

Quitting smoking before surgical interventions and its relationship to health literacy

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ABSTRACT

Objectives: The aim of our study was to evaluate the effect of health literacy (HL) level and smoking dependence of patients on their compliance with advice given by the physicians in anesthesia polyclinics on giving up smoking.

Methods: This prospective study included 165 smokers. HL was evaluated by The European Health Literacy (HLS-EU). Nicotine dependence was measured by Fagerstrom test for nicotine dependence (FTND). Patients were advised not to smoke and their carbon monoxide levels in expired air were measured before on the operation day.

Results: The number of patients smoking on the day of surgery was significantly higher among females ($p = 0.001$). While the HL was lower, the FTND scores ($p = 0.006$), daily cigarette consumption ($p < 0.001$) and years of cigarette smoking ($p = 0.002$) were found to be significantly higher. Fewer number of days between the polyclinic interview and the surgery date were positively correlated with compliance with the advice to give up smoking ($p = 0.011$).

Conclusion: Since the number of patients continuing to smoke cigarettes was high, it was concluded that verbal advice on giving up smoking is not enough and that other more effective measures are needed to ensure patient compliance. The reminder of 'quit smoking' on the day very close to the surgery may help more patients to stop smoking on that day.

Keywords: Health literacy, anesthesiologist, smoking, verbal advice, Fagerstrom test for nicotine dependence

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Cigarette smoking, one of the most serious health-threatening problems, is responsible for the increasing incidence of chronic disorders of the respiratory and circulatory systems [1, 2]. It has been reported that the probabilities of small airway narrowing and increased bronchial reactivity should be considered during administration of anesthesia to

patients who smoke cigarettes [3]. It may lead to various complications ranging from intraoperative hypoxia to bronchospasm, delayed recovery, postoperative pneumonia, delayed wound healing and extended hospital stay [4, 5]. Therefore, it is of great importance to advise smoking cessation and to motivate patients to quit smoking within the scope of



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preoperative evaluation [4, 6, 7]. In preoperative patients, determining the general condition of the patient, reducing anxiety, making the patient aware of the risk factors, and making recommendations to reduce these risk factors are among the responsibilities of anesthesiologists [7].

Health literacy (HL) is the degree to which people have the ability to understand and access basic health services information, prevent disease, and make and implement decisions during treatment in the process of acquiring health information [2, 8-11]. Low levels of HL indicate that health information is difficult to understand and that the instructions given are difficult and lead to adverse health outcomes [8, 12, 13]. The World Health Organization considers health literacy as a key factor in promoting health [2]. In addition, HL has great importance in the efficiency of health recommendations and consultations [14].

HL is becoming increasingly accepted as a critical factor affecting patient-physician communication and health outcomes [15]. It is also reported that lower HL is strongly associated with smoking [16, 17]. HL is also considered to be an important factor because it affects the response of smokers to different types of smoking risk messages [16, 18].

The aim of our study was to evaluate the effect of HL level and smoking dependence of patients on their compliance with advice given by physicians on smoking cessation in anesthesiology polyclinics.

METHODS

This prospective, observational study included smokers who came to the preoperative anesthesiology polyclinic of a university hospital for their scheduled surgery. Demographic information about the level of education and previous anesthesia experience was obtained. Patients who were between 18-80 years old, had regular use of tobacco products on a daily basis, agreed to fill out the HL scale, had no communication problems and who were scheduled for elective surgery were included in the study. Patients who had communication problems, psychiatric disorders, vision problems and those who declined to complete the survey were excluded from the study.

