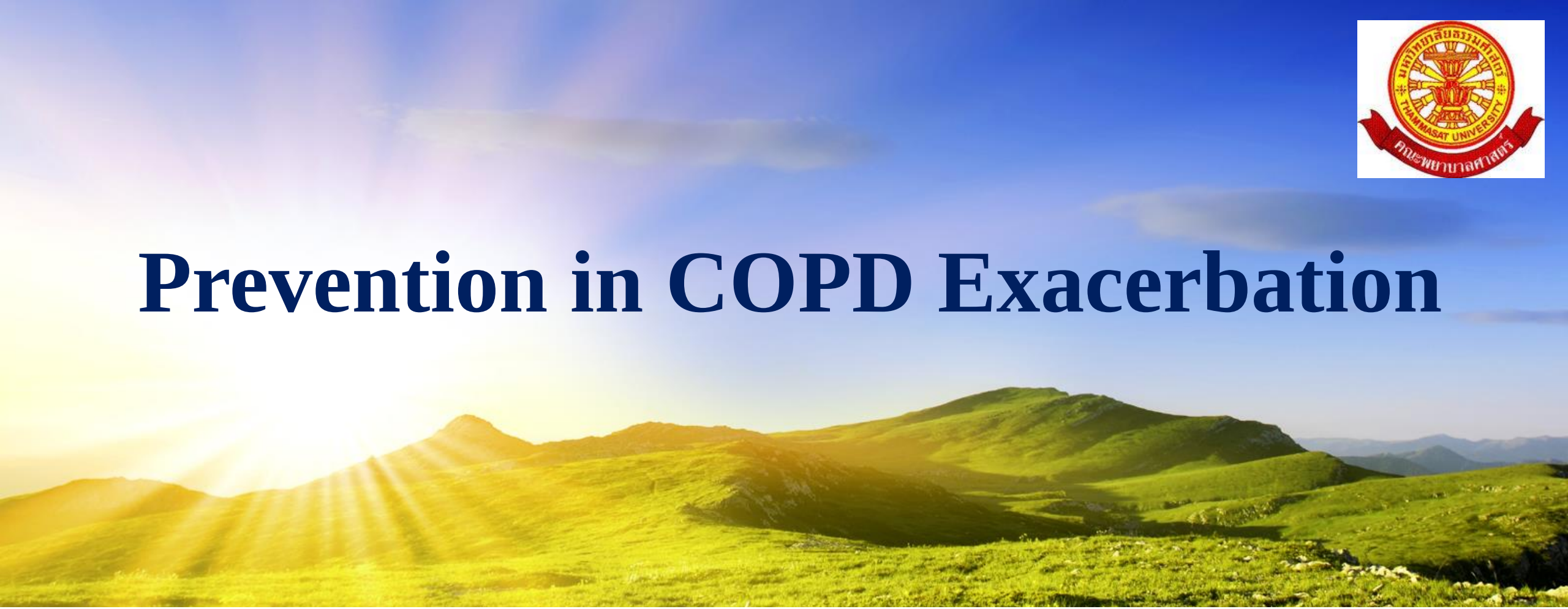


Prevention in COPD Exacerbation

BY

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Outline



https://montgomerypulmonary.com/department/chronic-obstructive-pulmonary-disease-copd/

- **Definition and Severity of AECOPD**
- **Prevention AECOPD During Stable COPD**
- **Prevention AECOPD During Exacerbation**

Definition and Severity of AECOPD

Definition:

- An exacerbation of COPD is an acute event with symptoms worsening over a few days (up to 14 days) and characterized by increased dyspnea and/or cough and sputum that may be accompanied by tachypnea and/or tachycardia and is often associated with increased local and systemic inflammation caused by infection, pollution, or other insult to the airways.

