Evaluation of Behavior of Sun Protection in University Students and Staff: Face-to-face Survey Study

Üniversite Öğrenci ve Çalışanların Güneşten Korunma Davranışının Değerlendirilmesi: Anket Çalışması

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Abstract

Objective	The aims of our study are as follows: 1) to determine the data and socio-demographic characteristics related to sun protective behavior during the summer months in the population who came for education and work from every region of the country, 2) to compare sun protective behaviors and intentional sun exposure factors in the highly educated population (college graduate or university students) as well as intentional sun exposure factors. We intend to reflect in this study the use of sunscreen cream and the knowledge and behavior about sun protection methods of the students of Sakarya University (SU) and hospital personnel working in Sakarya University Faculty of Medicine Research and Training Hospital (SURTH). **(Sakarya Med J 2019, 9(2):310-318)**
Materials and Methods	The study was held on the subjects consisting of student and staff volunteers of SU and SURTH. One thousand three hundred eighty-nine (69.2%) of these volunteers were students in SU, 616 (30.7%) of them were staff working in SURTH.
Results	The study was conducted on 2005 individuals with face-to-face interviews. Of the participants, 53.4% (n = 1070) were male and 46.6% (n = 935) were female.
Conclusion	The incidence of malignant melanoma and other skin cancers is increasing. We believe that the researches and warnings were still inadequate on these issues. The behaviors of protection from the sun were not caused because they want to be healthy, they were caused to avoid the inconvenience due to the sun while driving and playing sports.
Keywords	behavior; sun protection; sunscreen

Öz

Amaç	*Bu çalışmadaki amaçlarımız şu şekilde sıralanabilir. 1) Eğitim ve çalışma amacıyla ülkemizin değişik bölgelerinden gelen popülasyonda yaz aylarında güneşten korunma yöntemleri ve sosyo demografik verileri belirlemek, 2) Yüksek eğitimli nüfusun (üniversite mezunu veya üniversite öğrencileri) güneşten korunma davranışlarını ve isteyerek güneş ışığına maruz kalma davranışlarını karşılaştırmak Biz bu çalışmada Sakarya Üniversitesi Tıp Fakültesi Eğitim ve Araştırma Hastanesi (SÜEAH) personeli ve Sakarya Üniversitesi (SÜ) öğrencileri arasında güneş koruyucu kullanımı ile güneş koruma yöntemleri hakkında bilgi ve davranışlarını yansıtmayı amaçladık.* ***(Sakarya Tıp Dergisi 2019, 9(2):310-318)****.*
Gereç ve Yöntemler	*Çalışma SÜ-SÜEAH öğrenci ve personelinden oluşan gönüllü denekler üzerinde yapıldı. Bölgesel etik kuruldan etik onayı alındı. Çalışmaya 2005 gönüllü katıldı. Bu gönüllülerin 1389 (%69.2) tanesi SÜ'de öğrenci, 616(%30.7) tanesi SÜEAH'da çalışan personel idi. Tüm deneklerden 45 adet soru içeren anketi cevaplamaları istendi. Bizim çalışmamız kesitsel anket çalışmasıdır.*
Bulgular	*Çalışma yüz yüze görüşmeyle 2005 kişi üzerinde gerçekleştirilmiştir. Katılımcıların % 53.4'ü (n = 1070) erkek, % 46.6'sı (n = 935) kadın idi.*
Sonuç	*Malign melanom ve diğer deri kanserlerinin görülme sıklığı giderek artmaktadır. Bu nedenle halen bu konulardaki araştırmaların ve uyarıların yetersiz kaldığını düşünmekteyiz. Çalışmamızın sonucunda deneklerin güneşten korunma davranışlarını sağlıklı olmak istedikleri için değil, araba kullanırken ve spor yaparken güneşin verdiği rahatsızlıktan korunmak için uyguladıkları davranışlar olduğu yönündedir.*
Anahtar Kelimeler	*davranış; güneşten korunma; güneş koruyucu*

