**Supplementary Table E-1. Survey results of the first questionnaire conducted in 32 patients with COPD at the Tohoku Medical and Pharmaceutical University Wakabayashi Hospital**

| Component | Response rate (%) | Actual state | | Desired state | Rate of desire (percentage of 3) for all) (%) |
|---|---|---|---|---|---|
| | | 1) Capable (n) | 2) Not capable (n) | If 2) is not capable, 3) I would like to do (n) | |
| 1. Sleeping well | 100 | 26 | 6 | 3 | 9.4 |
| 2. Get to sleep without cough and sputum | 100 | 29 | 3 | 4 | 12.5 |
| 3. Living a daily life without respiratory symptom | 100 | 23 | 9 | 3 | 9.4 |
| 4. Not causing disturbance to others via cough or sputum | 96.9 | 27 | 4 | 2 | 6.3 |
| 5. Eating without dyspnea | 100 | 29 | 3 | 3 | 9.4 |
| 6. Using the toilet without dyspnea | 96.9 | 23 | 8 | 7 | 21.9 |
| 7. Bathing without dyspnea | 100 | 19 | 13 | 9 | 28.1 |
| 8. Doing the housework without any problem | 90.6 | 12 | 17 | 7 | 21.9 |
| 9. Walking up and down stairways | 96.9 | 6 | 25 | 13 | 40.6 |
| 10. Picking up and carrying a heavy item | 100 | 8 | 24 | 4 | 12.5 |
| 11. Driving a car without coughing | 75 | 16 | 8 | 1 | 3.1 |
| 12. Walking the dog without dyspnea | 59.3 | 8 | 11 | 3 | 9.4 |
| 13. Going out for shopping and walking without cough or dyspnea | 100 | 16 | 16 | 8 | 25 |
| 14. Working at a garden | 81.3 | 13 | 13 | 10 | 31.3 |
| 15. Spending without | 96.9 | 24 | 7 | 9 | 28.1 |

| | | | | | |
|---|---|---|---|---|---|
| destroying the life rhythm | | | | | |
| 16. Working without any problem | 81.3 | 8 | 18 | 6 | 18.8 |
| 17. Taking the train or bus without any problem | 71.9 | 11 | 12 | 0 | 0 |
| 18. Talking in front of others without cough and sputum | 71.9 | 13 | 10 | 0 | 0 |
| 19. Performing activities at a pace similar to the same age group | 87.5 | 7 | 21 | 7 | 21.9 |
| 20. Going out without feeling anxiety of running late | 84.4 | 15 | 12 | 3 | 9.4 |
| 21. Going out with friends without any problem | 87.5 | 9 | 19 | 7 | 21.9 |
| 22. Attending drinking parties | 81.3 | 9 | 17 | 1 | 3.1 |
| 23. Do not have deteriorating condition even after drinking | 78.1 | 11 | 14 | 2 | 6.3 |
| 24. Walking/brisk walking | 84.4 | 6 | 21 | 11 | 34.4 |
| 25. Riding a bicycle | 75 | 14 | 10 | 2 | 6.3 |
| 26. Enjoying sports (baseball, football, ski, etc.) | 87.5 | 6 | 22 | 4 | 12.5 |
| 27. Enjoying the outdoor activities (climbing, hiking, etc.) | 81.3 | 2 | 24 | 4 | 12.5 |
| 28. Going to a concert/movie | 78.1 | 12 | 13 | 5 | 15.6 |
| 29. Travelling (sightseeing, hot spring, overseas) | 78.1 | 11 | 14 | 7 | 21.9 |
| 30. Keeping to schedule | 78.1 | 7 | 18 | 3 | 9.4 |
| 31. Participating in volunteering activities | 71.9 | 5 | 18 | 6 | 18.8 |
| 32. Playing with the grandchildren | 71.9 | 11 | 12 | 6 | 18.8 |

