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# The cough frequency among call center workers: “call center cough”

Ayşe COŞKUN BEYAN<sup>1</sup>  
Adem DİRİCAN<sup>2</sup>  
Şevket ÖZKAYA<sup>3</sup>  
Nurhan KÖKSAL<sup>4</sup>  
Hülya BAYIZ<sup>1</sup>

<sup>1</sup> Division of Occupational and Occupational Diseases, Department of Chest Diseases, Faculty of Medicine, Dokuz Eylül University, Izmir, Turkey

<sup>1</sup> Dokuz Eylül Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, İş ve Meslek Hastalıkları Bilim Dalı, İzmir, Türkiye

<sup>2</sup> Department of Chest Diseases, VM Medical Park Samsun Hospital, Samsun, Turkey

<sup>2</sup> VM Medical Park Samsun Hastanesi, Göğüs Hastalıkları Bölümü, Samsun, Türkiye

<sup>3</sup> Department of Chest Diseases, Faculty of Medicine, Bahcesehir University, Istanbul, Turkey

<sup>3</sup> Bahçeşehir Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, İstanbul, Türkiye

<sup>4</sup> Department of Chest Diseases, Faculty of Medicine, Ondokuz Mayıs University, Samsun, Turkey

<sup>4</sup> Ondokuz Mayıs Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, Samsun, Türkiye

## SUMMARY

### The cough frequency among call center workers: “call center cough”

**Introduction:** Call centers are places where numerous people work together always speaking in a closed environment, and the most common complaint about admission to a doctor by call center employees is a cough and other respiratory system symptoms.

**Materials and Methods:** In this study, we aimed to demonstrate the relationship of call center employees between work and cough complaints and cough incidence with a questionnaire that consists of eleven questions and evaluates epidemiologic features, cough complaints of call center employees.

**Results:** 132 people were accrued to this study and the female/male ratio was 102/30. Mean age was  $26.4 \pm 2.7$  (min-max; 21-39) years, mean working time at the call center was  $2.6 \pm 1.2$  (min-max; 0.1-8) year and mean daily working hours was  $8.1 \pm 1.1$  hour. 40 (30.3%) participants had cough complaint before beginning, 89 (67.4%) participants had cough complaint after to work at a call center work ( $p = 0.004$ ).

**Conclusion:** Cough is more prevalent in call center employees. Pulmonary medicine specialist and occupational medicine practioner keep their mind unexplained cough with infections or other reasons might be a warning and early symptoms of sick building syndrome or other building related diseases or voice abusing on call center operators.

**Key words:** Cough, call center, occupational health

## ÖZET

**Çağrı merkezi çalışanlarında öksürük yakınma sıklığı: “çağrı merkezi öksürüğü”**

**Giriş:** Çağrı merkezleri birçok insanın birlikte çalıştığı kalabalık ve devamlı konuşma yapılan kapalı ortamlardır. Çağrı merkezi çalışanlarında doktor başvurusu yapılan en sık şikayet solunum sistemi yakınmalarıdır.

## Yazışma Adresi (Address for Correspondence)

Dr. Ayşe COŞKUN BEYAN

Dokuz Eylül Üniversitesi Tıp Fakültesi, Göğüs Hastalıkları Anabilim Dalı, İş ve Meslek Hastalıkları Bilim Dalı, İZMİR- TURKEY

e-mail: dr.aysecoskun@gmail.com

**Materyal ve Metod:** Bu çalışmada, çağrı merkezi çalışanlarında öksürük yakınması ve sıklığının iş ile ilişkisini göstermek amacıyla 11 sorudan oluşan anket uygulanmıştır. Anket sosyodemografik veriler ve öksürük yakınması ile ilgili sorulardan oluşmaktadır.

**Bulgular:** Çalışmamızda 132 olgu değerlendirildi. Kadın/erkek 102/30 idi. Ortalama yaş  $26.4 \pm 2.7$  (min-max; 21-39) yıl idi. Çağrı merkezinde ortalama çalışma süresi  $2.6 \pm 1.2$  (min-max; 0.1-8) yıl ve günlük ortalama çalışma süresi  $8.1 \pm 1.1$  saat idi. Olguların 40 (%30.3)'unda işe başlarken öksürük yakınması varken, 89 (%67.4) olgunun öksürük yakınması çağrı merkezinde çalışmaya başladıktan sonra başlamıştı ( $p= 0.004$ ).