INTRODUCTION

Sunlight is responsible for especially the development of melanoma and non-melanoma skin cancers and development of many cases such as photosensitivity, photoaging, erythema, sunburn, bronzing, solar keratosis and cataract.[1-4] In the last few decades, the incidence of skin cancer in the world is increasing and this increase is associated with the increase in exposure to sunlight.[5,6] In many countries, the studies are carried out for the determination of the awareness levels of various segments of the society on effects of sunlight on the skin and skin cancer and sun protection behaviors; education campaigns are organized in order to prevent the development of skin tumors.[7] The World Health Organization (WHO) and the international cancer society recommend wearing protective clothing to protect against harmful effects of the sun, avoiding outdoors during the middle of the day, and using sunscreen if they go out. Cancer organizations in developed countries have launched their own campaigns, for example in Germany "Liebe die Sonne und schütze deine Haut" and in Australia "Sun Smart in Australia". Within the scope of "Euro Melanoma Days" that is organized once a year in our country, free examinations and information are performed in many university hospitals. Several studies have been published showing that sun protection behaviors are related to gender, age and educational level.[8] However, most of these studies have been conducted in a limited number of examples focusing on a specific area. It is not possible to compare the harmful effects of the sun with age, gender, education, socioeconomic level and protection methods due to the inadequacy of the current literature.

Sunscreen cream use and training for changing the behavior and habits of individuals are very important in reducing the negative effects of sunlight. However, the studies show that the issue of increasing the sensitivity of the individual in this direction and as well as the issue of ensuring the correct and effective use of sunscreen cream were insufficient.[2,3,5-7,9-11]

In our country, there is limited information about the intentional sun exposure, the prevalence of sun protective behaviors and correlations between them. It is important to know the imperfect data regarding sun protection and associated socio-demographic characteristics in terms of developing target-specific interventions for the primary prevention of skin cancer.

Therefore, the aims of our study are as follows: 1) to determine the data and socio-demographic characteristics related to sun protective behavior during the summer months in the population who came for education and work from every region of the country, 2) to compare sun protective behaviors and intentional sun exposure factors in the highly educated population (college graduate or university students) as well as intentional sun exposure factors.

MATERIALS and METHODS

Study design: The study was held on the subjects consisting of student and staff volunteers of University (SU) and University Faculty of Medicine Research and Training Hospital (SURTH). A cross-sectional survey was conducted.

Setting and sample: Two thousand five volunteers participated in the study. One thousand three hundred eighty-nine of these volunteers were students in SU, 616 of were staff working in SURTH.

Ethical consideration : The content and methods of this study were approved by the institutional review board of University (Approval no. SUEK:71522473/050.01.04/82). Informed written consent was obtained from all participants before they took part in the study.

Measurements/ Instruments : All subjects were asked to complete the questionnaire containing 45 questions. The information about sun protection behaviors were evaluated in the questionnaire such as the use and frequency of use of sun protection cream [SPC), to avoid exposure to

the sun during peak hours (AESPH) and to wear suitable clothes for sun (WSC). Sun protection behaviors (SPB) was evaluated and compared according to age, sex, occupation, socioeconomic status and skin type. In addition, compliance levels of sun protection behaviors with other health behaviors such as sports activities, smoking, alcohol and seat belt use and obesity.

Data Collection/Procedure : All the patients who visited the outpatient department during the study period were invited to join the about sun protection behaviors anonymously, assisted by trained interviewers with standard protocol. The informed consent forms were signed before patients responded to the questionnaire.

Data Analysis : NCSS (Number Cruncher Statistical System) 2007 & PASS (Power Analysis and Sample Size) 2008 Statistical Software (Utah, USA) program was used for statistical analysis. When evaluating study data, Wilcoxon Signed Ranks Test was used for the evaluation of descriptive statistical methods (Mean, Standard Deviation, Median, Frequency, Rate, Minimum, Maximum) as well as pairwise comparisons of quantitative data. Pearson Chi-Square Test, Fisher-Freeman-Halton Test and Yates Continuity Correction test were used for the comparison of qualitative data. Coherence between other behaviors with the sun protection behavior was evaluated with Cohen Kappa coefficient. Logistic regression analysis was used for the evaluation of the factors effecting the use of sunscreen cream. Significance level was considered as $p < 0,01$ and $p < 0,05$.

RESULTS

The study was conducted with a total of 2005 persons including 53.4% (n = 1070) male and 46.6% (n = 935) female persons in SU and SURTH. The ages of the participants ranged from 15 to 62 years, the mean age is 28.4 ± 7.2 years. Fourteen five % (n = 291), 18.5% (n = 371), 60.1% (n = 1205) and 6.9% (n = 138) of the study participants were observed as skin type 1, skin type 2, skin type 3 and skin type 4, respectively. Natural skin color of the study participants was found to be white skinned for 34.5% (691), wheat skinned for 45.7% (917) and dark skinned for 19.8% (397).