**Supplementary Table E-2. Details of the seven components eliminated from the first questionnaire**

| Deleted items | Reason for exclusion |
|---|---|
| 4. Not causing trouble to others by cough or sputum | Content similarity with "3. Living daily life without respiratory symptoms" |
| 17. Taking the train or bus without any problem | Content similarity with "16. Working without any problem" |
| 18. Talking in front of others without cough and sputum | High item-to-item correlation with "16. Working without any problem" (r=0.75) Similar item has wider distribution of responses and is better worded |
| 20. Going out without feeling anxiety of running late | Similar item has wider distribution of responses and is better worded. |
| 21. Going out with friends without any problem | High item-to-item correlation with "19. Performing activity at a pace similar to same age group" (r = 0.93) |
| 22. Attending drinking parties | Similar item has wider distribution of responses and is better worded |
| 31. Participating in volunteering activities | High item-to-item correlation with "16. Working without any problem" (r = 0.83) |
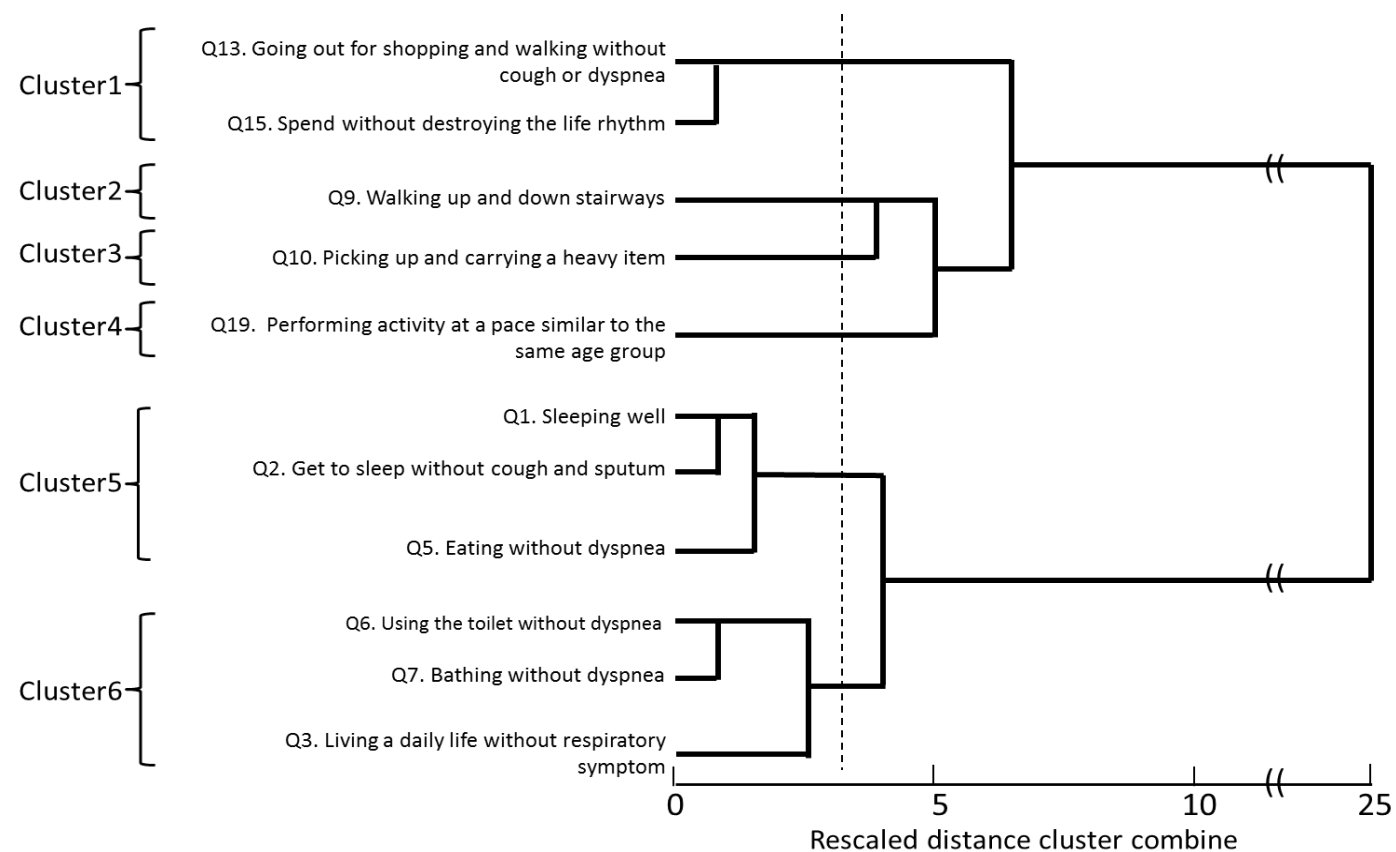
**Supplementary Figure E-1. Dendrogram illustrating the results of the cluster analysis of components.**

11 components were grouped into six clusters. Cluster 1, going-out activities (Q13 and Q15); cluster 2, moderate activities (Q9. walking on stairways); cluster 3, vigorous activities (Q10. carrying a heavy item); cluster 4, pace of activity (Q19. performing an activity at a pace similar to unaffected individuals in the same age group); cluster 5, activities of daily living (Q1, 2, & 5. sleeping and eating); and cluster 6, activities of daily living.

