

Fatigue in COPD

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Definition COPD GOLD, 2016

- Chronic Obstructive Pulmonary Disease = common preventable and treatable disease that is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lungs to noxious particles or gasses.
- Exacerbations and comorbidities contribute to the overall severity in individual patients
- Symptoms:
 - Dyspnea
 - Chronic cough
 - Chronic sputum production

Fatigue is not listed

Is fatigue an issue in COPD?

- Research: hardly any studies fatigue in COPD
- Patients:
 - 50% report fatigue every day or at least some days per week
 - Describe as: 'general feeling of fatigue', 'drained of energy', 'invalidating', making dependent of others
 - Associated with: irritation, frustration, concentration problems'

Prevalence fatigue and relationship health status (Peters et al., 2011)

- 168 outpatients with stable moderate – severe COPD
- Assessment fatigue: Checklist Individual strength (Vercoulen et al., 1994)
 - Standardized questionnaire validated in many patient populations & healthy subjects.
 - Many translations
 - Subscale *Subjective Fatigue*: 8-items, 7-point Likert scale
 - Discriminates between ‘normal fatigue’, ‘mild fatigue’, ‘severe fatigue’
 - Minimal clinically important difference (MCID) > 10 points

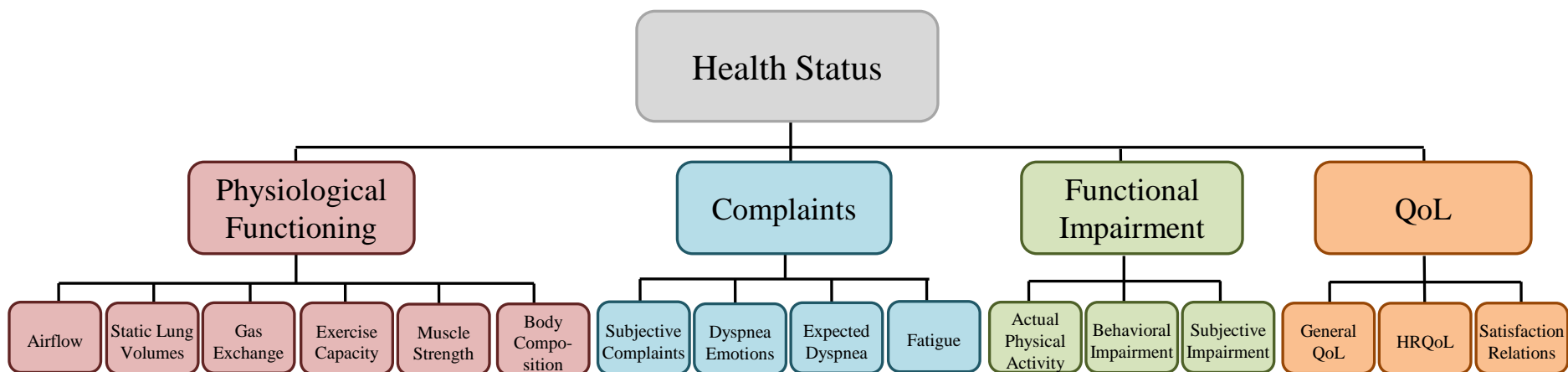
Prevalence fatigue in COPD

Peters et al., 2011

CIS- Subjective fatigue	N (%)
Normal fatigue	88 (52%)
Mild fatigue	39 (23%)
Severe fatigue	41 (25%)

Health Status assessment (including Fatigue)

- Physiological tests, battery of questionnaires
- Organized by a validated multi-dimensional assessment framework (Vercoulen et al., 2008, Peters et al., 2009)



Nijmegen Clinical Screening Instrument (NCSI)

Relationships Fatigue and other aspects of Health Status

Main domains HS Sub-domains	Fatigue
Physiological functioning	
Airflow	-
Static Lung volumes	-
Exercise capacity	0.30
Muscle strength	-
Body composition	-
Symptoms	
Dyspnea	.60
Dyspnea emotions	.34
Functional Impairment	
Subjective	.59
Behavioural	.46
Accelerometer (electronic)	-
Quality of Life	
General	.51
Health-Related	.55
Relationships	.37

Correlations printed $P < 0.01$
Peters et al., 2011

Effects standard treatment on fatigue

Standard treatment: medication, smoking-cessation, dietary advice.
Advice remain active

4-year longitudinal study on fatigue in COPD (Peters et al., 2011)
77 outpatients with moderate – severe COPD

Assessment	Severe Fatigue
Baseline	25%
After 4 years	42%

→ We need to do more than standard treatment!

