

Special Article

## Nursing Care Based on Health Promotion Model in Patients with Overlap Syndrome within the Scope of Pulmonary Rehabilitation: Case Report

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### Abstract

The aim of this case report is to show the effects of nursing care implemented according to the Health Promotion Model in a patient with Overlap Syndrome. In this patient with Chronic Obstructive Pulmonary Disease, Asthma and Obstructive Sleep Apnea Syndrome; guiding nursing practices implemented with the Health Promotion Model helped to increase the weight control, physical activity and functional capacity of the patient. The use of HPM in pulmonary rehabilitation programs to be applied to patients with overlap syndrome may be a useful approach.

**Keywords:** Health Promotion Model, Overlap Syndrome, Nursing Care, Case Report

### Introduction

The concept of Overlap Syndrome (OVS) in the pulmonary system is used in the presence of at least two diseases such as Chronic Obstructive Pulmonary Disease (COPD), Asthma and Interstitial Pulmonary Fibrosis and Obstructive Sleep Apnea Syndrome (OSAS) (Saraç & Afşar, 2017). COPD is a common, preventable disease characterized by airflow limitation, often caused by exposure to hazardous particles or gases, and is currently the fourth leading cause of death in the world as well (GOLD, 2019). OSAS is a syndrome characterized by increased respiratory effort and frequent sleep divisions due to full or partial temporary and repeated blockage of upper airways during sleep (Intepe, Yildirim & Ciftci, 2018). Asthma, it is a chronic inflammatory disease of the airways, in which various cellular and cellular elements play a role (Intepe, Yildirim & Ciftçi, 2018). Morbidity and mortality rates in OVS are significantly higher than the presence of diseases such as COPD, OSAS and asthma alone (Intepe, Yildirim & Ciftci).

The presence of cardiovascular diseases in OVS is essential. It is believed that individuals with both COPD and OSAS are at higher risk of cardiovascular disease (CVD) due to synergistic pathogenic effects such as oxidative stress, systemic inflammation, vascular endothelial dysfunction and accelerated atherosclerosis (Kendzerska et al., 2018). It is well known that in cardiovascular related comorbidities, approximately 50% of deaths in COPD patients are due to cardiovascular events. CVD and COPD share various risk factors such as hypertension, sedentarism, smoking and malnutrition (Brassington, Selemidis, Bozinovski & Vlahos, 2019). Obesity due to sedentarism and malnutrition pose risk factor for CVD and COPD, also it is one of the major risk factors for both OSAS and asthma as well. There are also findings that there is an increasingly strong relationship between COPD and obesity (Liu et al., 2015; Turgut & In, 2018). OSAS whose frequency increases gradually in conjunction with the epidemic of obesity in western societies is the most common sleep disorder. Obesity in asthmatic

patients leads to more respiratory symptoms, more frequent and severe inflammations, reduced response to asthma medications and greater impairment in life quality (Turgut & In, 2018). Obesity was found to be positively correlated with increased mortality in early COPD (Stage 1 and 2) (Turgut & In, 2018). While increased exertional dyspnoea decreases physical activity in individuals with COPD, corticosteroids used in these patients increase weight gain. In situations where coexistence of OSAS and COPD plays an important role in etiology of obesity, there is a higher risk of developing respiratory failure, pulmonary hypertension and cor pulmonale by comparison in patients with COPD alone (Turgut & In, 2018). Therefore, in order to improve respiratory conditions, more importance should be given to exercise and nutrition, personalized arrangements should be made in these patients as well (Liu et al., 2015; Robinson, Shimada, Quigley & Moy, 2019). Educational activities about COPD patients belong to nurses who have an educational role in physical activity and healthy nutrition are unfortunately ordinary. It is suggested that nurses be planned and formally included in the implementation process of health promotion programmes for these patients (Dobrowolska et al., 2014). In order to increase patient compliance, usage of individual models is needed for a strong healthcare team-patient relationship and health behaviour change. It is important to use nursing models in this field which enables nurses to be scientific and realistic about a behaviour, and in this context, one of the scientifically proven models is the Health Promotion Model (HPM) (Uysal, 2014).

**Health Promotion Model:** HPM, developed by Pender (1982-1984), aims to improve health condition and health behaviours by focusing on cognitive factors. According to HPM, it is important in introducing a new behaviour to know what meanings the individual attributes to own health, in what aspects he/she sees his/her health behaviours positively and negatively and how he/she manages them (Uysal, 2014). HPM was revised in 1996 by Pender et al. and renewed based on changing theoretical perspectives. According to revised model, health-promoting behaviour affected by “individual characteristics and experiences” and “behaviour-specific cognitions and effects” and emerges as a “behavioral outcome”. According to the model, demographic and social factors can also affect health (Pender, 2011).

