023¹. The GOLD update 2023 adopted the Rome Proposal of COPD exacerbation definition³. It was proposed that the new definition of COPD exacerbation requires not only symptoms but also objective measurements of respiratory rate, heart rate, serum C-reactive protein, pulse oximetry, and arterial blood gas. Similarly, no

agreement on the new definition of COPD exacerbation has been made internationally or domestically. If we define COPD exacerbation according to the Rome Proposal, it will be more objective to differentiate mimicking diseases from COPD exacerbation. Although there is a need to revise the definition of COPD exacerbation, the change in definition may affect clinical practice and disease statistics. In addition, the change in definitions of COPD and COPD exacerbation may affect communication among healthcare professionals, patients, and even the general public. Therefore, this study aimed to make an agreement between experts on the new definitions of COPD and COPD exacerbation in South Korea.

Materials and Methods

This study was performed with a modified Delphi method (Figure 1)⁴.

1. Recruitment of experts

Experts were recruited from the study groups of the Korean Academy of Tuberculosis and Respiratory Diseases (KATRD) and also from the Korean Academy of Asthma, Allergy, and Clinical Immunology, based on their clinical and research expertise. Fifteen experts were contacted and asked to participate in this survey. All of the 15 experts agreed on the participation. Among the 15 experts, 11 experts were recruited from the COPD

Figure 1. Flowchart of the modified Delphi method. COPD: chronic obstructive pulmonary disease.