(GOLD, 2026)

Definition and Severity of AECOPD

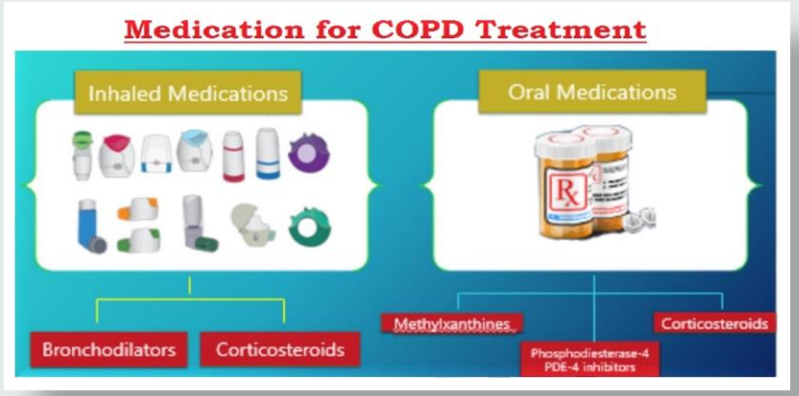
Severity: The Rome classification of exacerbation severity (Celli et al., 2021)

Severity	Variable Thresholds to Determine Severity
Mild (Default)	• Dyspnea VAS < 5 • Respiratory rate < 24 breaths/min • Heart rate < 95 bpm • Resting SaO2 ≥ 92% breathing ambient air (or patient's usual oxygen prescription) AND change ≤ 3% (when known) • CRP < 10 mg/L (if available)
Moderate (meets at least three of five*) *If obtained, ABG may show hypoxemia (PaO2 70-80 mmHg)	• Dyspnea VAS ≥ 5 • Respiratory rate ≥ 24 breaths/min • Heart rate ≥ 95 bpm • Resting SaO2 < 92% breathing ambient air (or patient's usual oxygen prescription) AND/OR change > 3% (when known) • CRP ≥ 10 mg/L (if available)
Severe	• Dyspnea, respiratory rate, heart rate, SaO2 and CRP same as moderate • If obtained, ABG may show hypoxemia (PaO2 ≤ 60 mmHg) and/or hypercapnia and acidosis (PaCO2 > 45 mmHg and pH < 7.35)

(GOLD, 2026; Celli et al., 2021)

Prevention AECOPD During Stable COPD

- **General 2 principles of AECOPD prevention**
  1. Pharmacological Treatment
  2. Non-Pharmacological Treatment



https://medicoinfo.org/chronic-obstructive-pulmonary-disease-copd/



https://www.247coastalcontact.com/great-exercises-for-those-with-copd/

Pharmacological Treatment

Evidence-Based Guidelines and Best Practice
(Carlin, 2023)

Pharmacologic	Preventive intervention
Inhaler technique	• จำเป็นต้องทบทวนเทคนิคการใช้ยาพ่นอย่างสม่ำเสมอ
Medication	• ผู้ป่วยที่มีการอุดกั้นทางเดินหายใจระดับปานกลางหรือรุนแรง และมีประวัติ AE อย่างน้อยหนึ่งครั้งในช่วงปีที่ผ่านมา (กลุ่ม GOLD B และ E) แนะนำให้ใช้ยา LAMA ร่วมกับ LABA แทนการใช้ LABA เพียงอย่างเดียว • ไม่แนะนำให้ใช้ LABA ร่วมกับ ICS หากมีข้อบ่งชี้ในการใช้ ICS ควรเลือกใช้ LABA + LAMA + ICS แทน • ผู้ป่วยที่ได้รับยา LABA + LAMA และมีจำนวน blood eosinophil count ≥ 100 cell/uL ควรพิจารณาเพิ่มยา ICS เข้าไปด้วย • พิจารณาใช้ LABA + LAMA + ICS สำหรับผู้ป่วยในกลุ่ม GOLD E หาก blood eosinophil count ≥ 300 cell/uL • ผู้ป่วยที่มีภาวะอุดกั้นทางเดินหายใจรุนแรงหรือรุนแรงมาก มีอาการหลอดลมอักเสบเรื้อรัง และมีอาการกำเริบ แม้จะได้รับการรักษาด้วยยาพ่นอย่างเหมาะสมแล้ว แนะนำให้ใช้ยา Roflumilast เพื่อป้องกันการกำเริบของโรคในอนาคต • ผู้ป่วยที่มีภาวะอุดกั้นทางเดินหายใจระดับปานกลางถึงรุนแรงมาก และมีอาการกำเริบ แม้จะได้รับการรักษาด้วยยาพ่นอย่างเหมาะสมแล้ว แนะนำให้ใช้ยาปฏิชีวนะกลุ่ม Macrolide เพื่อป้องกันการกำเริบของโรคในอนาคต • ผู้ป่วยที่มีภาวะอุดกั้นทางเดินหายใจระดับปานกลางถึงรุนแรง และมีอาการกำเริบ แม้จะได้รับการรักษาด้วยยาพ่นอย่างเหมาะสมแล้ว แนะนำให้ใช้ยาละลายเสมหะชนิดรับประทาน (Mucolytic agent) เพื่อป้องกันการกำเริบของโรคเพิ่มเติม

