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What is the Color of Cancer?

Kanserin Rengi Nedir?

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Abstract

Objective: To investigate the colors that evokes cancer in the patients with prostate, lung and breast cancer, and in healthy controls.

Materials and Methods: A visual card in one of the 9 colors (white, red, orange, yellow, green, blue, purple, navy, black) was shown to totally 210 patients diagnosed with lung cancer (LC), prostate cancer (PC) or breast cancer (BC) and 200 healthy participants and the question of "What is the color of cancer?" was asked to them. Disease information of the cancer patients were also recorded.

Results: The mean ages of the patient and control groups were 61.54 and 20.49, respectively (p<0.001). While the most preferred color was yellow (24.8%) in the patient group, it was red (39%) in the control group. The patients were divided into three groups according to both type and stage of cancer. While the patients with PC and BC selected yellow color, the patients with LC selected black color. The patients without recurrent and residual diseases preferred yellow, patients with local recurrence preferred red and patients with distant metastasis preferred black colors.

Conclusion: While cancer patients selected yellow color which represents positive emotions, the healthy young individuals selected red color which represents negative emotions. However, progressive or aggressive cancer patients selected red and black colors which is associated with negative emotions.

Keywords: Cancer, color, prostate cancer, breast cancer, lung cancer

Öz

Amaç: Prostat, akciğer ve meme kanseri olan hastalar ile sağlıklı kontrollerde kanseri çağrıştıran rengin incelenmesi.

Gereç ve Yöntem: Akciğer kanseri (AK), prostat kanseri (PK) veya meme kanseri (MK) tanısı almış toplam 210 hastaya ve 200 genç sağlıklı katılımcıya 9 renkten (beyaz, kırmızı, turuncu, sarı, yeşil, mavi, mor, lacivert, siyah) görsel bir kart gösterildi ve "Kanserin rengi nedir?" sorusu soruldu. Kanser hastalarında hastalıkları ile ilgili bilgi ayrıca kaydedildi.

Bulgular: Hasta ve kontrol grubunun ortalama yaşları sırası ile 61,54 ve 20,49 idi (p<0,001). Hasta grubunda en fazla tercih edilen renk sarı (%24,8) iken, kontrol grubunda kırmızı (%39) en fazla söylenen renkti. Hasta grubu kanserin tipine ve evresine göre üç gruba ayrıldı. PK ve MK olan hastalar en çok sarı rengi söylerken, AK olan hastalar siyah rengi tercih ettiler. Nüks ve metastazı olmayan kür sağlanmış hastalar sarı rengi, lokal nüksü olan hastalar kırmızı rengi ve uzak metastaz hastalığı olan hastalar ise siyah rengi tercih ettiler.

Sonuç: Kanser tanısı olan hastalar pozitif duyguları temsil eden sarı rengi seçerken, sağlıklı genç bireyler negatif duyguları temsil eden kırmızı rengi seçmektedirler. Ne var ki, hastanın hastalığı ilerlemiş ya da agresif seyreden bir kanser ise bu hastalar da negatif duyguları temsil eden kırmızı ve siyah rengi seçmektedirler.

Anahtar Kelimeler: Kanser, renk, prostat kanseri, meme kanseri, akciğer kanseri

Introduction

According to the World Health Organization, the rate of cancer has been increasing worldwide due to the increase in population and average life expectancy (1). Lung cancer (LC) is currently responsible for the largest number of "neoplastic" deaths both among women and men (2). Breast cancer (BC) is the most common female cancer worldwide, and the second cause of cancer death in women. Prostate cancer (PC) is the most common malignancy diagnosed in men and the second leading cause of cancer death for men in the general population (3).

Researches have indicated that individuals often associate colors with various emotional terms. For example, when participants were asked to associate an emotional response with a color, they often associate bright colors (e.g., white, pink) with

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positive emotions (e.g., happy, relaxed) and dark colors (e.g., black, brown) with negative emotions (anxious, sad) (4,5). The color is an important perceptual feature of six basic emotions: anger, disgust, fear, happiness, sadness, and surprise (6). Colors are often used to signify information in our environment. For example, the color red generally conveys information regarding threat (e.g., alarms) and failure, particularly in achievement settings (e.g., the red ink used by teachers to correct mistakes) (7).

The aim of the present study was to investigate the colors that evoke cancer in the patients with PC, LC and BC, and healthy controls.