**Supplementary Figure E-2. The GAP Questionnaire (final version).**

For each question, please mark the box that best describes your current condition of suffering from COPD symptoms (e.g. breathlessness, cough, sputum) for both the actual state as well as the one that best represents your desired state.

| Component | | | Completely capable (0 point) | Highly capable (1 point) | Somewhat capable (2 point) | Poorly capable (3 point) | Not capable (4 point) |
|---|---|---|---|---|---|---|---|
| 1 | Walking up and down stairways | Actual state (a) | | | | | |
| | | Desired state (i) | | | | | |
| 2 | Picking up and carrying a heavy item | Actual state (b) | | | | | |
| | | Desired state (ii) | | | | | |
| 3 | Going out for shopping and a walk, etc. | Actual state (c) | | | | | |
| | | Desired state (iii) | | | | | |
| 4 | Eating | Actual state (d) | | | | | |
| | | Desired state (iv) | | | | | |
| 5 | Bathing and using the toilet | Actual state (e) | | | | | |
| | | Desired state (v) | | | | | |
| 6 | Performing activities at a pace similar to individuals in the same age group | Actual state (f) | | | | | |
| | | Desired state (vi) | | | | | |
| 7 | Sleeping well | Actual state (g) | | | | | |
| | | Desired state (vii) | | | | | |
| 8 | Enjoying a hobby or sport (please specify:     ) | Actual state (h) | | | | | |
| | | Desired state (viii) | | | | | |

Please calculate each score;

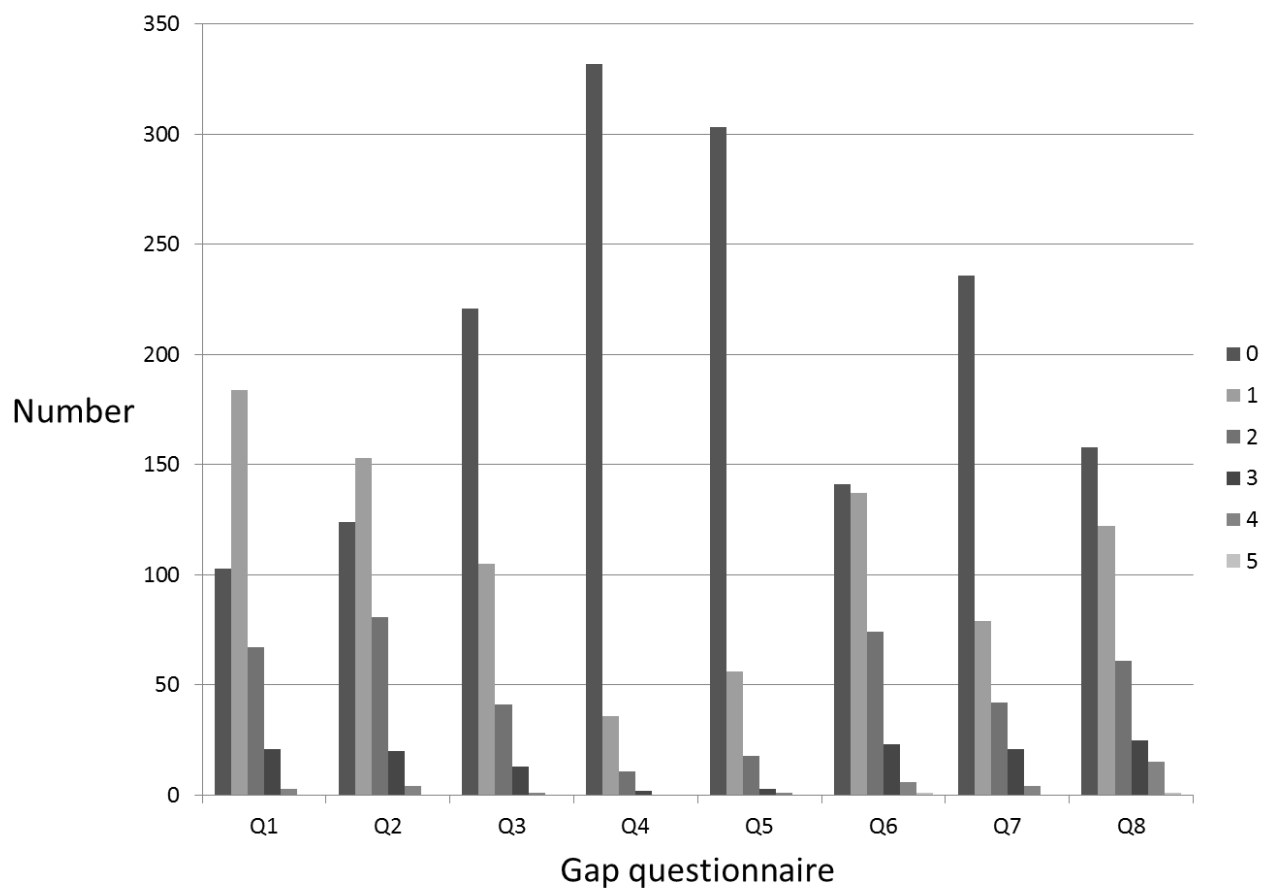Actual state score = (a)____+(b)____+(c)____+(d)____+(e)____+(f)____+(g)____+(h)____ = (1)_____