**Figure 1.** Health Promotion Model (Bahar & Açıl, 2014; Pender, 2011; Şişman, 2017)

### Case Report

HS is 58 years old, secondary school graduate, married and has two children. He works as a worker in forest enterprises, both of his children study at the university and he lives on the second floor in his own apartment which has no elevator. HŞ has been living with asthma for about 40 years, COPD for 15 years, and using BiBAP device for 7 years due to OSAS. He underwent two inguinal hernia operations; from right side fifteen years ago, and from left side three months ago, and he still has an umbilical hernia. General surgery specialist stated that HŞ could undergo umbilical hernia operation if he lost 15 kg. HŞ has calcification and meniscus ruptures in both knees and he has also grade 2 gonarthrosis. About 4 years ago, he was told that knee replacement surgery was necessary, but his surgery was delayed because he was young. Due to knee pain and dyspnea, he cannot walk long distance (max: 300 meters). He stated that the primary obstacle in the limitation of his activities is dyspnea. He applied to the Chest Diseases Service because he had intense dyspnea 2 weeks before contacting Cardiopulmonary Rehabilitation Unit and was hospitalized with the diagnosis of pneumonia. After being treated for 2 weeks, he was consulted to the Cardiopulmonary Rehabilitation Unit for both weight-loss and pulmonary rehabilitation. On the day he was discharged, HŞ was directed to the unit to get an idea about the treatment that he will receive. When HŞ came to unit, his statement was “they have directed me to here but what will be my benefit, I can’t use these implements, I have both difficulties in breathing and knee pain”. He said that he couldn’t commute to unit daily as an outpatient. He also expressed his anxiety about his inpatient treatment by saying “I don’t know what they say from the workplace”. When HS came to the unit, he appeared as well-groomed and short-haired, also his beard looked like shaven few weeks ago. As soon as HŞ came to the unit, he chose to sit down and take a breath and then to introduce himself. HŞ was 164 cm tall and weighed 95.6 kg (BMI: 35.67/Obese), his body fat percentage was 41.4% with a hip circumference of 103 cm and also the most recent pulmonary function test results before hospitalization was measured as FVC=90, FEV1=80 and FEV1/FVC=71.55. When the last laboratory findings of HŞ were examined, it was seen that Fasting Blood Sugar=100 ng/dL, Insulin=29.3

ng/dL (HOMA-IR=7.2/Insulin Resistance), triglyceride=126 ng/dL, total cholesterol=158 ng/dL, LDL=109 ng/dL, HDL=45 ng/dL, T4=1,15 ng/dL and TSH=0.63 ng/dL. HŞ stated that he used his medicines regularly.

**Care Plan Based on Health Promotion Model:** HS's OVS, dyspnea on exertion, obese and physically inactive, made us think of problems related to adequate-weight loss and adequate physical activity among healthy lifestyle behaviors. Informed consent forms were obtained from both HŞ and spouse for the case study before data collection.

### Data Collection and Diagnosis Based on Health Promotion Model

**Individual Characteristics and Experiences:** HŞ, 58 years old, enters the obese group with a mass index of 35.67 and has abdominal obesity with a 126 cm waist circumference. He has insulin resistance with HOMA-IR value (7.2). His functional capacity is low since he cannot walk a long distance due to dyspnea. The fact that results of the Six-Minute Walk Test were 300 meters is an indication of this. He felt a need to rest for 20 seconds once during Six-Minute Walk Test. HŞ who appeared as well-groomed is also secondary school graduate, eager to learn and self-expressive as well.

**Prior Related Behaviour:** HŞ stated that he did not exercise and diet regularly; his appetite was always good; he had a carbohydrate-weighted nutrition; he was more active and slimmer before his trouble increased but he gained weight because he lived more sedentary when COPD related dyspnea and knee pain increased. HŞ thought that the drugs he has taken also contributed to weight gain and when he was told that he should lose weight for umbilical hernia surgery 3 months ago, he also stated that he received a diet list from the dietician, and then lost 2 kg in 3 months. According to health history, it was determined that the wife of HŞ was overweight in the health history, and her son who was 23 years old at the same time decreased from 118 kg to 87 kg by diet and exercise.