Evidence-Based Guidelines and Best Practice
(Carlin, 2023)

Pharmacologic	Preventive intervention
Vaccination	• Influenza vaccination • WHO and CDC recommend SARS-CoV-2 vaccination • CDC recommends one dose of 20-valent pneumococcal conjugate vaccine (PCV) (PCV20) or one dose of 15-valent PCV15 followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23) • CDC recommends Tdap (dTaP/dTPa) vaccination to protect against pertussis (whooping cough) for people with COPD that were not vaccinated in adolescence and Zoster vaccine to protect against shingles for people with COPD over 50 y of age.

Non-Pharmacological Treatment

Non-Pharmacological Treatment for prevention AECOPD



https://copdnewstoday.com/news/tai-chi-improves-copd-patients-respiratory-function-study/

➢**The methods of Non-pharmacological therapy included:**

(1) Pulmonary rehabilitation (PR)

- Exercise training

(2) Taking something as directed to prevent flare-ups

(3) Music therapy

(4) Alternative medicines/Therapeutic alternatives



Non-Pharmacological Treatment for prevention AECOPD

(1) Pulmonary rehabilitation

- Comprehensive pulmonary rehabilitation (PR): including exercise training, symptom management, patient education, smoking cessation intervention, nutritional counseling, respiratory therapy techniques, and lung volume reduction surgery. (Carlin, 2023)
- A systematic review: 13 RCTs reported reduced mortality, and number of readmissions among patients who had pulmonary rehabilitation initiated during hospitalization or within 4 weeks of discharge. (Ryrsø et al., 2018; GOLD, 2026)

Non-Pharmacological Treatment for prevention AECOPD

➢ Exercise training

Research	Result
Inspiratory muscle training in people with chronic obstructive pulmonary disease (COPD): a systematic review (Mota et al., 2023)	• 10 studies, including 733 patients. • There was a significant increase in inspiratory muscle strength and endurance compared to the control group; four showed advances in reducing dyspnea and exercise tolerance. • Notably, inspiratory muscle training is effective in improving dyspnea, exercise tolerance, and in increasing inspiratory muscle strength and endurance in people with moderate to severe COPD.

Examples of Data Extraction form (Mota et al,. (2023)

Authorship (year)	Type of study	Sample	Groups	Intervention	Results		
					Increased inspiratory muscle strength and endurance	Improved exercise tolerance	Decreased dyspnea
Cutrim et al.[9] (2019)	Randomized clinical trial	Male: 17 Female: 5 Age: ±66 to 80 years	IMTG (11) CG (11)	Training time: 30min*/day Training frequency: 3×/week Total intervention time: 12 weeks Device used: Threshold Inspiratory Muscle Training; POWERbreathe Medic +Plus Load adopted: 30% of the initial MIP*. CG: control group who received no intervention and was evaluated before and after 12 weeks.	IMTG showed improvement in MIP after 12 weeks when compared with the control group. The MIP of the study participants before the intervention was ±62cmH_2O*; after the intervention, the MIP was ±84cmH_2O.	IMTG showed no significant improvement in exercise tolerance when compared with CG in the 6MWT.	IMTG did not show significant improvements in the reduction of dyspnea when compared with CG in the 6MWT.
Chuang et al.[10] (2017)	Randomized Clinical Study	Male: 36 Female: 19 Age: ≥66	IMTG (27) CG (28)	Training time: 21 to 30min/day, consisting of a IMT cycle of 2min and 1min of rest; and then seven repeated cycles. Training frequency: 5×/week Total intervention time: eight weeks. Device used: NS Load adopted: NS CG: only medical treatment and routine care were provided, without intervention.	IMTG showed significant improvement in MIP when compared with CG. The mean improvement in MIP in the IMT group was (−17.6±0.18cmH_2O), while in the CG it was (−2.21±0.4cmH_2O)	IMTG showed an increase in distance in the 6MWT of 47.8±1.46 meters, while CG showed an increase of 5.6±1.1 meters.	IMTG showed an increase in BDI, from 4.48±2.12 points to 9.0±2.27 points. Consequently, there was a reduction in dyspnea.