Causes of fatigue

Physiological

- Few studies on fatigueability of breathing muscles → related to increasing exercise limitation
- Hardly any studies on subjective experience of fatigue
 - Most use fatigue as outcome in treatment studies
 - Not related to airflow limitation (Peters et al., 2011)

Psychological

- Anxiety & Depression
- Dyspnoea
- Treatment not specifically directed at fatigue

Causes of fatigue. What can we learn from clinical practice?

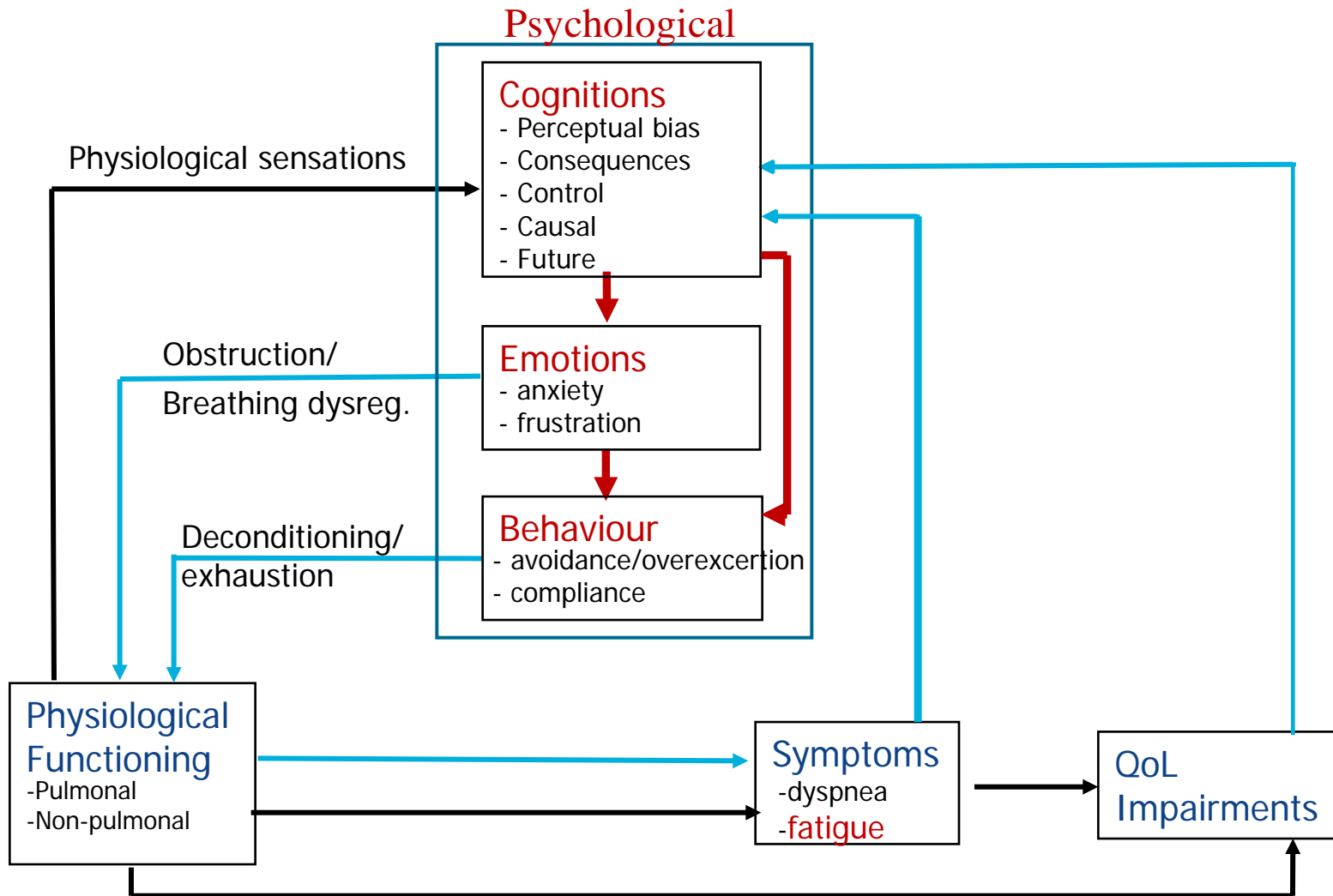
- Symptoms
- Functional impairments
- Problems quality of life (QoL)