### Behaviour-Specific Cognitions and Effects:

**Perceived Benefits of the Action:** HŞ stated that he thought that he could lose weight with exercise and that his son succeeded by doing so. He also applied to the dietician and lost some weight, even if less than expected.

**Perceived Barriers of the Action:** He emphasized that having dyspnea and knee pain when he went out for a walk is a real obstacle for him. He believes that he cannot lose much weight without doing advanced intensive exercises. However, it is an imaginary obstacle for him to believe that there are no alternative types of exercise and to think that he will not be able to exercise at all. He was concerned that he may have problems with the workplace if he is hospitalized at the Cardiopulmonary Rehabilitation Unit.

**Perceived Self-Efficacy:** HŞ has insufficient belief on his own exercising capability. He clearly stated his belief about that he cannot do exercise. He thought that participating in the program as a hospital patient rather than as an outpatient would cause more weight-loss showed that his own self-diet management was inadequate.

**Activity-Related Affect:** HŞ stated that if he does not feel uncomfortable, he likes all kinds of physical activities and stated that if he can be active and lose weight, he will be very happy.

**Interpersonal Influences:** HŞ stated that his wife and children supported him to lose weight, but that only his son was successful with dieting and exercising but the other child and his wife did not pay attention to what they eat in the meantime.

**Situational Influences:** He stated that the environment in which he wants to be physically active for pleasure is nature and that he loves outdoor and natural environments.

**Diagnosis:** In line with collected data, nursing diagnosis involving Activity Intolerance (code: 00092), Ineffective Activity Planning (code: 00199), Obesity (code: 00232), Sedentary Lifestyle (code: 00168), and Lack of Information (code: 00126) were made to HS in order of their priorities, so the plans were implemented based on the model in this direction (Herdman & Kamitsuru, 2014).

**Planning-Intervention:** It has been decided by the rehabilitation team that HŞ primarily needs cardiopulmonary rehabilitation in order to prevent the development of secondary complications due to the need to increase in the quality of life and the diseases he has. It is stated that to help HŞ decide at the beginning of the program, he can lose weight, do appropriate exercises for himself and increase his functional capacity. In order to reduce his anxiety about the workplace, the necessity of the program was discussed with HŞ's workplace and needed support was received from his managers. Within the scope of healthy lifestyle behaviours, it is targeted to ensure that his diet is

adequate and balanced, to lose weight by gaining enough physical activity habits, and to increase his life quality by increasing its functional capacity. In this context, training and counselling based on the Health Promotion Model for nutrition, physical activity and managing methods were given to HS by the cardiopulmonary rehabilitation nurse for six weeks. HS was admitted to the hospital for the cardiopulmonary rehabilitation program and from the moment he was admitted, his existing positive thoughts were supported in terms of **perceived benefits**. Additionally, possible gains associating with weight loss aimed at exercising with his diseases have been explained to HŞ in detail and comprehensively. In this context, it was emphasized that his effort dyspnea will relent and both of sleep apnea and asthma inflammations may decrease if the functional capacity increases with weight-loss. HŞ was also informed about the harmfulness of physical inactivity and obesity. The functional capacity of the HŞ for the **perceived barriers** has been evaluated and within the capacity, information has been given about the planned exercise program considering his medical history. It was reported that a specific exercise program was organized considering the dyspnea and knee pain which are the obstacles that HŞ perceives. In this exercise program, it was emphasized that the upper arm ergometer and pulmonary exercises to strengthen the accessory respiratory muscles and the vertical condition bike is preferred because it can balance increased oxygen demand through exercise and strengthen the knee muscles.

It was interviewed with a dietitian HS's weight management and was promoted by following his diet while he was staying in the hospital. In order to increase **self-efficacy**, the weight success achieved during each session in course of both exercise and weekly monitoring were supported and he was encouraged about his activities. In terms of **activity-related affect**, his feelings about his own diet and exercise were discussed in weekly periods. Interviews were conducted with the patient in a double patient room. In each meeting the facts about how he feels, compliance with diet and activity, and his perceptions on this issue yet from the previous meeting are questioned in detail. Daily rest and activity times were determined in order to prevent HŞ from feeling fatigue due to activity and this plan has been followed throughout the program. During each exercise, continuous heart rate and SpO<sub>2</sub> were monitored to ensure that HS does not exceed the

