All measures were conducted in the hospital by same trained researcher in each follow up visits.

Nutritional screening

Nutritional screening was undertaken on admission using the validated screening tool as recommended by the clinical guidelines for hospital nutrition at Landspitali [1-3] and was validated against a full nutritional assessment (weight, height, BMI, serum albumin, pre-albumin, total lymphocyte count, triceps skinfold thickness, mid-arm muscle circumference or area, and information on unintentional weight loss) in COPD patients. [2 3] A total score of ≥4 is considered 'at nutritional risk'.

Weight and body composition

Weight measurements were conducted during hospitalisation (baseline) and in four follow ups visits (3, 6, 9 and 12 months after discharge) using the same device. A portable, multi- frequency (20kHz, 100kHz) bioelectrical impedance analysis (BIA) device (InBody230 Co., Ltd. Korea) was used to measure weight and other variables for body composition e.g. fat mass, fat free mass and muscle mass. The method has previously been validated in stable COPD patients. [4] Patients were asked to wear light clothes and measurement was performed prior to other functional measures. If patients were not able to stand on BIA, a chair weight was used to measure weight. In cases when there was lost to follow up, information on weight was collected from electronic medical records SAGA (TM software 3.1.39.9) when possible.

Quality of life

Quality of life was measured during hospitalisation (baseline) and in two follow ups visits (3 and 12 months after discharge). For assessment of quality of life the validated St George's Respiratory Questionnaire (SGRQ) was used. [5] The questionnaire is based on 76 items used to calculate three component scores: symptoms, activity and impacts, and a total score which summarises the overall impact on health status. Scores of 100 represents worst possible health status and 0 indicates best possible health status. Change of 4 points in SGRQ total score is considered a minimum clinically relevant difference. [6] Therefore, health status was classified into 3 groups based on difference between total score at baseline and total score in 3 and 12 months follow up. Improvement: ≥ 4 points decrease in SGQR total score, worsening: ≥4 point increase in SGQR total score and stable: <4 point change in SGQR total score.

Lung function

Forced expiratory volume in one second (FEV_1) and forced vital capacity (FVC) were measured by spirometry (Jaeger MS-PFT®, Care Fusion, San Diego, USA). [7]

Energy and protein intake

Total energy- and protein intake during hospital stay was estimated using a validated plate diagram sheet [8 9] for three days, starting on the first day of participation in the study and after intervention had started. After each meal, the proportion of the meal consumed by the subjects (0%, 25%, 50% or 100%) was recorded. The plate diagram sheet has special guidelines on how to record each meal. Other snacks such as sweets, biscuits and yogurt and beverages such as coffee, soft drinks and milk consumed were also recorded as well as intake from the two interventions, ONS and Snacks. Data collected were analyzed using Aivo2000 for Windows, version 1.12.0.1 (AIVO, AB, Stockholm, 2012). Nutrition data in the program is based on the Icelandic nutrient composition database (ISGEM). Nutritional content of ONS was obtained from the package label.

Compliance and total energy- and protein intake at home was assessed using the 24-hour recall method, [10] two and four weeks after hospital discharge and analysed using the ICEFOOD nutritional analysis program. [11] With regard to compliance, consuming less than one ONS or Snack per day was categorised as poor compliance, two to three ONS or snacks was adequate and four ONS or Snacks was considered good compliance.

Functional capacity

Measure of functional performance was conducted using several tests according to protocol and have all been validated in COPD patients: 6MWD, [12] TUG, [13] 30sec chair stand [14] and HGS [15] measured by a handheld dynamometer (Jamar® Sammons Preston Rolyan, Boilingbrook, IL, USA).

1. Friðriksdóttir AJ, & Möller, P. H. . Clinical guidelines on patients nutrition: Landspítali; 2011 [cited 2012 19. September 2012]. Available from: http://www.landspitali.is/lisalib/getfile.aspx?itemid=28242.
2. Ingadottir AR, Beck AM, Baldwin C, et al. Two components of the new ESPEN diagnostic criteria for malnutrition are independent predictors of lung function in hospitalized patients with chronic obstructive pulmonary disease (COPD). *Clinical Nutrition* doi: https://doi.org/10.1016/j.clnu.2017.05.031
3. Thorsdottir I, Gunnarsdottir I, Eriksen B. Screening method evaluated by nutritional status measurements can be used to detect malnourishment in chronic obstructive pulmonary disease. *Journal of the American Dietetic Association* 2001;101(6):648-54. doi: 10.1016/S0002-8223(01)00163-8
4. Schols AM, Broekhuizen R, Weling-Scheepers CA, et al. Body composition and mortality in chronic obstructive pulmonary disease. *Am J Clin Nutr* 2005;82(1):53-9.
5. Jones PW, Quirk FH, Baveystock CM, et al. A self-complete measure of health status for chronic airflow limitation. The St. George's Respiratory Questionnaire. *Am Rev Respir Dis* 1992;145(6):1321-7. doi: 10.1164/ajrccm/145.6.1321
6. Jones PW. Interpreting thresholds for a clinically significant change in health status in asthma and COPD. *Eur Respir J* 2002;19(3):398-404.
7. Vogelmeier CF, Criner GJ, Martinez FJ, et al. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Lung Disease 2017 Report. *Arch Bronconeumol* 2017 doi: 10.1016/j.arbres.2017.02.001
8. Bjornsdottir R, Oskarsdottir ES, Thordardottir FR, et al. Validation of a plate diagram sheet for estimation of energy and protein intake in hospitalized patients. *Clin Nutr* 2013;32(5):746-51. doi: 10.1016/j.clnu.2012.12.007
9. Vilhjalmsdottir DO, Hinriksdottir HH, Pordardottir FR, et al. [Energy and protein intake of patients at the Department of Cardiothoracic surgery, Landspitali - the National University Hospital of Iceland]. *Laeknabladid* 2013;99(2):71-5.
10. Salvador Castell G, Serra-Majem L, Ribas-Barba L. What and how much do we eat? 24-hour dietary recall method. *Nutr Hosp* 2015;31 Suppl 3:46-8. doi: 10.3305/nh.2015.31.sup3.8750
11. Thorgeirsdottir H, Valgeirsdottir H, Gunnarsdottir I, et al. Hvað borða Íslendingar? Könnun á mataræði Íslendinga 2010-2011. Helstu niðurstöður.: Embætti Landlæknis, Matvælastofnun and Rannsóknastofa í næringarfræði, 2011.
12. Singh SJ, Puhan MA, Andrianopoulos V, et al. An official systematic review of the European Respiratory Society/American Thoracic Society: measurement properties of field walking tests in chronic respiratory disease. *Eur Respir J* 2014;44(6):1447-78. doi: 10.1183/09031936.00150414
13. Mesquita R, Wilke S, Smid DE, et al. Measurement properties of the Timed Up & Go test in patients with COPD. *Chron Respir Dis* 2016 doi: 10.1177/1479972316647178
14. Kato D, Fueki M, Endo Y, et al. 30-second chair-stand test is a valuable evaluation in chronic respiratory diseases. *European Respiratory Journal* 2014;44(Suppl 58)
15. Puhan MA, Siebeling L, Zoller M, et al. Simple functional performance tests and mortality in COPD. *Eur Respir J* 2013;42(4):956-63. doi: 10.1183/09031936.00131612