The HL scale was applied after the patient was recommended not to smoke until the day of surgery,

as we routinely do in the anesthesiology polyclinic (the nature of the scale requires an interview method where a health care professional asks questions and the patient gives answers). The scale contains 12 sub-dimensions, which are operationalized with 47 items. Each item is assessed using a 4-point self-report scale: 1 = very difficult, 2 = difficult, 3 = easy, 4 = very easy. We used code "5" to indicate the "don't know" answers. Additionally, demographic data and smoking habits of all patients were queried and recorded along with the age when they started smoking and the duration of the habit. We also recorded the cigarettes smoked per day, whether patients consumed tobacco or not till the day of operation, and if yes, the amount of cigarettes consumed. Nicotine dependency was assessed by means of the Fagerstrom Test for Nicotine Dependence (FTND) [19] in the anesthesiology polyclinic. To verify the use/non-use of tobacco, the eBCO (Exhaled Breath Carbon Monoxide) levels were estimated using the piCO+ Smokerlyzer® (piCO+ smokerlyzer®Bedfont Micro Breathalyzer, Kent, United Kingdom) in the operation room on the day of surgery.

Statistical Analysis

Statistical analyses were conducted using the SPSS 21 package program. The Kolmogorov-Smirnov test was used to investigate the distribution of variables. Non-normally distributed variables are given as median (minimum – maximum). Categorical data was recorded in percentages. Whereas the Mann Whitney U test was employed to compare averages, the Spearman Chi-square test and the Fisher's exact test were used for the comparison of rates, and correlations were analyzed with the Spearman correlation test. $p < 0.05$ was considered statistically significant.

RESULTS

Of 700 patients that came to the preoperative anesthesiology polyclinic during the three months, only 288 patients agreed to participate in the study. After the exclusion of patients that were unobserved in the operating room, did not give consent to measurement of the eBCO level and those filling out invalid forms, a total of 165 patients' data was

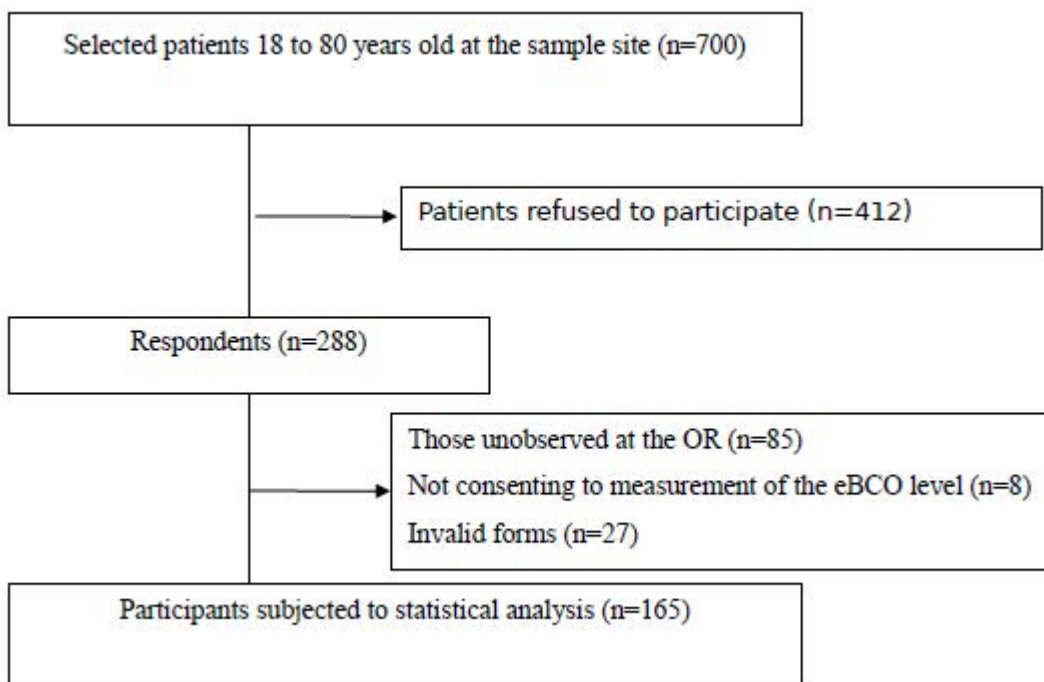


Figure 1. Participants flow chart of procedures

subjected to statistical analysis (Figure 1). The patients’ demographic data is shown in Table 1. Table 1 also shows the smoking status till the day of operation, the HL level and the details of the cigarette

smoking habit. In this study, the mean FTND score was consistent with a low level of nicotine dependence. The FTND score was used to estimate the dimension and profile of nicotine dependence [3]. The