anaerobic threshold, and peak heart rate was determined according to age and risk profile and exercise workload were determined according to SpO<sub>2</sub> interval. In order to perceive the **interpersonal influences** positively, his wife and son were interviewed, they were provided with the necessary information, they were informed about that they could support the case and that they could be included as a family. HŞ was also supported by all healthcare team and other patients in physical activity and weight management. For **situational influences**, music was used to increase the motivation of the HŞ during exercise and the sessions were planned simultaneously with the patient groups that he enjoyed chatting with. Functional capacity, body fat analysis, weight, and blood tests were re-evaluated after 30 sessions for the planning of discharge. Both information and information booklet about daily physical activities that he can do with his wife, points to be aware of, diet, control times, urgent needs that may arise and what to do in this case (such as starving, diseases of flu, cold, etc. that require a break in the activity period or travel times) were provided. HŞ was provided to make plans for the desired behaviour (Figure 2, 3)

### Evaluation

HS continued the program for 6 weeks without having any problems. Having less dyspnea and knee pain during walking after the activity program, losing more weight than previously lost weight increased his perceived benefits and reduced his perceived obstacles. 6 minutes walking distance of HŞ has increased from 300 meters to 420 meters. According to the repeated body analysis, a total of 9.3 kg weight- and 6.1 kg fat-loss (Fat mass-FM) so an increase within lean body mass (fat free mass-FFM) were detected. HOMA-IR value decreased from 7.2 which was at the beginning of the program to the value of 2.4. HŞ stated that he paid attention to his diet on the weekends when he was on leave of absence and that he went for walks without interrupting the program (He took time offs on weekends corresponding to 2 weeks and 4 weeks from the beginning of the program). Increase in exercise capacity, ability to do this without problems and losing weight regularly while the program continued, increased the self-effectiveness of HŞ in physical activity and weight loss. He continued to the program conformably and willingly, also expressed that he enjoyed the exercise and the environment. During the program, he was constantly supported by both of his wife and son

who came to visit and then, his overweight wife stated that he wanted to join the program later. He stated that he will keep walking after the end of the program and asked for consultancy to buy an exercise bike. A plan was made with HŞ for controlling after one month and he aimed to give another 5 kg over this period. HŞ complied with the planned control time. He stated that he continued his walks after discharge, found a bike

suitable for him on the internet and asked whether this bike was suitable (in terms of resistance levels) for himself. He lost 2 kg more within a month. HŞ stated that he continued his diet, but he only had soup for lunch because he found the meal oily at work. It was reminded to HŞ that he should pay attention to protein-carbohydrate balance and as weight-loss exceeds 10 kg, he was re-directed to the dietitian (Figure 2, 3).