SPB related to age and gender is presented in Table 1. Sun protection methods according to occupational, educational and sociodemographic factors are given in table 2. Sun protection methods according to the sun sensitivity situations are presented in Table 3.

We also examined the compliance levels between sun protection behavior and diet, smoking, alcohol use, seat belt use, sports activities and obesity. Kappa compliance was examined in all other behaviors compared to the sun protection behavior, those with level of Kappa compliance under 0,200 were not taken, those with level of Kappa compliance over 0,200 was given in Table 4. In men 20 years and younger of age, moderate compliance was observed between wearing hat and using seat belt (Kappa: 0.377); sunscreen cream use and playing sports (Kappa: 0.283); repeating sunscreen cream and playing sports (Kappa: 0.287). In women over 40 years of age, moderate compliance was observed between sunscreen cream use (Kappa: 0.273) and repeating sunscreen cream (Kappa: 0.300) with using seat belt. In men over 40 years of age, moderate compliance was observed between wearing hat (Kappa: 0.227) and obesity.

DISCUSSION

The main objective of this cross-sectional study, which involves individuals from every region of country due to current structure of the university, is to determine the sun protection habits that is observed in the country population and to associate these habits with skin cancer prevention methods.

As a result of this study, the main methods used by the population to protect the sun from harmful effects were found as follows: 1) avoiding sun exposure during peak hours (94.5%) and using sunglasses were the most com-

mon and second most common ways of sunscreen behavior for all participants, 2) the third most common use of hats in men, and using sunscreen cream was a common behavior in women, 3) according to occupational groups, using a sunscreen cream was more frequent in health-care provides than students, 4) using sunscreen cream regularly was significantly more common in women, 5) interestingly, having a history of relative skin cancer was associated with sun protection behavior in this study (Table 1,2,3).

According to the data obtained from phone interviews with 40-70 adults from 5 countries in Europe, it has been found that one third of them have never used or rarely used sun protection products while they were outside (30% in England and 46% in Spain).[11] In the study of Devos et al. conducted in Belgium coasts with 360 individuals, the use of sunscreen cream (42%) was reported as the most po-

Table 1: Evaluation of methods of sun protection by age and gender

	Age and Gender											
	≤ 20		20.1 – 30		30.1 – 40		> 40		Total			
	Man	Woman	Man	Woman	Man	Woman	Man	Woman	Man	Woman		
	n=40	n=63	n=695	n=581	n=245	n=222	n=92	n=67	n=1072	n=933	[c]p	[c]p
Wearing hat; n(%)	22(73.7)	30(59.4)	412(60.0)	245 (44.5)	139(59.6)	94 (46.8)	46(59,2)	26 (50,0)	619(59,8)	395(47,1)	0,573	0,888
[a]p	0,301		0,001**		0,035*		0,416		0,001**			
Wearing concelear clothes ; n(%)	22 (73.7)	27(51.5)	372(54.2)	346(61.2)	134(57.5)	145(70.5)	56(71,4)	39 (68,6)	584(57,2)	557(63,2)	0,147	0,027*
[a]p	0,117		0,049*		0,025*		0,778		0,032*			
Using cream; n(%)	27(89.5)	51(97.0)	303(44.2)	434 (75.9)	106(44.9)	164(77.3)	41(51,0)	46(80,6)	489(45,7)	728(77,9)	0,534	0,453
[a]p	[b]0,546		0,001**		0,001**		0,005**		0,001**			
Using cream again after sea / pool; n(%)	27(89.5)	46(87.9)	346(50.5)	429 (75.1)	122(51.7)	165(78.0)	44(54,9)	43 (75,0)	555(51,9)	720(77,1)	0,542	0,674
[a]p	[b]1,000		0,001**		0,001**		0,056		0,001**			
Using sun-glasses; n(%)	21(72.2)	47(87.9)	456(66.7)	444 (80.3)	186(80.6)	176(84.0)	57(70,6)	44 (87,5)	747(70,4)	745(82,3)	0,057	0,505
[a]p	[b]0,249		0,001**		0,460		0,074		0,001**			
Avoid from sun exposure during peak hours; n(%)	26(84.2)	48(90.9)	649(95.5)	527 (95.4)	222(96.5)	188(92.9)	78(96,1)	49 (88,6)		848(94,0)	0,222	0,252
[a]p	[b]0,656		0,912		0,180		[b]0,179		0,238			

[a]PearsonChi-Square [b]Fisherexact test [c]Linearbylinearassociation (men) [d]Linearbylinearassociation (women) *p<0,05 **p<0,01