... are poorly related to physiological processes, such as airflow limitation

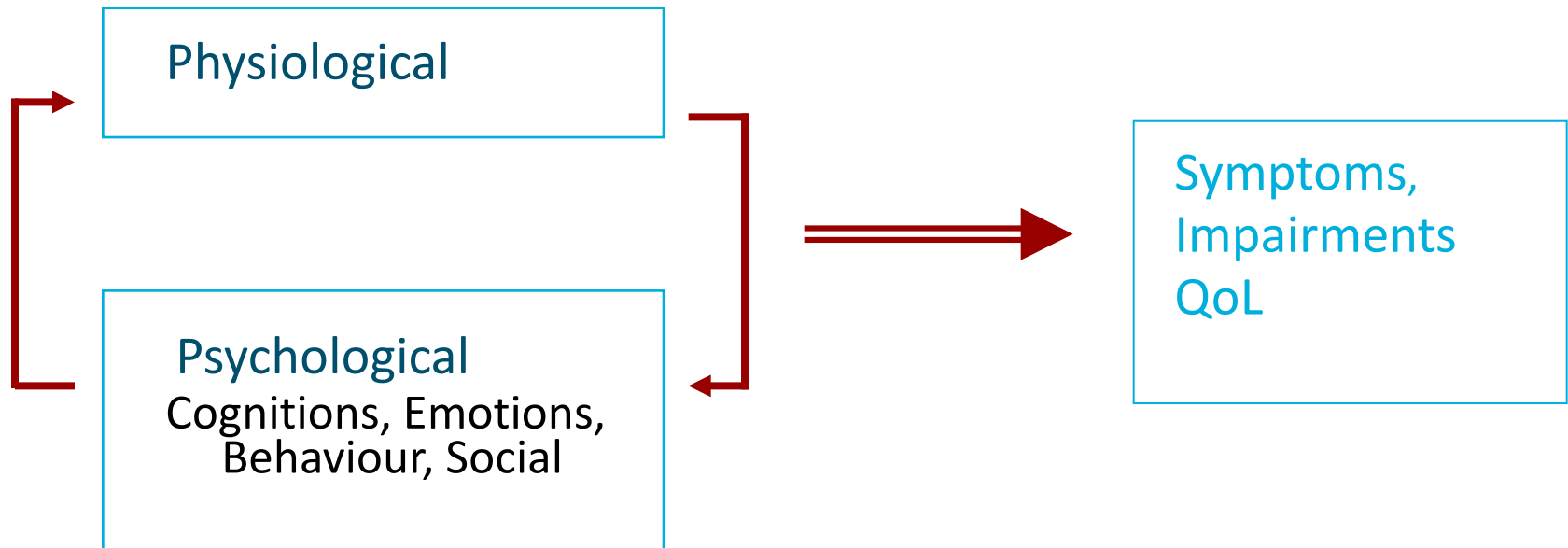
→ The 'missing link' = *psychological processes*

A simple model

Vercoulen et al., 2008



Symptoms: interaction physiology and psychology



This holds true for every patient! → normal human psychological processes, not psychiatric disorders.