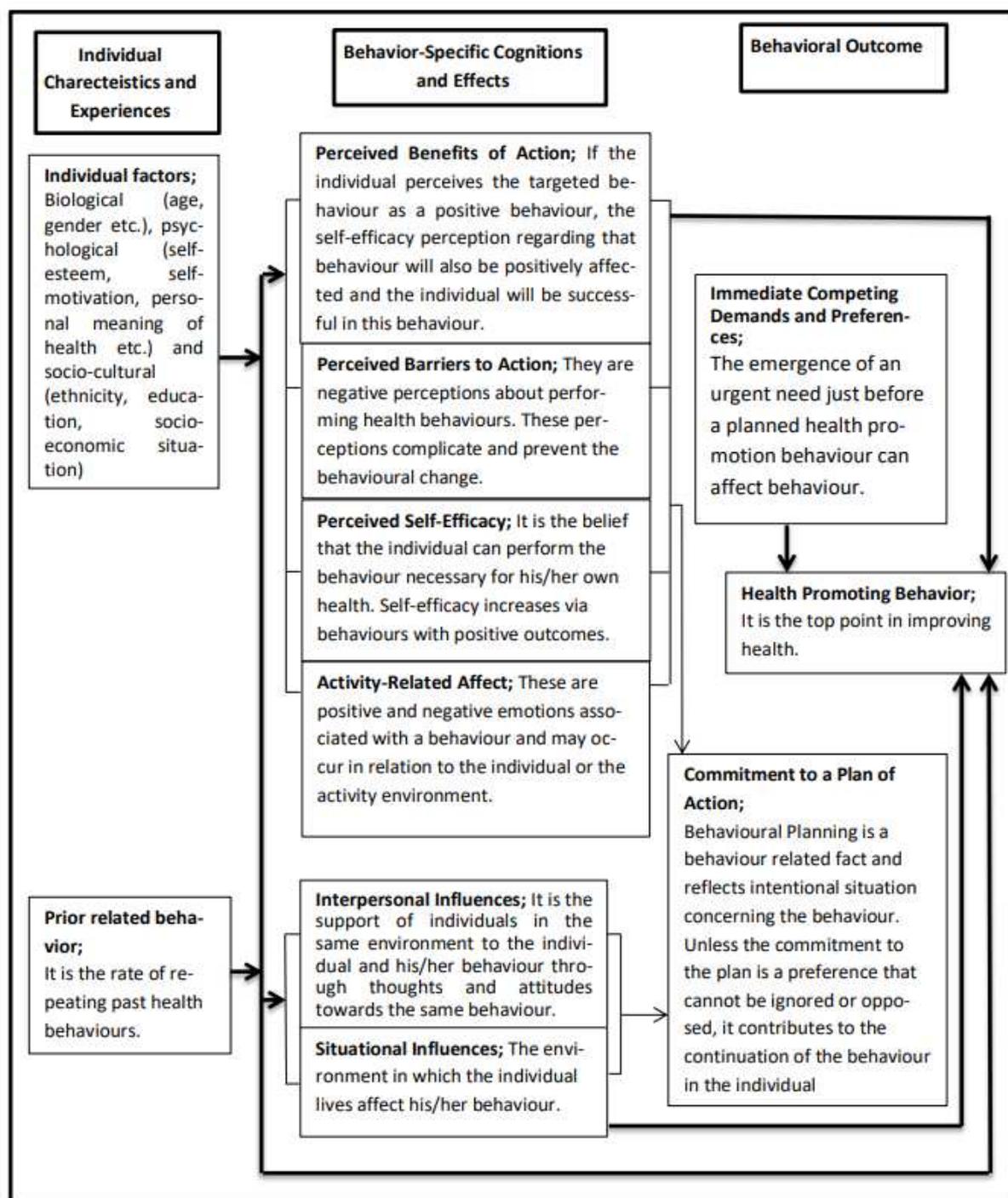


Figure 1. Health Promotion Model (Bahar & Açıl, 2014; Pender, 2011; Şişman, 2017)