Table 2: Evaluation of sun protection methods according to socio-demographic characteristics						
	Wearing Hat	**Wearing Concelear Clothes**	**Using Cream**	**Using Cream Again After Sea / Pool**	**Using Sunglasses**	**Avoid From Sun Exposure During Peak Hours**
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Health personnel	280 (%48.1)	392 (%65.3)	403 (%65.5)	403 (%65.5)	475 (%80.1)	552 (%93.2)
Student	779 (%56.5)	800 (%57.7)	814 (%58.6)	872 (%62.8)	1017 (%74.1)	1308 (%95.4)
[a]p	**0,007****	**0,011***	**0,023***	**0,365**	**0,026***	**0,111**
Occupation Status						
Doctor	51 (%50.0)	62 (%59.1)	67 (%63.6)	69 (%65.2)	89 (%86.2)	99 (%93.9)
Nurse	106 (%49.6)	131 (%59.9)	166 (%74.3)	157 (%70.0)	187 (%85.4)	202 (%94.0)
Personnel	123 (%46.1)	198 (%72.1)	170 (%59.2)	178 (%62.0)	198 (%73.4)	251 (%92.4)
Student	779 (%56.5)	800 (%57.7)	814 (%58.6)	872 (%62.8)	382 (%74.1)	1309 (%95.4)
p	**[a]0,051**	**[a]0,006****	**[a]0,005****	**[a]0,393**	**[a]0,006****	**[b]0,321**
Educational Status						
Primary + Secondary School	29 (%50.0)	53 (%86.8)	29 (%46.2)	35 (%56.4)	27 (%51.5)	51 (%91.4)
High School	94 (%48.7)	125 (%66.7)	139 (%72.5)	125 (%65.0)	157 (%84.5)	171 (%90.7)
University (2 years)	272 (%55.7)	144 (%61.7)	312 (%62.3)	333 (%66.5)	394 (%80.1)	454 (%93.7)
University (4 years)	617 (%54.0)	656 (%56.8)	688 (%59.5)	729 (%63.1)	848 (%74.1)	1097 (%96.1)
p	**[a]0,816**	**[a]0,001****	**[a]0,011***	**[a]0,549**	**[a]0,001****	**[b]0,034***
Number of persons living at home						
≤4	742 (%53.5)	819 (%58.3)	882 (%62.1)	925 (%65.2)	1089 (%78.2)	1312 (%94.6)
≥5	251 (%55.2)	373 (%64.0)	336 (%57.4)	350 (%59.8)	403 (%70.4)	549 (%95.3)
p	**[a]0,601**	**[a]0,062**	**[a]0,118**	**[a]0,075**	**[a]0,004****	**[b]0,719**
Income Status						
Income = Expense	597 (%55.6)	640 (%59.0)	672 (%61.7)	698 (%64.0)	800 (%74.7)	1016 (%95.2)
Income < Expense	246 (%52.4)	293 (%61.2)	266 (%54.6)	282 (%57.9)	349 (%73.6)	443 (%93.0)
Income > Expense	216 (%51.7)	259 (%61.1)	280 (%65.3)	296 (%69.0)	344 (%81.4)	402 (%95.8)
[a]p	**0,464**	**0,739**	**0,025***	**0,021***	**0,057**	**0,246**

[a]PearsonChi-Square [b]FisherFreemanHalton Test *p<0,05 **p<0,01

pular behavior in the study.[11] Robinson et al.[4] investigated sun protection methods that were used by 503 adults to protect their children from sunlight during the summer months, and the use of sunscreen cream was detected as the most common sun protection behavior. Görig et al.[4] found in their study, involving 3000 individuals, that wearing long-sleeve cloths (53.9%) was the method used to protect against sun.

In the study of Ermertcan et al.[2] that was performed on 1,018 university staff and students, it was determined that the most popular sun protection behaviors were not going outside during the middle of the day and wearing sunglass in men and women, respectively. In our study, avoiding sunlight at peak hours was the most popular sunscreen behavior for men (95.5%) and women (94%). Sunglasses were the second most protection behavior for women (82.3%) and men (70.4%). The use of hats in males (59.8%) and the use of sunscreen in females (77.9%) was the third most commonly used sun protection method.