Table 1. General characteristics of the patients (n = 165)

Characteristics	Data
Age, median (min-max), years	39 (22-73)
Male gender, n (%)	125 (75.8)
BMI, median (min-max)	25.2 (16.6-20.6)
Starting age of smoking (years)	18 (7-43)
Cigarettes smoked per day, n (%)	18 (5-40)
Duration of smoking, median (min-max), years	18 (1-65)
COppm	12 (1-88)
FTND	3 (0-10)
Smoking on morning of operation	56 (33.9)
Smoking on previous day	156 (94.5)
Health Literacy Category, n (%)	
Inadequate	31 (18.8)
Limited	63 (38.2)
Adequate	40 (24.2)
Excellent	31 (18.8)

Data are shown as median (maximum-minimum) or number (%). FTND = The Fagerstrom Test for Nicotine Dependence

Table 2. Health literacy and variables related to smoking

Spearman Correlation Test	Health Literacy Score		Health Literacy Category	
	<i>p</i> value	Correlation Coefficient	<i>p</i> value	Correlation Coefficient
Age	0.007	-0.210	0.027	-0.172
Cigarettes smoked per day	< 0.001	-0.279	0.001	-0.263
Duration of smoking	0.002	-0.241	0.01	-0.199
FTND	0.006	-0.211	0.008	-0.205

FTND = The Fagerstrom Test for Nicotine Dependence, $p < 0.05$ statistically significant

mean total HLS-EU (European Health Literacy Survey – Turkish Adaption) score was 32.6 (range 7.4-50). The patients' HL levels were as follows: inadequate 18.8%; limited 38.2%; adequate 24.2% and excellent 18.8%. While the percentage of the patients who smoked on the day prior to surgery was 94.1%, the percentage of those who smoked on the day of surgery was 33.9%.

The eBCO levels were statistically higher in patients that smoked before or on the day of surgery as compared to those who did not smoke ($p = 0.001$ for both). The number of female patients that smoked on the day of operation was significantly higher than male patients ($p = 0.001$). However, there was no statistically significant difference between the patients that smoked and did not smoke on the day of surgery regarding health literacy ($p > 0.05$). When the patients that smoked cigarette(s) one day before surgery were compared with those who did not smoke, a statistically significant difference was detected regarding the duration from the day of preoperative polyclinic examination till the day of surgery ($p = 0.011$).

The lower the HL level was, the higher the FTND level, cigarettes smoked per day and the duration of smoking habit ($p = 0.006$, $p < 0.001$ and $p = 0.002$, respectively). Furthermore, the HL level was found to be significantly lower among older patients ($p = 0.007$) (Table 2).

DISCUSSION

In this study, we aimed to investigate the effect of HL level and smoking dependence of patients on their compliance with advice given by the physicians in

anesthesiology polyclinics. Whereas the HL level did not differ between the compliant and noncompliant patients, there was a relation between HL and nicotine dependence. Women's preoperative smoking prevalence was higher as compared to men. Additionally, the prevalence of smoking one day before surgery significantly increased as the time interval between preoperative anesthesiology examination at the polyclinic and surgery was extended.

There are a large variety of studies investigating the relationship of HL with self-efficacy, management of chronic diseases, depression, eating habits, endocrinological diseases, and the capacity to understand and use the information and treatment given by a physician [11-13, 17, 18, 20]. Inou *et al.* [11] indicated in their observational study that communicative and critical HL was positively associated with diabetic care and self-efficacy. Carrara and Schulz [13] found different results in their review related to the role of HL in adherence to the diet advice of doctors.