**Sonuç:** Çağrı merkezi çalışanlarında öksürük sık görülen bir yakınmadır. Göğüs hastalıkları uzmanları ve iş yeri hekimleri enfeksiyon ya da diğer sebeplerle açıklayamadığı öksürük yakınmalarında hasta bina sendromu ya da bina ile ilişkili hastalıkların erken belirtisi olarak öksürük yakınması olabileceğini ya da çalışanlarının seslerini kötüye kullanımına bağlı öksürük yakınmalarının gelişebileceğini akıldta tutmalıdır.

**Anahtar kelimeler:** Öksürük, çağrı merkezi, iş sağlığı

## INTRODUCTION

A cough, which can occur for various reasons and which is one of the most reference reason to doctors, is an important, annoying problem. Although the most common cause of a cough infections, environmental and occupational factors, and irritants are also a frequent cause of a cough (1,2).

Call centers, with their simplest definition, are the communication units where all the calls from clients, suppliers, dealers and other third parties of a company are replied, transferred to relevant offices and also outer calls according to business needs are operated. As of 2010, call centers create a market that worth 340 billion USD. 130.000 call centers, 88 million call desks, and 11.5 million call center employees operate on the market (3). The most common occupational health consequences can be categorized as respiratory problems and voice deformation due to continuous talking and sick building syndrome (SBS), visual problems due to working with a video display units, auditory problems due to intense headset use and acoustic shocks, musculoskeletal problems due to equipment and work station design and also psychosocial problems due to monotonous work task (4,5). According to 2011 data, It has been reported that, the most common complaint about admission to a doctor by call center employees is a cough and other respiratory system symptoms (3). However, the majority of studies concerning office workers focus on musculoskeletal problems and ergonomics interventions (6-8). There is limited awareness of the respiratory diseases in office workers. In this study, we aimed to demonstrate the relationship of call center employees between work and cough complaints and cough incidence.

## MATERIALS and METHODS

### Study Sample

This is a descriptive and exploratory study conducted with call center workers in the city of Samsun, located

in Karadeniz region. Data were collected in 2014. The research population consisted of 132 employees working at the private call center. All of the employees have been included to the research and sampling was not performed. During the study, workers who has cough complain and no other any clinical condition to explain this symptom were included.

### Data Collection

The questionnaire prepared by researcher was applied. Questionnaire consists of eleven questions and evaluates epidemiologic features, cough complaints of call center employees. Questions in the questionnaire are; 1. Your age and sex, 2. Do you smoke? If yes, for how long and how many cigarettes do you smoke in a day? 3. For how long have you been working at a call center and how many hours do you work in a day? 4. Approximately with how many clients do you speak in an hour? 5. How is the temperature of the environment that you work according to you (hot, cold, normal, irregular)? 6. Did you ever have cough complaint? 7. Approximately how many times did you have a cough complaint in last year? 8. How many days continued your latest cough? 9. Did you have a cough complain before began working in a call center? 10. Did you have cough complaint after you started working in a call center/Did you cough complaint increase after you started working in a call center? 11. Did you ever apply to a doctor with a complaint of a cough, did you take any treatment for your cough complaint?

### Statistical Analysis

Descriptive findings were expressed as mean and standard deviation, as well as minimum and maximum values. The dependent variable of the study is having cough complain. Chi-square test was used to compare the cough prevalence after starting to work at call center. The entire analyses were carried out by SPSS13.0 program (Chicago, Illinois: SPSS Inc.). P values less than 0.05 accepted for the significance level.