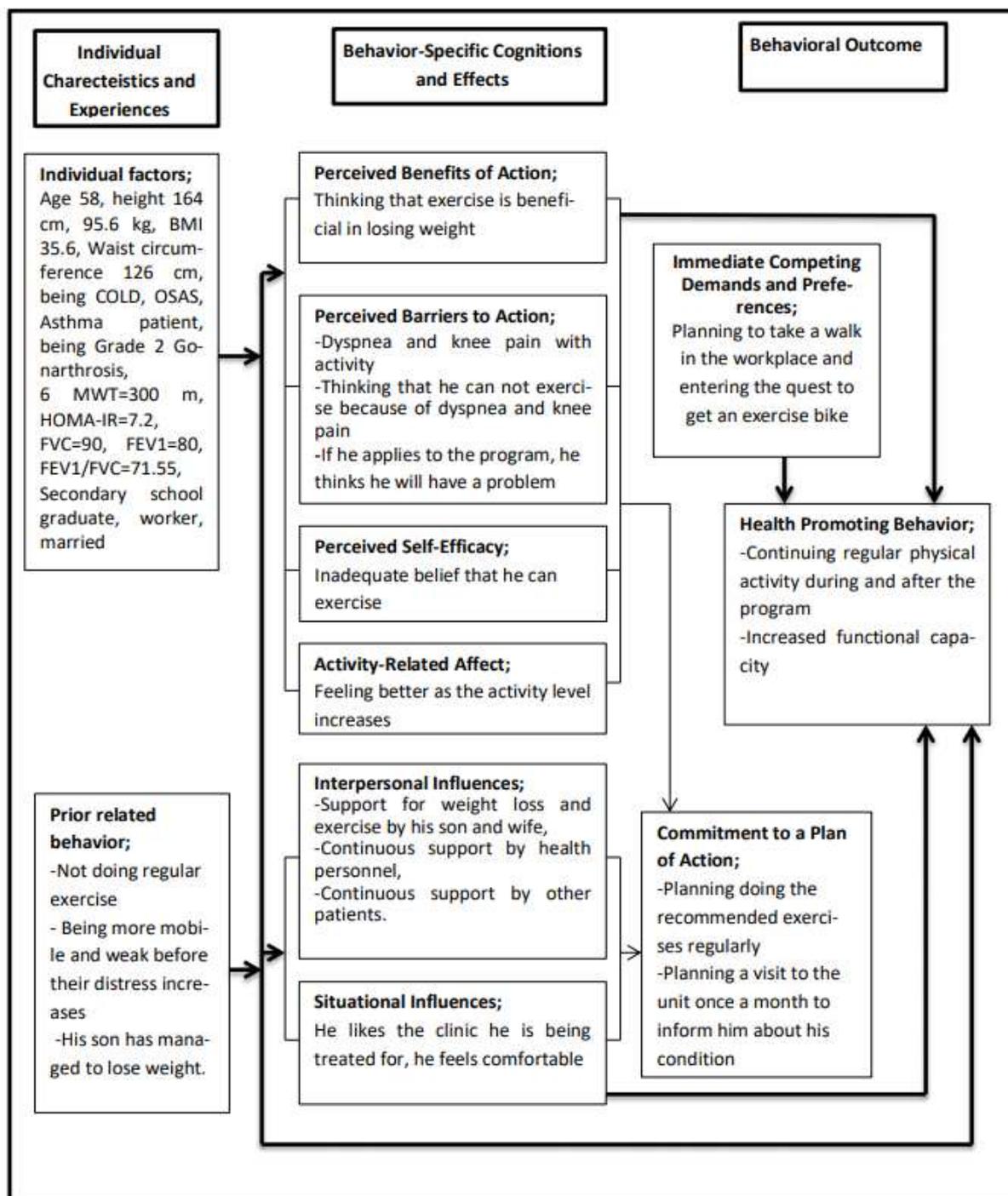
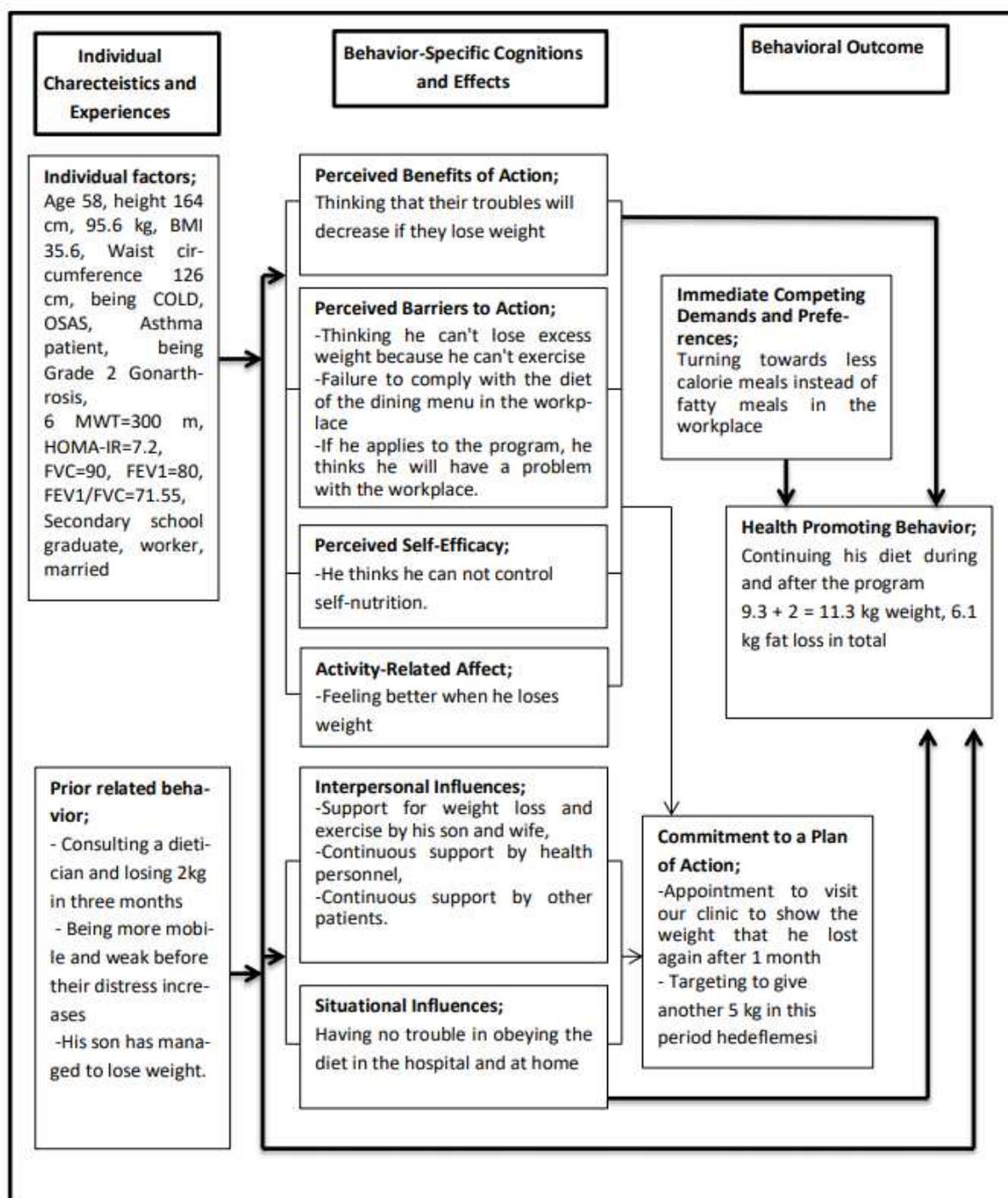