IMTG: inspiratory muscle training group; CG: Control group; IMT: inspiratory muscle training; MIP: maximal inspiratory pressure; MEP: maximal expiratory pressure PR: pulmonary rehabilitation; 6MWT: 6-minute walk test; mMRC: Modified Medical Research Council scale; BDI: baseline dyspnea index; EMT: expiratory muscle training

Non-Pharmacological Treatment for prevention AECOPD

Other Types of exercise/Physical activity

(1) Swinging arms (แกว่งแขน): was the type of exercise that most participants used

(2) Walking (การเดิน)

(3) Stretching limbs (ยืดเหยียดแขนขา)

(4) Push-ups (วิดพื้น)

(5) Hurling around (เหวี่ยงตัวไปมา)

(6) Spreading arms and tilting (กางแขนและก้มเงย)

(7) Lifting dumbbells (ยกดัมเบล)

(8) Jogging (การเดิน-วิ่งเหยาะๆเพื่อออกกำลังกาย)

(9) Chopping grass and shoveling tree soil (ตัดหญ้าและพรวนดินต้นไม้)



https://www.thaihealth.or.th



https://glebephysiotherapy.com.au/service/exercise-for-copd-including-emphysema-chronic-bronchitis-and-bronchiectasis/

(Chatreewatanakul et al., 2022)

Non-Pharmacological Treatment for prevention AECOPD

(2) Taking something as directed to prevent flare-ups

- Avoiding risk factors of AECOPD: the most participants used this method
- Nasal washing with normal saline
- Always drinking warm water
- Eating lemon slices soaked in honey



https://vegetarianmamma.com/honeyed-lemons/

(Chatreewatanakul et al., 2022)

Non-Pharmacological Treatment for prevention AECOPD

(3) Music therapy

Research	Result
The effects of music therapy on patients with chronic obstructive pulmonary disease: A systematic review and meta-analysis (Feng et al., 2025)	• 11 studies with 947 patients were included. • Music therapy provide benefits in the quality of life and exercise endurance in patients with COPD. • It could reduce depression by prolonging intervention duration. • However, its effect on dyspnea remains unclear. • Further high-quality RCTs are needed to investigate the effects of music therapy.

Data Extraction form (Feng et al., 2025)

Study	Country	Age in years (M ± SD)	Sample size (E/C)	Intervention measure		Duration of Intervention	Study Outcomes
				E	C		
Bauldoff, Hoffman, Zullo, and Sciurba (2002)	USA	40 ~ 85*	12/12	**passive music therapy: listening to music**	**routine care**	8 weeks	①c, ②e、g, ③l, ④m, ⑤p
				pace for 20 to 45 min, two to five times a week	pace for 20 to 45 min, two to five times a week		
Bonilha et al. (2009)	Brazil	E: 69.8 ± 7.4	15/15	**active music therapy: singing**	**execution of handcraft artwork**	24 weeks	①a, ②e
		C: 73.6 ± 7.5		weekly classes, an hour	weekly classes, an hour		
Ho et al. (2012)	Taiwan, China	E: 73.1 ± 11.2	20/21	**passive music therapy: listening to music**	**routine care**	16 weeks	①c, ②e, ⑤o
		C: 75.1 ± 9.6		walk at least 30 minutes a day, 5 days a week	at least 30 minutes of exercise each day, 5 times per week		
Lord et al. (2012)	London	E: 68.6 ± 10.7	13/11	**active music therapy: singing**	**watch the film**	8 weeks	②d, ③j, ④j, ⑤o
		C: 67.9 ± 8.8		twice weekly, each session lasted for one hour	once weekly, the workshop afterward for about an hour discussion		
Hua (2015)	China	E: 72.5 ± 7.38	28/28	**passive music therapy +walking training**	**walking training**	12 weeks	①b, ②i, ⑤p
		C: 70.46 ± 8.93		5 times/week, once a day, 30 min/time	5 times/week, once a day, 30 min/time		
Horuz, Kurcer, and Erdo an (2017)	Turkey	E: 71.6 ± 8.35	32/32	**passive music therapy: listening to music**	**routine care**	15 days	③k
		C: 69.1 ± 10.60		1 hour/day	/		
Liu et al. (2019)	China	E: 63.85 ± 4.25 C: 63.30 ± 5.49	28/28	**active music therapy: singing**	**routine health education**	24 weeks	②f, ④j
				once a week, 90 min/time	once a week		
Guo et al. (2020)	China	E: 58.10 ± 7.23	50/50	**active music therapy: singing**	**routine care**	48 weeks	②h, ④n
		C: 57.54 ± 7.33		2 times/day, 30 ~ 40 min/time	/		
XiaoJie (2021)	China	E: 66.96 ± 6.22	30/28	**active music therapy: singing**	**routine care**	12 weeks	①c, ②i, ⑤p
		C: 64.78 ± 7.26		1-2 times/week,45 ~ 60 min/time; Practice for 45 ~ 60 min daily	Remote follow-up/2 weeks, face-to-face follow-up and health lecture hall/4 weeks, 30 ~ 40 min/time		
Kaasgaard et al. (2022)	Denmark	E: 70.2 ± 8.8	108/87	**active music therapy: singing**	**physical exercise training**	10 weeks	①c, ②e, ③j, ④j, ⑤p
		C: 68.8 ± 8.0		twice weekly, 90 min/time	twice weekly, 90 min/time		
		C: 63. 22 ± 7.41		2 ~ 3 times/day, 10 ~ 15 min/time	2 ~ 3 times/day, 10 ~ 15 min/time		
Cai and Gu (2022)	China	E: 62.72 ± 7.47	150/150	**passive music therapy +breathing exercises**	**breathing exercises**	8 weeks	②d
		C: 63. 22 ± 7.41		2 ~ 3 times/day, 10 ~ 15 min/time	2 ~ 3 times/day, 10 ~ 15 min/time		