Adaptation to the disease (self-management)

Chronic illness: normal life changes drastically and permanently

Patient faces the challenge to adapt to this new situation

- Symptoms (fatigue), Functional Impairment & QoL are resultant of the **cognitive, emotional and behavioural ADAPTATION** to the **PHYSIOLOGICAL DISORDERS**
- **Behaviour change is required**

Main intervention strategies

- Fatigue is the result of a complex interaction between many physiological and psychological processes
- Treatment strategies:
 1. Optimizing physiological disorder
 2. Optimizing adaptation to the physiological disorder (by teaching self-management)

Pulmonary rehabilitation

Pulmonary rehabilitation program Radboudumc, location Dekkerswald

- 10-week program
- Inpatient setting (Monday to Friday)
- Inter-disciplinary (*pulmonologist, psychologist, physiotherapist, nurse, psychomotor therapist, dietician, social worker, art therapist*)
- Treatment is tailored to the individual patient, based on a thorough assessment of health status and adaptation to the disease (3 days)
 - Physiological tests, questionnaires, accelerometer
 - Interviews with seven disciplines

Treatment of fatigue: physical

Goals:

- Increasing exercise capacity,
- slowing down decline airflow limitation
- decreasing number of exacerbations

All these 'physical' goals require ***behaviour change*** by the patient!

Means:

- Physical training: increasing cardiovascular fitness, muscle strength
- Medication
- Avoidance of noxious particles and gasses
- Exacerbation management
- Life style:
 - smoking cessation
 - healthy nutrition
 - regular exercise

Treatment of fatigue: psychological

Goals:

- Improving self-management
- Means: principles of cognitive behavioural therapy (in part Chronic Fatigue Syndrome treatment protocol)
 - Behaviour change to enable physical goals previous slide
 - Anxiety & depression
 - Reducing stress
 - Grieving process
 - Energy saving techniques
 - etc

Treatment of fatigue behavioural/psychological

example

- **Over-exercisers: Adequate energy saving strategies:**
 - Day structure: sleep/wake, meals
 - Slowing down pace
 - Spreading activities over the day/week
 - Identifying bodily signals
 - Performance activities guided by these signals (e.g. brief rest, pacing)
 - Learning to ask for help
- **Avoiders: reactivation**
 - Reducing fear for dyspnea (or even fatigue)
 - breathing regulation techniques

Inter-disciplinary approach

Avoiders: some examples

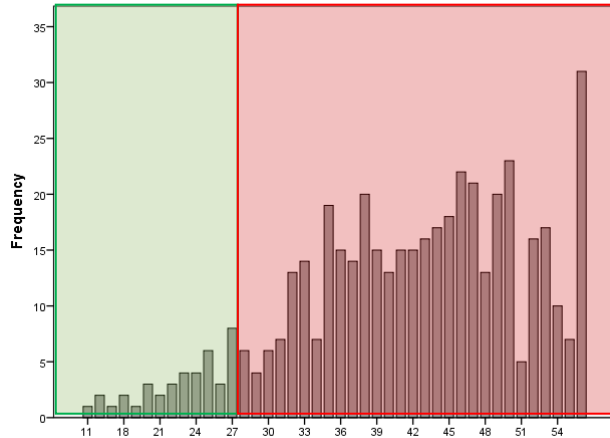
- Psychologist:
 - analyses causes of avoidance (cognitive, emotional, behavioural, social)
 - stimulate experimenting in settings of other disciplines
- Physiotherapist / psychomotor therapist
 - actual practice with new behaviours (breathing techniques, energy saving strategies)
 - → experience benefits of new behaviours and change dysfunctional cognitions
- Nurse:
 - Practicing daily activities (taking a shower, chores, etc.)

Effect pulmonary rehabilitation on fatigue

Patient characteristics

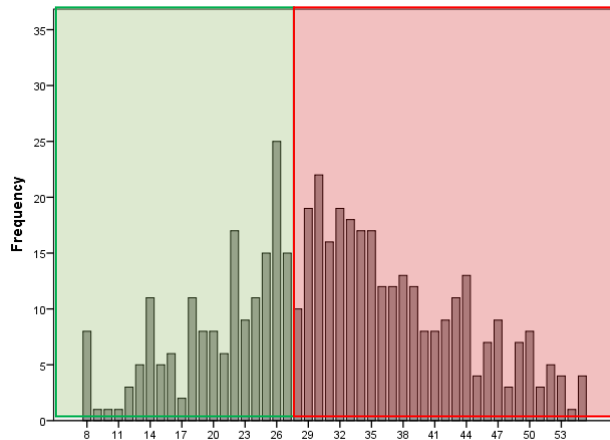
- 459 patients with COPD
- 54% male
- 60.5 ± 8.8 years
- GOLD-classification (severity airflow limitation → FEV₁%pred.)
 - Stage 1: 4% (mild)
 - Stage 2: 22% (moderate)
 - Stage 3: 47% (severe)
 - Stage 4: 27% (very severe)