Figure 2. Physical activity behavior plan prepared for HŞ in line with the Health Promotion Model



**Figure 3.** Healthy nutrition behaviour plan prepared for HŞ in line with the Health Promotion Model

### Discussion and Conclusion

Pulmonary rehabilitation programs are specifically aimed at improving the ability of COPD patients to self-manage their exercise tolerance and daily living activities. However, despite its proven benefits, there is still a significant lack of understanding of pulmonary rehabilitation being carried out with a

multidisciplinary team apart from specialization. In the multidisciplinary pulmonary rehabilitation team, especially nurses have an indispensable role (Karagozoglu, Donmez, Ozden & Tel, 2013). One of the most important responsibilities of the nurse in pulmonary rehabilitation is to enable patients to gain the ability to manage their illnesses for a healthier and more active life (Vincent & Sevell,

2014). In this context, training and counselling based on the Health Promotion Model for nutrition, physical activity and managing methods were given to HŞ by the cardiopulmonary rehabilitation nurse for six weeks. As a result of this process, positive behavioural changes and results regarding nutrition and physical activity were observed for HŞ. In this process, HŞ increased his physical activity (100 meters in 6 minutes) and lost weight (11.3 kg). Only just one case study which utilized from nursing care based on Pender's HPM model was found to be applied in the literature. Since no study on evaluation of nursing care and its results was found in Overlap Syndrome, different experimental study results in this area were used to discuss our case report.

In the case study conducted by Kiliç and Kartal (2019) using the HPM-based nursing care process, the individual who had myocardial infarction was visited and educated by the public health nurse twice each week for 3 weeks. As a result of the process, the patient gained healthy eating behaviours and increased his physical activity. In a randomized controlled study in patients with type II diabetes, training CD and needed information based on the health promotion model were provided to both intervention group and their friends or family members who could support them about physical activity. In the evaluation made after three months, the cognitive status of the education group towards physical activity changed positively and the physical activity levels increased significantly (Lari, Tahmasebi & Noroozi, 2018). In another randomized controlled study, training based on HPM was implemented on 35 patients of intervention group with myocardial infarction and it was determined that there were improvements in the levels of healthy nutrition behaviour, physical activity and self-efficacy for these patients, and training and counseling based on HPM was recommended in patients who had MI (Sevinç & Argon, 2018).

In other studies where physical activity training was applied based on HPM, it was observed that the intervention group gained higher levels of healthy eating behaviour, increased physical activity level, decreased obstacle perception and increased benefit perception in within three months (Adibelli & Kiliç, 2017; Lari, Tahmasebi & Noroozi, 2018). In the study conducted by Zhu and Li (2011), healthcare based on HPM applied to patients with COPD, so compliance to the treatment increased and admission rate to the hospital decreased at the end of the process.

Although all these studies were carried out on different groups, it was found that education, counseling and nursing care along with HPM positively affected healthy nutrition and physical activity behaviours as in our case. As we hope that this case study will contribute to our colleagues in HPM-based nursing care in lung diseases, we recommend further studies in this area as well.