1. E: Music therapy group; C: Control group; M: Mean; SD: Standard deviation; * Age in years (range) 2. Outcome: ① dyspnea; ②quality of life; ③anxiety; ④depression; ⑤exercise endurance; 3. Scale: a. BDI, Basal Dyspnoea Index; b. mMRC, modified Medical Research Council; c. Borg, Borg dyspnea scale; d. SF-36, Short Form-36 health status score; e. SGRQ, Saint George Respiratory Questionnaire; f. CCQ, Clinical COPD Questionnaire; g. VAS, Visual Analogue Scale; h. GQOLI-74, Generic Quality of Life Inventory-74; i. CAT, COPD Assessment Test; j. HADS, Hospital Anxiety and Depression Score; k. BAI, Beck Anxiety Inventory; l. STAI, State-Trait Anxiety Inventory; m. CES-D, Center for Epidemiologic Studies Depression Questionnaire; n. HAMD, Hamilton; o. ISWT, Incremental Shuttle Walking Test; p. 6 MWD, 6-Minute Walking Dis.

Non-Pharmacological Treatment for prevention AECOPD

(4) Alternative medicines/Therapeutic alternatives

- Three methods of alternative medicines included:

  4.1) Herbs

  - Drinking boiled Lingzhi juice (ดื่มน้ำเห็ดหลินจือต้มช่วยเสริมสร้างภูมิต้านทานของร่างกาย ลดการอักเสบ)
  - Drinking some Thai brand of herb
  - Drinking *Andrographis Paniculata* boiled water for cold relief (ดื่มน้ำต้มฟ้าทะลายโจรเพื่อบรรเทาอาการหวัด)

  4.2) Practicing dharma (การปฏิบัติธรรม)

  4.3) Self-awareness meditation (raising hands to create a rhythm)

(Chatreewatanakul et al., 2022)



https://www.123rf.com/photo_99420073_ganoderma-lucidum-tea-with-ling-zhi-mushroom-.html



https://www.dreamstime.com/andrographis-paniculata-leaves-soak-hot-water-white-cup-to-drink-to-resist-corona-virus-andrographis-paniculata-image

Prevention AECOPD During Exacerbation

- **General 2 principles of AECOPD prevention**
  1. Pharmacological Treatment
  2. Non-Pharmacological Treatment



https://www.boehringer-ingelheim.com/human-health/products/berodual



https://inspirebreathingbetter.com/handheld-fans

Pharmacological Treatment

Pharmacological Treatment for prevention AECOPD

- The 3 classes of medications commonly used for COPD exacerbations are bronchodilators, glucocorticoids, and antibiotics (GOLD, 2026)