**Table 1.** Demographic and cough characteristics of call center workers

Characteristics	n (%)	Range
<b>Age-year (mean <math>\pm</math> SD), Q1</b>	26.4 $\pm$ 2.7	21-39
<b>Gender (n,%), Q1</b>	132	
Female	102 (77.3)	
Male	30 (22.7)	
<b>Smoking status (n,%), Q2</b>		
Non-smoker	73 (55.3)	
Smoker	59 (44.7)	
Pack/year (mean $\pm$ SD)	2.2 $\pm$ 0.1	0.1-20
<b>Working status</b>		
Year (mean $\pm$ SD), Q3	2.6 $\pm$ 1.2	0.1-8
Hour/daily (mean $\pm$ SD), Q3	8.1 $\pm$ 1.1	0.1-10
Number of responded clients/hour (n,%), Q4		
< 10	5 (3.7)	
10-20	112 (84.9)	
> 20	15 (11.4)	
<b>The temperature of working environment (n,%), Q5</b>		
Cold	4 (3.0)	
Hot	28 (21.2)	
Irregular	34 (25.8)	
Normal	66 (50.0)	
<b>Cough (overall time), Q6</b>		
Yes (n,%)	105 (79.5)	
The frequency of last year (mean $\pm$ SD), Q7	2.8 $\pm$ 2.5	1-9
Duration-day (mean $\pm$ SD), Q8	9.3 $\pm$ 14.3	1-75
No	27 (20.5)	
<b>Cough history (n,%)</b>		
Before working, Q9		
Yes	40 (30.3)	
No	92 (69.7)	
After working, Q10		
Yes	89 (67.4)*	
No	43 (32.6)	
Hospital admission, Q11		
Yes	96 (72.7)	

\* p= 0.004.

Q1. Your age and sex, Q2. Do you smoke? If yes, for how long and how many cigarettes do you smoke in a day? Q3. For how long have you been working at a call center and how many hours do you work in a day? Q4. Approximately with how many clients do you speak in an hour? Q5. How is the temperature of the environment that you work according to you (hot, cold, normal, irregular)? Q6. Did you ever have cough complaint? Q7. Approximately how many times did you have a cough complaint in last year? Q8. How many days continued your latest cough? Q9. Did you have a cough complain before began working in a call center? Q10. Did you have cough complaint after you started working in a call center/Did you cough complaint increase after you started working in a call center? Q11. Did you ever apply to a doctor with a complaint of a cough, did you take any treatment for your cough complaint?

## Approval of the Ethics Committee

The study was performed in accordance with the ethical principles in the Good Clinical Practice (GCP) guidelines, applicable local regulatory requirements, and the protocol was approved by local ethics review boards. All the patients read the patient information form about the study procedure and written informed consent was obtained.

## RESULTS

132 people were accrued to this study. The results of study were shown in the one table (Table 1). The female/male ratio was 102/30. Mean age was 26.4  $\pm$  2.7 (min-max; 21-39) years. Of the participants, 59 (44.7%) was smoker and period of smoking were 2.2  $\pm$  0.1 packs/year. Mean working time at the call center was 2.6  $\pm$  1.2 (min-max; 0.1-8) year and mean daily working hours was 8.1  $\pm$  1.1 hour. Mean client number every hour < 10 was 5 (3.7%), 10-20 clients was 112 (84.9%), > 20 was 15 (11.4%). The mean temperature of the working environment was normal for 66 (50%), irregular for 34 (25.8%), hot for 28 (21.2%), and cold for 4 (3%) of participants. Some cough complainers during their entire life were 105 (79.5%), the incidence of cough complaints in last year was 2.8  $\pm$  2.5 times and mean of cough complaint duration was 9.3  $\pm$  14.3 days. 40 (30.3%) participants had cough complaint before beginning to work at a call center. Two of these participants were previously diagnosed as "asthma" and they were under treatment. Some participants that developed cough complaint was 89 (67.4%), and the number of participants that apply to a doctor with cough complaint was 96 (72.7%). We observed a statistically significant differences between participants that had cough complaint before beginning to work at call center and participants that developed cough complaint after starting to work at call center (p= 0.004).

## Conclusion

Together with the best of our knowledge no other study in the literature mainly focuses on cough complaint of call center employees.

Moreover, numerous customer service representatives work together the same time in environments like open office design; they have problems with heat, humidity, lighting and ventilation conditions of working environment (3). Most of studies focus on job stress, shift working and sleep quality and musculoskeletal disorders among call center operators (9-12). We

mainly focused on cough complain and showed that there was a significant increasing after starting work at call center. Some participants that had cough complaint after they start working at the call center were 89 (67.4%), and 96 (72.7%) participants were applied to the doctor with cough complaint. In a limited number of studies showed respiratory symptoms such as dry throat as a part of sick building syndrome (SBS) with other SBS related symptoms such as eye dryness, lethargy and headache (13). Graudenz et al., showed higher cough prevalence caused by ventilation and air-conditioning systems (HVAC) in office workers as a part of building related symptoms, as well (14).