## References

- Adibelli D. & Kilic D. (2017). The Effect Health Promotion Education Given to Women on Reduction of Cardiovascular Risk Factors. *International Journal of Recent Scientific Research*, 8(8): 19514-19520.
- Bahar Z. & Acil D. (2014). Health Promotion Model: Conceptual Structure. *Dokuz Eylül Üniversitesi Hemşirelik Yüksekokulu Elektronik Dergisi*, 7(1): 59-67.
- Brassington K., Selemidis S., Bozinovski S. & Vlahos R. (2019). New frontiers in the treatment of comorbid cardiovascular disease in chronic obstructive pulmonary disease. *Clin Sci (Lond)*, 133(7):885-904. doi: 10.1042/CS20180316.
- Dobrowolska B., Mazurek H., Slusarska B., Zarzycka D., Charzyńska-Gula M. & Cuber T. (2014). Health-promoting activities performed by nurses for patients with COPD. *Pneumonol Alergol Pol.*, 82(2):125-32. doi: 10.5603/PiAP.2014.0018.
- Global Strategy for the Diagnosis, Management and Prevention of COPD, Global Initiative for Chronic Obstructive Lung Disease (GOLD) 2019. Available from: <http://goldcopd.org>. Accessed April 1, 2019.
- Herdman T.H. & Kamitsuru S. (Eds.). (2014). *NANDA International Nursing Diagnoses: Definitions & Classification, 2015–2017*. Oxford: Wiley Blackwell.
- Intepe Y.S., Yildirim E. & Ciftci B. (2018). Obstructive Sleep Apnea Syndrome and Lung Diseases. *Bozok Tıp Dergisi*, 8 (Supp): 9-14.
- Karagozoglu S, Donmez A.A., Ozden D. & Tel H. (2013). Information and Practices of Nurses on Chest Physiotherapy. *İzmir Göğüs Hastanesi Dergisi*, 27(2): 95-104.
- Kendzierska T., Leung R.S., Aaron S.D., Ayas N., Sandoz J.S. & Gershon A.S. (2018). Cardiovascular Outcomes and All-Cause Mortality in Patients with Obstructive Sleep Apnea and Chronic Obstructive Pulmonary Disease (Overlap Syndrome). *Canadian Respiratory Research Network*, 1-61.
- Kiliç E. & Kartal A. (2019). Pender' s Health Promoting Model Based Nursing Care in Young Adult Individual with Acute Myocardial Infarction. *Türkiye Klinikleri J. Nursing Science*, 1-12. DOI: 10.5336/nurses.2019-64999
- Lari H., Tahmasebi R. & Noroozi A. (2018). Effect of electronic education based on health promotion model on physical activity in diabetic patients.

- Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 12: 45–50.
- Liu Y., Pleasants R.A., Croft J.B., Lugogo N., Ohar J., Heidari K., Strange C., Wheaton A.G., Mannino D.M. & Kraft M. (2015). Body mass index, respiratory conditions, asthma, and chronic obstructive pulmonary disease. *Respiratory Medicine*, 109: 851-859.
- Pender N.J. (2011). *Health Promotion Model Manual*. deepblue.lib.umich.edu.  
<http://hdl.handle.net/2027.42/85350> / Accessed February 24, 2019
- Robinson S.A., Shimada S.L., Quigley K.S. & Moy M.L. (2019). A web-based physical activity intervention benefits person with low self-efficacy in COPD: results from a randomized controlled trial. *J Behav Med*, 42(6):1082-1090. doi: 10.1007/s10865-019-00042-3.
- Sarac S. & Afsar G.C. (2017). Coexistence of Obstructive Sleep Apnea Syndrome, Chronic Obstructive Pulmonary Disease and Asthma. *Journal of Turkish Sleep Medicine*, 4:43-7. DO I: 10.4274/jtstm.18209
- Sevinc S. & Argon G. (2018). Application of Pender's Health Promotion Model to Post-Myocard Infarction Patients in Turkey. *International Journal of Caring Sciences*, 11(1), 409-418.
- Sisman N.Y. (2017). Nola J. Pender Health Promotion Model. Karadag, A., Caliskan, N., Baykara, Z.G. (Ed), *Nursing Theories and Models* (pp. 637-706) 1st Edition. Academy Press and Publishing. Istanbul.
- Turgut T. & In E. (2018). Obesity and Respiratory System. *Fiat Tip Dergisi*, 23 (Supp): 35-41.
- Uysal H. (2014). Improving Patient Education and Behavioural Change in Cardiac and Pulmonary Rehabilitation. Uzun, M. (Ed.), *Cardiac and Pulmonary Rehabilitation* (pp.98-102). Istanbul: Istanbul Medical Publishing.
- Vincent E. & Sewell L. (2014). The role of the nurse in pulmonary rehabilitation. *Nursing Times*, 110: 50, 16-18.
- Zhu P. & Li X-H. (2011). Application of health promotion model in elderly patients with chronic obstructive pulmonary disease. *Journal of Shanghai Jiaotong University (Medical Science)*, 31(6):713-716.