Materials and Methods

The study comprised 210 consecutive patients diagnosed with LC, PC or BC who had attended our hospital as outpatients between January and April 2015 and 200 healthy controls. Sociodemographic characteristics of the participants (in the patients, including the characteristics of cancer) were recorded via face-to-face interview with an open questionnaire. While all of the participants were shown a visual card, including 9 colors (white, red, orange, yellow, green, blue, purple, navy, black), they were asked "What was the color of cancer?". An informed consent form was obtained from all participants. The study protocol was approved by the Local Ethics Committee (approval number: 20478486-53).

Statistical analysis was performed with SPSS 16.0 (SPSS, 129 Chicago, IL). The demographic features and color selection of the patient and control groups were statistically compared. A p value of <0.05 was considered statistically significant.

Results

The mean age of the patient and control groups were 61.54 and 20.49, respectively ($p<0.001$). The demographic data of the patients and controls were given in Table 1. Although the most common preferred color was yellow (24.8%) in the patient group, it was red (39%) in the control group. The proportions of preferred color in the patient and control groups were given in Table 2. The patients were divided into three groups according to both type and stage of cancer. The proportions of preferred color in these groups were given Table 3. Although the patients with PC and BC selected yellow color, the patients with LC selected black color. The most of the patients having no recurrence and residual disease, the patients having local residual disease and distant metastasis chose yellow, red and black colors, respectively.

Discussion

Cancer is a chronic illness that can result in major lifestyle changes which may cause severe disruptions to a person's normal functioning in life, starting from illness to severe financial crises (8). Twenty-five percent to 50% of all cancer patients report significant levels of distress, and it is frequently not assessed nor detected by health professionals. Advanced cancer has an adverse effect in virtually all dimensions of patients' lives, including physical, psychosocial, spiritual, familial, and role function (9). The aim of the present study was to compare the replies to what is the color of cancer between the control and patient groups. The control group comprised healthy young volunteers because they were the people who had no cancer or chronic disease. We compared the healthy young volunteers and elderly cancer patients. We think that most of the healthy young volunteers have no distress occurring due to cancer, disease or hospital.

Sutton and Altarriba (6) investigated the relationship between color, emotion and emotion-laden words. The purpose of their study was to construct norms for positive and negative emotion and emotion-laden words and their color associations. They noticed that the color red was most commonly associated with negative emotion and emotion-laden words, whereas yellow and white were associated with positive emotion and emotion-laden words, respectively. In our study, although the most common color response was yellow in the patient group, it was red in the control group. These results were very interesting. Although the most of the patients with diagnosed

Table 1. The demographic data of the patients and controls

	Patient group	Control group	
N	210	200	p
Age (years)			
Mean (SD)	61.57 (9.58)	20.49 (3.16)	<0.001
Sex, n (%)			
Female	74 (35.2)	113 (56.5)	<0.001
Male	136 (64.8)	87 (43.5)	
Marital status, n (%)			
Married	172 (81.9)	1 (0.5)	<0.001
Single	12 (5.7)	199 (99.5)	
Divorced	26 (12.4)	0	
Education, n (%)			
Primary school	124 (59.1)	0	<0.001
Secondary school	24 (11.4)	0	
High school	41 (19.5)	200 (100)	
University	21 (10.0)	0	
Work status, n (%)			
Student	0	200 (100)	<0.001
Working	96 (45.7)	0	
Retired	56 (26.7)	0	
House wife	58 (27.6)	0	
Income level (TL), n (%)			
<1000	107 (51.0)	147 (73.5)	<0.001
1000-3000	89 (42.4)	37 (18.5)	
3000-5000	12 (5.7)	6 (3.0)	
>5000	2 (1.0)	10 (5.0)	
Living status, n (%)			
Village	42 (20)	1 (0.5)	<0.001
Town	66 (31.4)	6 (3.0)	
City	102 (48.6)	193 (96.5)	

SD: Standard deviation

cancer selected yellow color that were associated with positive emotion, the most of the healthy young controls selected red color that were associated negative emotion. When the patients were divided into three groups according to status of cancer, the most of the patients who had no recurrence or residual disease chose yellow color. The most of the patients who had local residual disease and distant metastasis chose red and black color, respectively. These results were though to be related with the patients with cancer-free after a success treatment of cancer and positive emotion. Although, these patients had initially cancer-related fear (e.g., fear of death), after the success treatment they had positive emotion and were hopeful. On the other hand, the patients having local residual disease and distant metastasis had fear of death and were pessimistic.