Although a cough is a normal protective mechanism of the respiratory tract, it is a symptom of almost all chronic respiratory tract diseases and some other non respiratory tract diseases. It is one of most common symptoms that make patients apply to the doctor (15-17).

In our study, most of workers applied to a doctor with cough complaint, as well.

In Turkey, the estimated number of call center operators is around 7.721 (18). Because this sector is relatively new and fast growing, standards are not yet fully taken their form. The Ministry of Labour and Social Security of Turkish Republic has relised a brief report about appropriate working conditions for office workers (19).

Call center activities (NACE code: 82.20.01) is regarded as hazardous according to the Workplace Hazard Classes of the Work Health and Safety regulation issued by the Ministry of Labour and Social Security in Turkey (20). Noise exposure limit and exposure threshold are set in another legislation (21). There is no other legislation or regulation on call centers. Therefore, occupational hygiene measurements such as dust, noise, thermal environment, has not been performed regularly in Turkey.

In our study, there are factors determined to explain worker' cough in call center. Continuous breathing of the office air causes a cough and other respiratory tract complaints (3). We also hypothesized that since employees are in the continuous act of talking stimulate cough reflex a bronchial provocation occurs in their airways.

The other mechanism is thermal comfort and humidity conditions in the workplace. Participants told that working environment temperature was 50% normal and 25.8% irregular. We think that provocation due to the crowded working environment, fluctuating tem-

peratures, and, and this is primary cause why cough complaint is such frequent.

The effect of working environment over the employees is defined as "sick-building syndrome" firstly. After that, it is named as "building related diseases" (22). World Health Organisation used to describe SBS for situations in which modern building occupants experience irritations in their skin, mucous membranes. Therefore, they have respiratory tract and central nervous system symptoms and complaints. In conjunction with mucosal irritation, they experience dryness and irritations in their throat. Complaints relating to respiratory system are feeling tightness in chest, dyspnea, cough, wheezing. Participants also expressed that they had dizziness, headache, vertigo, tiredness, difficulty in concentration as relating to their central nervous system. Sick building symptoms that are stimulated by deterioration of inner environmental conditions such as room temperature, relative air humidity, ventilation, building dampness and moulds, chemical indoor exposure and disappear when sick gets out of the building (8,15,16,23). We have also known that SBS is a group phenomenon and not a typical syndrome as normally described in medical practise hence individual diagnostic is difficult (23).

Lim et al. have stated that atopy and elevated FeNO show strong association with SBS symptoms and also transient symptoms were associated with room temperature and relative air humidity (24). Chung et al., showed moderate significant relationship between SBS symptoms exposure to CO<sub>2</sub> and total VOCs (25).

Abdel-Hamid et al., stated that SBS was highly prevalent among office workers and was influenced by poor ventilation, poor lighting, environmental tobacco smoke, high temperature, poor job satisfaction, and inadequate office cleaning working conditions (26).

We didn't perform neither room temperature or humidity or VOC and hygiene measurement nor skin prick test or exhale FeNO measurement. The questionnaire didn't contain SBS related symptoms such as eye symptoms, dermal symptoms and mucosal symptoms and others. We recommend that, more detailed and comprehensive researches should be planned for the future.

However, there are some limitations of this study. Our study is the cross-sectional study design which limits the possibility to draw conclusions on causality. We didn't perform any workplace measurement and other

medical assesment (workplace respiratory function test, skin prick test).

Our study is provided a good evidence for need of comprehensive occupational health and safety services for call center workers. SBS and other respiratory diseases should be monitored closely. Control programs should be developed and applied in order to prevent respiratory diseases in call centers. Occupational hygienest consultation should be kept in mind. New regulations and new legislations should be enacted.

We think that our study will pioneer to other studies relating to the respiratory symptoms of call center employees. We highlight, pulmonary medicine specialist and occupational medicine practioner keep their mind unexplained cough with infections or other reasons might be a warning and early symptoms of SBS or other building related diseases or voice abusing on call center operators.

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