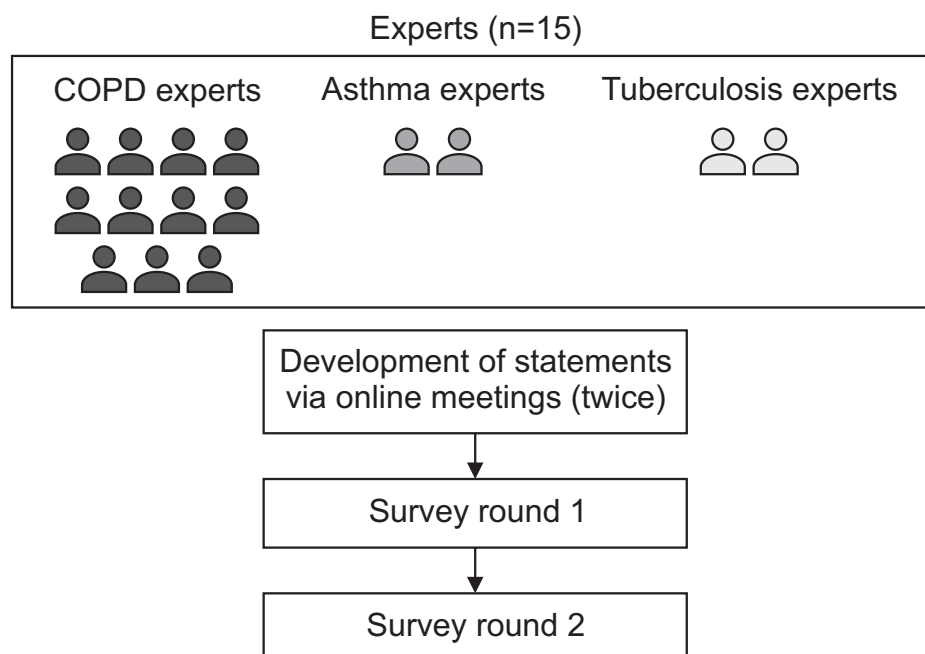


Table 1. Summary of the modified Delphi surveys

	Statements or questions	Answers		
		Choice	% in the 1st round	% in the 2nd round
Q1	Recently, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) has proposed the revised definitions of both COPD and COPD exacerbation. In line with the revised definitions, we also should revise the definitions.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 0 6.7 46.7 46.7	0 0 14.3 21.4 64.3
Q2	Even if we revise the definitions in line with the international revision, we may add more details to reflect our opinions. Note: The items to be changed and added are the following.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 6.6 6.7 20 66.7	0 0 0 42.9 57.1
Q3	The definition of COPD consists of the remaining three, excluding 1) among the four below. 1) Long-term exposure to gas and dust 2) Chronic respiratory symptoms (dyspnea, cough, sputum) 3) Persistent airflow obstruction 4) Chronic bronchitis, chronic bronchiolitis and emphysema Note: GOLD 2023 excluded 1) from the revised COPD definition. The revised COPD definition of GOLD 2023 is as follows. COPD is a heterogeneous lung condition characterized by chronic respiratory symptoms (dyspnea, cough, sputum production) due to abnormalities of the airways (bronchitis, bronchiolitis) and/or alveoli (emphysema) that cause persistent, often progressive, airflow obstruction	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 13.3 0.1 53.3 33.3	0 7.1 7.2 64.3 21.4
Q4	To classify COPD according to risk factors, the GOLD 2023 and the Lancet Commission suggested the followings. GOLD 2023 Classification: COPD is classified according to risk factors such as COPD-G (genetic), COPD-D (development, premature birth and low birthweight), COPD-C (cigarette smoking), COPD-P (pollution, indoor and outdoor air pollution), COPD-I (childhood infection, tuberculosis), COPD-A (asthma, childhood asthma), and COPD-U (unknown cause). The Lancet Commission classifications: Type 1 (genetic), Type 2 (early-life events), Type 3 (infection), Type 4 (smoking and environmental tobacco smoke), and Type 5 (environmental exposure) (Lancet 2022:400;921) Which of these two classifications do you prefer?	<input type="radio"/> GOLD 2023 <input type="radio"/> Lancet Commission <input type="radio"/> Etc.	80 20 0	85.7 14.3 0
Q5	The definition of COPD includes patients with persistent airflow obstruction due to a prenatal or childhood developmental disorder, even without previous exposure to gases and dust, including cigarette smoking.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 6.7 13.3 46.7 33.3	0 7.1 0 57.1 35.7
Q6	The definition of COPD includes patients with persistent airflow obstruction as a result of tuberculosis destroyed lungs, even without previous exposure to gases and dust, including cigarette smoking.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	6.6 6.7 0 60 26.7	0 14.3 0 42.9 42.9

Table 1. Continued

	Statements or questions	Answers		
		Choice	% in the 1st round	% in the 2nd round
Q7	The definition of COPD includes patients with persistent airflow obstruction due to bronchiectasis, even without previous exposure to gases and dust, including cigarette smoking. Note: Bronchiectasis mentioned here refers to bronchiectasis patients who are treated with the main diagnosis of bronchiectasis for their respiratory condition.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	6.6 20 20 26.7 26.7	0 26.7 20 20 33.3
Q8	It is included as COPD if there is a history of childhood asthma and persistent airflow obstruction, even if there has been no exposure to gases and dust, including cigarette smoking.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 6.7 0 53.3 40	0 0 7.1 50 42.9
Q9	If there is persistent airflow obstruction, it is included as COPD, even if it is asymptomatic. Note: The above is a broader concept than that of the COPD definition proposed in GOLD 2023, and may be referred to as 'COPD in a broad definition.'	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	6.7 0 13.3 46.7 33.3	0 0 7.1 71.4 21.4
Q10	In line with international revision, we should also make the same revision for the definition of COPD exacerbation. Note: Accepting the Rome Proposal in GOLD 2023, COPD exacerbation was defined as below. In a patient with COPD, an exacerbation is an event characterized by dyspnea and/or cough and sputum that worsens over ≤ 14 days, which may be accompanied by tachypnea and/or tachycardia and is often associated with increased local and systemic inflammation caused by airway infection, pollution, or other insults to the airways.	<input type="radio"/> Strongly disagree <input type="radio"/> Disagree <input type="radio"/> Neutral <input type="radio"/> Agree <input type="radio"/> Strongly agree	0 6.7 33.3 40 20	0 0 26.7 60 13.3
Q11	What is the conceptual definition of COPD exacerbation? Choose your preferred one among the options below. Note: Definitions of terms should be concise and composed of genus and differentia. Being concise means leaving out the non-essentials. In addition, the genus is an already established term, which is a larger concept that includes terms to be newly defined, and differentia is a concept that is distinguished from other terms belonging to the genus. For example, 'acute worsening in a patient with COPD' is a genus and 'associated with airway inflammation' is a differentia.	<input type="radio"/> Acute worsening associated with airway inflammation in a patient with COPD <input type="radio"/> Acute worsening associated with acute bronchitis or bronchiolitis in a patient with COPD <input type="radio"/> Etc.	86.7 13.3 0	100 0 0
Q12	Choose which of the options below would be better when translating COPD exacerbation into Korean.	<input type="radio"/> COPD exacerbation <input type="radio"/> COPD acute exacerbation <input type="radio"/> Etc.	13.3 86.7 0	7.1 92.9 0
Q13	Based on the above survey results, the cut-off is 2/3 when deciding to agree/disagree according to the expert opinion. Note: The cut-off 2/3 means that if the expert panel agrees in 66.7% or more for each item, it is judged as 'expert agreement,' whereas if less than 33.3% agree, it is judged as 'expert disagreement,' and if 33.3%–66.6% agree, it will be judged as 'uncertain expert opinion.'	<input type="radio"/> Agree <input type="radio"/> Disagree <input type="radio"/> Etc.	100 0 0	100 0 0