In our literature review, we came across only one study investigating anesthesiology polyclinics and HL within the same context. In the study conducted on a total of 502 patients, Garcia-Marcinkiewicz *et al.* [21] investigated the knowledge of patients with adequate or high health literacy levels on the responsibilities of anesthesiologists related to intensive care, blood transfusion and pain, and their knowledge level was found to be low on these topics. An educational booklet was the preferred method to provide this information [21]. Also, the HL levels were heterogeneous among the patients.

Although there are studies addressing the relation

of HL to quitting smoking [16, 17], we could not find studies investigating the association of HL and smoking cessation in the setting of anesthesiology polyclinics. There was only one study evaluating the knowledge of patients on the role of anesthesiologists [21]. For this reason, we think that this is the first study evaluating the influence of HL on compliance with the advice not to smoke. Low health literacy is associated with unhealthy behaviors including smoking [16, 18]. Steward *et al.* [18] reported in their study that low HL negatively affected the results of smoking cessation. Those with low health literacy reported that they were less informed and had lower perceptions about the health risks of smoking. It was also suggested that nicotine dependency is the most significant indicator in giving up smoking and is associated with lower smoking cessation rates. Similarly, in the present study, HL was found to be associated with daily cigarette consumption, the duration of smoking habit and the level of nicotine dependency. However, we could not find a relation between the adherence to advice to give up smoking and HL level.

Health literacy is becoming more important in doctor and patient communications [12, 15, 18]. Williams *et al.* [15] demonstrated in their retrospective study that low HL influences health-related outcomes by complicating the communication between patients and physicians. Additionally, patients with low health literacy often have difficulties in understanding the information provided to them due to lack of knowledge, which consequently may result in bad temper and anxiety [12]. These patients have less information about their medical condition and treatment, and may have increased hospitalization rates. [12, 15]. In this context, Chu and Tseng [12] stated that using different approaches like empathic communication was more beneficial and helped patients with low HL better understand physicians' advice. Furthermore, Hoover *et al.* [16] suggested that besides HL, emotionality also impacts the overall effect and credibility of the messages on the risks of smoking that are intended to help facilitate smoking cessation. A person's HL is important when considering the factual or emotional content of communication in determination of risks associated with smoking cigarettes [16]. Steward *et al.* [17] suggested the use of methods that involve less text and more images to facilitate the understanding of people

regardless of HL in studies on smoking cessation. Johnson *et al.* [22] mentioned the need for increasing the awareness of pharmacists on limited health literacy of patients and providing education to them with the support of health systems for an effective communication with patients.

It is also among the responsibilities of an anesthesiologist to determine the general condition of the patient, reduce anxiety, raise the awareness of the patient about the risk factors, and make recommendations to reduce identified risk factors. In our study, we could not find any association between HL and compliance to our verbal advice, and the rate of preoperative smoking was very high. It may be beneficial to use supporting techniques like empathy and emotionality while approaching these patients. Additionally, using visual materials to promote the influence of verbal warnings/advice and including surgeons and other allied health personnel in the preoperative evaluation process at anesthesiology polyclinics, which are generally intensely busy, may positively affect the outcome.

Limitations

The heterogeneity of smoking habits among the patients, the single-centered nature of the study and the smoking cessation advice being given by various doctors with different levels of experience in the polyclinic were the limitations of this study. It may change the outcome if smoking cessation advice is given by a surgeon, and therefore, this should be investigated in further studies.

CONCLUSION

No correlation was observed between verbal advice for giving up smoking in anesthesiology polyclinics and the patients' HL scores. Since the number of patients continuing with smoking was high, it was concluded that verbal advice on quitting smoking is not enough, and thus, other more effective measures are needed to ensure patient compliance. Regardless of the HL score, the shorter the interval between the advice to quit smoking and the day of operation, the greater the adherence to the advice becomes.

Conflict of interest

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