Prevalence of Fatigue pre and post rehabilitation



Before rehabilitation :

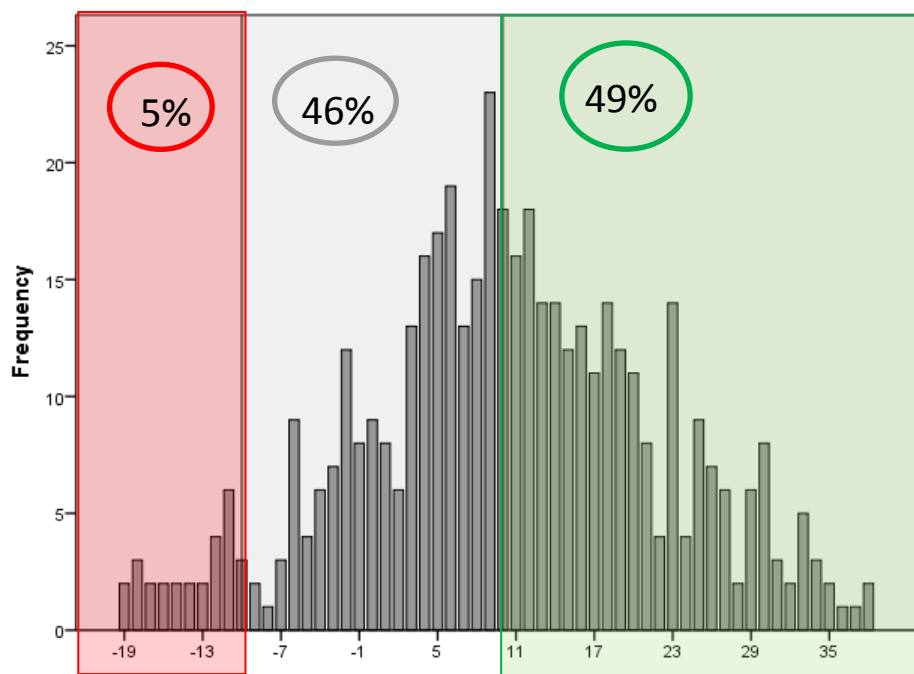
- 7% normal fatigue
- 93% abnormal fatigue



After rehabilitation:

- 33% normal fatigue
- 67% abnormal fatigue,
but reduced severity

MCID pre- and post rehabilitation



- 49% of the patients showed a MCID improvement (≥ 10 points)
- Effect-size (Cohen's d)= 1.03 'large effect'

Correlations between change fatigue and change health status

Main domain	Sub domain	Δ _fatigue by Δ _sub-domain
Physiological Functioning	Airflow	- 0.03
	Body Composition	- 0.14
	Static Lung Volumes	0.01
Symptoms	Dyspnea	0.37**
	Dyspnea Emotions	0.23**
Functional Impairment	Behavioural Impairment	0.13**
	Subjective Impairment	0.30**
Quality of Life	General QoL	0.30**
	HRQoL	0.43**
	Satisfaction Relations	0.14*

Conclusion

- Fatigue is a major, but neglected problem in COPD.
- Fatigue is result of complex interactions physiological and psychological processes
- Inter-disciplinary rehabilitation has a strong beneficial effect on fatigue in COPD patients (even severe and very severe)
- 2017 multi-center study: Investigate physical, systemic, behavioural, psychological factors underlying fatigue in COPD (Spruit, Vercoulen, Sprangers, Wouters, grant Dutch Lung Foundation)
 - CIRO/Maastricht University Medical Center
 - Radboud University Medical Center
 - Amsterdam Medical Center