In the 1st round of the survey, 15 out of 15 experts answered all of the statements and questions. In the 2nd round of the survey, 15 out of 15 experts answered the two statements, Q7 and Q10 but 14 out of 15 experts answered the other 11 statements. COPD: chronic obstructive pulmonary disease.

Study Group of KATRD. We recruited two asthma experts, one from the Asthma Study Group of KATRD and the other from the Korean Academy of Asthma, Allergy, and Clinical Immunology. In addition, two tuberculosis experts were recruited from the Tuberculosis Study Group of KATRD.

2. Development of statements

Based on the proposal of the new GOLD definitions, a draft of survey statements was made by an author (Yeon-Mok Oh). After two online meetings with the experts, we designed the final version of the survey statements with 13 issues: two, general issues; seven, specific issues for COPD definition; three, specific issues for exacerbation definition; one, agreement vs. disagreement.

3. Surveys, round 1 and 2

Surveys, round 1 and 2 were performed using an online survey platform, Google Forms (<https://docs.google.com/forms>). The statements or questions of the surveys, round 1 and 2 were the same. The experts were asked to choose one of the following answers to each statement: strongly disagree, disagree, neutral, agree, and strongly agree. The agreement rate was defined as the percentage of experts who answered, "strongly agree" or "agree." The disagreement rate was defined as the percentage of experts who answered "disagree" or "strongly disagree."

4. Agreement or disagreement

The experts' opinions on the statements or questions were classified as agreement, disagreement, or uncertain opinion. If the experts agreed 66.7% or more on a statement, it was judged as 'experts agreement,' whereas if less than 33.3% of experts agreed, the statement was judged as 'experts disagreement,' and if 33.4% to 66.6% agreed, it was judged as 'uncertain experts opinion.' We put this item of agreement or disagreement into the last statement of the survey (Q13 in Table 1).

5. Ethics committee and informed consent

The study protocol was approved by the Institutional Review Board of Asan Medical Center, Seoul, South Korea (application number S2022-2674-0001). Informed consent was obtained from all 15 experts.

Results

In the 1st round of the survey, all 15 experts answered all of the statements and questions. In the 2nd round

of the survey, all 15 experts answered the two statements, Q7 and Q10 but 14 out of 15 experts answered the other 11 statements. In the 1st round of the survey, more than 66.7% of experts agreed on 11 statements out of 13 statements (Table 1). In the 2nd round of the survey, one more statement was agreed on by more than 66.7% of experts. The statement which was not agreed on in round 1 but was agreed on in round 2 was statement Q10, the definition of COPD exacerbation proposed by the GOLD update 2023. On the survey statement Q7 about bronchiectasis, experts showed an uncertain opinion with an insufficient agreement rate of 53.3% even in survey 2.