Similarly, when the patients were divided into three groups according to type of cancer, although the most of the patients with PC and BC selected yellow color, the most of the patients with LC selected black color. Although the most common cancers in women and men are respectively PC and BC, the most common cause of cancer death in both women and men is LC. The most of the patients with LC selected black color associated with negative emotion. This negative emotion may be due to that they had knowledge about the progression of their disease. The progression and response of therapy in BC and PC are better than LC. So the patients with BC and PC in our study might be choosing yellow color associated with positive emotion.

Table 2. The preferred color of the patients and controls

Colors	Patient group n (%)	Control group n (%)
White	11 (5.2)	0 (0)
Red	38 (18.1)	78 (39.0)
Orange	5 (2.4)	8 (4.0)
Yellow	52 (24.8)	7 (3.5)
Green	28 (13.3)	5 (2.5)
Blue	21 (10.0)	6 (3.0)
Purple	15 (7.1)	29 (14.5)
Navy	9 (4.3)	8 (4.0)
Black	31 (14.8)	59 (29.5)

Table 3. The preferred color of the patients dividing into three groups according to type of cancer and status of disease

Colors	Type of cancer			Status of disease		
	Lung cancer n (%)	Prostate cancer n (%)	Breast cancer n (%)	Disease free n (%)	Local residue disease n (%)	Metastatic disease n (%)
White	0 (0)	1 (1.4)	10 (15.6)	10 (7.7)	0 (0)	1 (2.0)
Red	11 (15.3)	19 (25.7)	8 (12.5)	22 (16.9)	10 (32.3)	6 (12.2)
Orange	1 (1.4)	3 (4.1)	1 (1.6)	4 (3.1)	1 (3.2)	0 (0)
Yellow	7 (9.7)	20 (27.0)	25 (39.1)	43 (33.1)	5 (16.1)	4 (8.2)
Green	13 (18.1)	8 (10.8)	7 (10.9)	11 (8.5)	7 (2.6)	10 (20.4)
Blue	5 (6.9)	10 (13.5)	6 (9.4)	15 (11.5)	3 (9.7)	3 (6.1)
Purple	9 (12.5)	3 (4.1)	3 (4.7)	8 (6.2)	1 (3.2)	6 (12.2)
Navy	4 (5.6)	5 (6.8)	0 (0)	5 (3.8)	2 (6.5)	2 (4.1)
Black	22 (30.6)	5 (6.8)	4 (14.8)	12 (9.2)	2 (6.5)	17 (34.7)
Total	72 (100)	74 (100)	64 (100)	130 (100)	31 (100)	49 (100)

Study Limitations

Our present study has some limitations, most important one was; there was not large number of patients, so we could not perform detailed statistical analysis in patients with PC, BC and LC. The other important limitation of our study was; we did not objectively assess the emotion of the patients by using relevant tools.

Conclusion

Overall, the findings of the presents study showed that although the patients with cancer chose the color (yellow) associated positive emotion as a response to the question "What is the color of cancer?", the healthy young participants chose the color (red) associated with negative emotion. However, the patients having progressive or aggressive cancer selected the colors (red and black) associated with negative emotion. Further large studies should be confirm our study and also objectively assess emotion of patients by using relevant tools. So these future studies will guide us to determine the psychological state of patients with cancer by using colors and to steer them to proper psychological support. Also basically may be a loadstar about the decoration of the cancer treatment clinics. As we mentioned above for these aims we need further broad participated studies.

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Ethics

Ethics Committee Approval: The study was approved by the Celal Bayar University Local Ethics Committee (Approval number: 20478486-53), Informed Consent: Consent form was filled out by all participants.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: Volkan Tatlı, Oktay Üçer, Concept: Volkan Tatlı, Oktay Üçer, Talha Müezzinoğlu, Design: Volkan Tatlı, Talha Müezzinoğlu, Data Collection or Processing: Volkan Tatlı, Oktay Üçer, Analysis or Interpretation: Oktay Üçer, Literature Search: Volkan Tatlı, Oktay Üçer, Writing: Volkan Tatlı, Oktay Üçer.

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