Desired state score = (i)____+(ii)____+(iii)____+(iV)____+(v)____+(vi)____+(vii)____+(viii)____ = (2)_____

GAP score = Desired state score (2)_____ −  Actual state score (1)_____ = _____
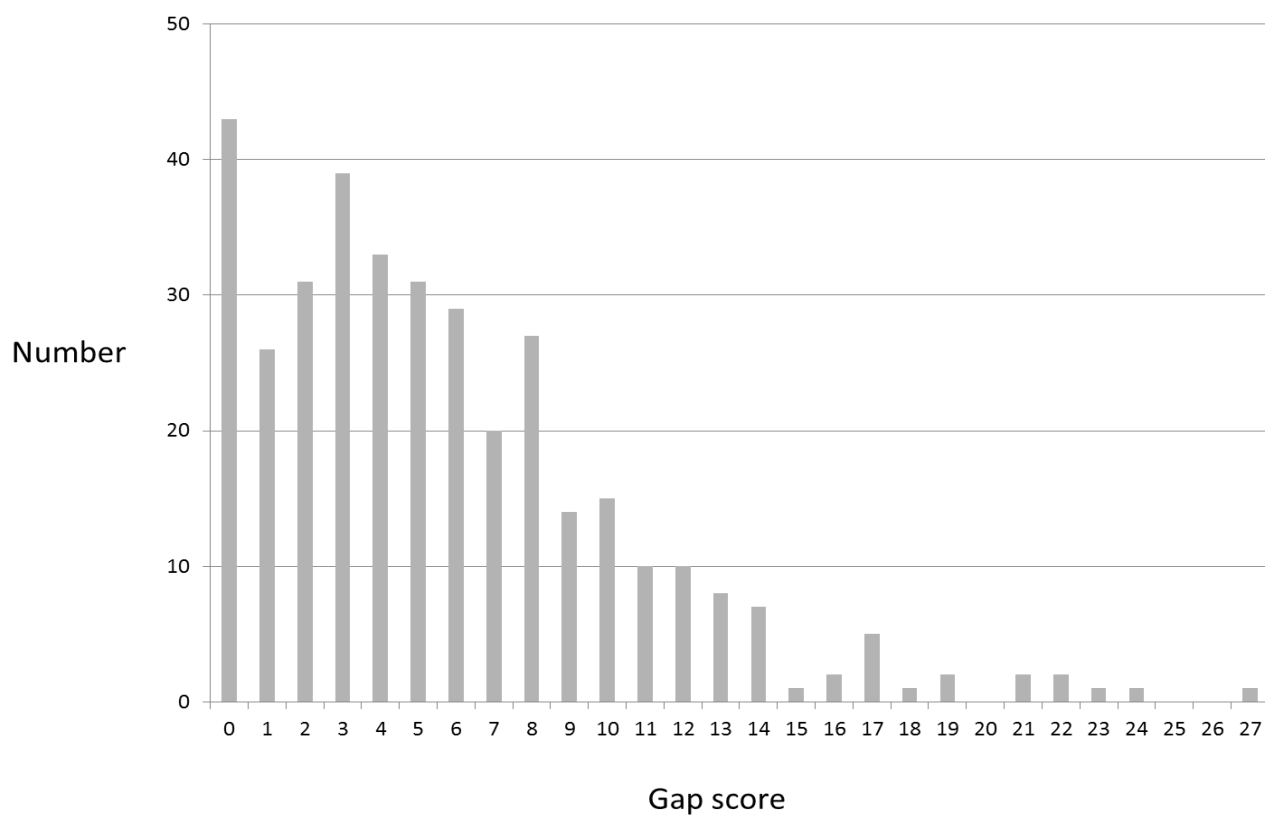
**Supplementary Figure E-3. Distribution of the gap score.**

Larger scores indicate a more unfavorable state.    Mean score = 5.7 (SD = 4.7)

**Supplementary Figure E-4. Distribution of each gap score component**

The minimum value of each score was 0 points and the maximum was 5 points. Although the activities of daily living did not differ significantly (Q4 or Q5), the hobby that the person wants to take up can easily introduce a difference (Q8).

(Mean±SD; Q1=1.0±0.9, Q2=1.0±0.9, Q3=0.6±0.8,Q4=0.2±0.5, Q5=0.3±0.6, Q6 1.0±1.0, Q7=0.6±1.0, Q8=1.0±1.1)