A total of 85.7% of the experts agreed on the statement Q3 that was about the removal of an important component, long-term exposure to gas and dust in the 2nd round of the survey. For the classification of COPD according to risk factors (survey statement Q4), 85.7% of the experts preferred the GOLD update 2023 to Lancet Commission in the survey 2.

A total of 100% of the experts preferred the answer to Q11, "acute worsening associated with airway inflammation in a patient with COPD" for the conceptual definition of COPD exacerbation in the 2nd round of the survey. A hundred percentage of the experts agreed on the survey statement Q13 about the cut-off of two-thirds when deciding to agree or disagree with experts' opinions.

Discussion

In this modified Delphi survey, most experts out of the 15 Korean experts agreed on the definitions of COPD and COPD exacerbation that should be revised in line with the definitions proposed by the GOLD update 2023¹. Based on this survey, we argue that the new GOLD definitions of COPD and exacerbation should be adopted in South Korea.

The survey statements Q1 and Q10 were that we should revise the definitions of COPD and COPD exacerbation in line with the definitions proposed by the GOLD update 2023. In the 2nd round of the survey, more than two-thirds of experts agreed on both statements Q1 and Q10. However, for the survey statement Q10 about the definition of COPD exacerbation, less than two-thirds of experts agreed in the 1st round of the survey. The less agreement on Q10 might be because the new definition of exacerbation is not concise but is too long for experts to comprehend. This might be supported by the finding that statement Q11 on a more concise conceptual definition was agreed on by 100% of experts in the survey round 2.

The survey statement Q2 was that even if we revise the definitions in line with the GOLD update 2023, we may add more details to reflect our opinions. 100% of experts agreed on the statement Q2 in the survey round 2.

The survey statement Q3 was about the removal of an important component from the previous COPD definition. Before the new proposal of definition, the previous definition of COPD consisted of four components: firstly, long-term exposure to gas and dust; second, chronic respiratory symptoms of dyspnea, cough, and sputum; third, persistent airflow obstruction; lastly, chronic bronchitis, chronic bronchiolitis, and emphysema². Among the four components of COPD definition, the first component of long-term exposure to gas and dust was proposed to be removed in the new definition of COPD given by the GOLD update 2023. In addition, we asked the survey statement Q4 about the new classification of COPD according to risk factors proposed by the GOLD update 2023: COPD-G (genetic), COPD-D (development, premature birth, and low birthweight), COPD-C (cigarette smoking), COPD-P (pollution, indoor and outdoor air pollution), COPD-I (childhood infection, tuberculosis), COPD-A (asthma, childhood asthma), and COPD-U (unknown cause). In this study, experts agreed on the new definition and classification of COPD proposed by the GOLD update 2023¹.

If we adopt the new definitions of COPD proposed by the GOLD update 2023, we could expand the concept of COPD. When we remove 'long-term exposure to gas and dust,' one of the important components from the previous GOLD definition of COPD, we might include more conditions into the expanded new definition of COPD: firstly, persistent airflow obstruction due to a prenatal or childhood developmental disorder even without previous exposure to gases and dust (survey statement Q5); second, persistent airflow obstruction as a result of tuberculosis destroyed lung even without previous exposure to gases and dust (survey statement Q6); third, persistent airflow obstruction due to bronchiectasis even without previous exposure to gases and dust (survey statement Q7); fourth, persistent airflow obstruction with a history of childhood asthma even without previous exposure to gases and dust (survey statement Q8). In this study, the experts showed agreement on the expansion of the COPD definition except for inclusion of bronchiectasis (survey statement Q7), on which the experts showed an uncertain opinion with an agreement rate of 53.3%. This finding of uncertain opinion on bronchiectasis might be interpreted by the fact that bronchiectasis has long been considered a disease distinct from COPD in the aspects of etiology,

pathogenesis, and treatment.