Pharmacologic	Preventive intervention
Bronchodilators	• Inhaled SABAs, with or without short acting anticholinergics, are the initial bronchodilators for acute treatment of a COPD exacerbation. • A systematic review of the route of delivery of SABAs found no significant differences in FEV1 between using pMDIs (with or without a spacer device) or nebulizers to deliver the agent.
Glucocorticoids	• Systemic corticosteroids are recommended for up to 5 days in patients with moderate/severe exacerbations.
Antibiotics	• Antibiotics should be given to patients with COPD who: 1) Have these at least two of these symptoms: increase in dyspnea, fever, sputum volume, and sputum purulence, if increased purulence of sputum is one of these symptoms 2) Prior positive sputum culture during prior exacerbation 3) Require mechanical ventilation (invasive or noninvasive)

Non-Pharmacological Treatment

Methods of Symptom Management

(During AECOPD State)

- **Nine methods included:**

(1) Sitting: Most participants use sitting to manage exacerbation.

(2) Taking something as directed for flare-ups: The methods were according to the signs and symptoms of previous experience of AECOPD.

Example: turn on a steam fan when weather was hot, pressing the Adam's apple, moving it, and coughing out sputum

(3) Reducing activity: reducing activity or stopping activity

Methods of Symptom Management

(During AECOPD State)

➢ Nine methods included:

(4) Deep breathing and effective cough

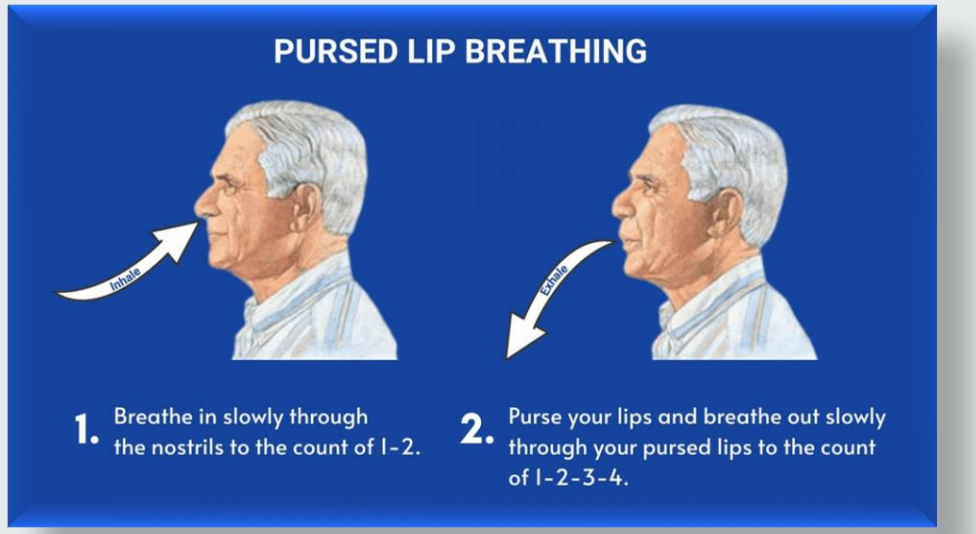
(5) Standing still (ยืนนิ่งๆ)

(6) Purse lip

(7) Sleeping

(8) Slow breathing

(9) Relaxing: Example: watching TV



https://thehomerehabnetwork.com/breathing-exercises-for-copd/

Conclusions

- การป้องกันอาการกำเริบในผู้ป่วย COPD ที่มีประสิทธิภาพ บุคลากรทางการแพทย์ควรมี แนวทางปฏิบัติแบบองค์รวม ครอบคลุมทั้งการรักษาด้วยยา การปรับเปลี่ยนพฤติกรรม และการจัดการอาการกำเริบเบื้องต้น สามารถป้องกันได้ทั้งในระยะสงบและในระยะกำเริบ พร้อมทั้งให้คำแนะนำเกี่ยวกับการตระหนักรู้ อาการกำเริบเบื้องต้น และการจัดการอาการกำเริบแก่ผู้ป่วยแต่ละรายโดยมีความแตกต่างกัน

"Prevention is better than cure"



https://ehealth.eletsonline.com/2016/08/preventive-cure-prevention-is-better-than-cure/

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