In this study, we added the statement (Q9) about asymptomatic persistent airflow obstruction in the definition of COPD. The experts agreed on the broader definition of COPD in which asymptomatic persistent airflow obstruction is included. This is a broader concept than that of the COPD definition proposed in the GOLD update 2023, and may be referred to as 'COPD in a broad definition.'

Survey statements Q10 and Q11 were about the definition of COPD exacerbation. A shortcoming of the previous GOLD definition is that it depends on subjective symptoms that may also be associated with heart failure, pneumonia, or pulmonary thromboembolism. In contrast, the GOLD update 2023 proposed objective measurements of respiratory rate, heart rate, serum C-reactive protein, pulse oximetry, and arterial blood gas in addition to the subjective symptoms¹. The update also proposed the addition of evaluation of differential diagnosis and etiologic testing for airway insult and removal of the term, "additional therapy" from the definition of COPD exacerbation. However, a good definition should be concise without non-essential components and be usually composed of two parts: a genus (category of concept) and differentia (differentiating characteristics)⁵. So, we asked the survey statement Q11 about a concise definition of COPD exacerbation. The concise definition of COPD exacerbation was agreed on by 100% experts while the new GOLD definition of COPD exacerbation was agreed on by 73.3% experts in this study.

In this study, there are some limitations. Firstly, we did not survey any statements related to early COPD⁶. The concept of early COPD is important to prevent the disease and overcome the burden of COPD worldwide. However, we decided to focus on the specific issue of the new GOLD definitions of COPD and COPD exacerbation. Secondly, all experts who participated in this study were Korean, which might limit the study result from extrapolation to other countries because experts from different countries might have different opinions. Although we recruited experts from the Korean academic societies of respiratory or allergy, there might be a selection bias because we did not perform random sampling when recruiting the experts. However, the high agreement rate on most survey statements might support the findings of this study. Third, we did not compare the new definition to the previous one⁷. Although some experts might prefer the previous definition, we decided to focus on the new GOLD definitions.

As we mentioned, the new GOLD definition of COPD could expand the concept of COPD to include 'per-

sistent airflow obstruction' due to a prenatal or childhood developmental disorder, due to tuberculosis destroyed lung, due to bronchiectasis, and associated with a history of childhood asthma even without previous exposure to gases and dust. Further to the new GOLD definition of COPD, we might choose a broader concept of COPD, asymptomatic persistent airflow obstruction for the definition of COPD.

As for the new definition of COPD exacerbation, the GOLD update 2023 added objective measurements on subjective symptoms. Furthermore, compared to the new GOLD definition of COPD exacerbation, we could define COPD exacerbation more concisely when we remove the non-essential elements (survey statement Q11).

In conclusion, based on this Delphi survey, experts' agreement was made on the definitions of COPD and COPD exacerbation proposed by the GOLD update 2023.

Authors' Contributions

Conceptualization: Park YB, Lee JH, Jung JY, Kim DK, Hwang YI, Oh YM. Methodology: Kang YA, Jo KW, Oh YM. Formal analysis: Oh YM. Data curation: Lee JH, Ra SW, Park HY, Rhee CK, Yoo KH, Lim SY, Lee JS, Oh YM. Investigation: Lee JH, Ra SW, Park HY, Rhee CK, Yoo KH, Lim SY, Lee JS, Oh YM. Writing - original draft preparation: Lee JH, Ra SW, Park HY, Rhee CK, Yoo KH, Lim SY, Lee JS, Oh YM. Writing - review and editing: Park YB, Lee JH, Ra SW, Park HY, Jung JY, Kang YA, Rhee CK, Kim DK, Yoo KH, Hwang YI, Lim SY, Lee JS, Jo KW, Oh YM. Approval of final manuscript: all authors.

Conflicts of Interest

No potential conflict of interest relevant to this article was reported.

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