Türel Ermertcan et al.[2] reported a high rate of use of sunsc-

Table 3: Evaluation of sun protection methods according to the present situation sensitivity						
	Wearing Hat	**Wearing Concelear Clothes**	**Using Cream**	**Using Cream Again After Sea / Pool**	**Using Sunglasses**	**Avoid From Sun Exposure During Peak Hours**
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Skin type						
Type 1	174 (61.6)	166 (58.4)	195 (67.0)	197 (67.6)	242 (85.8)	275 (97.2)
Type 2	208 (57.3)	226 (61.3)	238 (64.2)	246 (66.4)	267 (73.9)	339 (93.8)
Type 3	618 (52.4)	710 (59.4)	712 (59.1)	752 (62.4)	889 (74.9)	1118 (94.5)
Type 4	59 (43.0)	89 (65.1)	72 (52.3)	80 (58.1)	94 (69.4)	128 (95.2)
[a]p	**0,019***	**0,703**	**0,055**	**0,310**	**0,007****	**0,444**
Natural skin color						
White-skinned	370 (54.7)	406 (59.5)	446 (64.6)	457 (66.2)	526 (78.3)	648 (96.0)
Wheat-skinned	494 (55.2)	339542 (59.6)	351562 (61.3)	366586 (63.9)	431690 (76.0)	531849 (94.0)
Dark-skinned	195 (50.0)	243 (61.8)	209 (52.8)	232 (58.5)	277 (71.5)	363 (94.6)
[a]p	**0,372**	**0,812**	**0,009****	**0,128**	**0,139**	**0,376**
Total number of nevus						
None	168 (53.0)	224 (68.3)	211 (62.9)	217 (64.8)	229 (73.3)	290 (%92.8)
0 – 10	571 (51.7)	643 (57.7)	640 (57.0)	68 (61.1)	840 (75.4)	1046 (%94.2)
10 – 20	221 (59.0)	219 (57.8)	251 (66.0)	264 (69.3)	298 (78.8)	368 (%97.5)
> 20	92 (60.2)	106 (64.1)	115 (69.9)	107 (65.0)	126 (77.5)	157 (%96.1)
[a]p	**0,138**	**0,035***	**0,012***	**0,141**	**0,569**	**0,127**
Sun related diseases						
No	1026 (54.1)	1141 (59.4)	1165 (60.1)	1226 (63.3)	1448 (75.7)	1813 (94.9)
Yes	11 (41.2)	10 16 (58.8)	19 (76.5)	1219 (70.6)	26 (94.1)	24 (82.4)
[a]p	**0,289**	**0,964**	**0,171**	**0,533**	**[b]0,090**	**[b]0,056**
Family history of skin cancer						
No	893 (53.6)	1026 (60.6)	1029 (60.3)	675 (63.3)	1278 (75.8)	1595 (94.8)
Yes	131 (55.0)	120 (50.3)	142 (58.9)	93 (61.6)	187 (77.9)	226 (95.3)
[a]p	**0,734**	**0,016***	**0,746**	**0,680**	**0,584**	**0,798**

[a]PearsonChi-Square [b]Fisherexact test *p<0,05 **p<0,01

Table 4: Compliance levels between sun protection methods and other behaviors		
	Sun Protection Methods - Protection behaviors from the sun	**K ***
≤20 Males	Wearing Hat - Using seat belt	0.377
≤20 Males	Using cream - Making sport	0.283
≤20 Males	Using cream again after sea / pool - Making sport	0.283
>40 Females	Using sunglasses - Using seat belt	0.273
>40 Females	Using cream again after sea / pool - Using seat belt	0.300
>40 Males	Wearing Hat - Obesity	0.227

* Compliance levels with Kappa values greater than 0.200 are expressed.

reen cream in those with skin type 1-2 and those with a total number of nevus greater than 10, and those with the history of skin cancer and sun-related diseases in their families. In our study, there was a correlation between using sunscreen cream and educational level, income level, skin type, skin color, total nevus number, and sunburn history. Tamir et al.[12] evaluated sun-related behavior changes over the period of 1994-1998 in Israel and reported an increasing incidence of sun protection from; 34% in 1994, 41% in 1996 and 46% in 1998. In our study, the ratio of using sunscreen cream and the recurrence rate of using sunscreen scream in individuals who had sunburn in previous summer was significantly higher than those who did not have sunburn last summer.

Purdue et al.[13] found that wearing protective cloths and using sunscreen cream was more frequent in those with a higher educational level. In our study, we determined that the ratio of wearing protective cloths was higher in women than in those with lower levels of education and socioeconomic status. We believe that the behavior of wearing protective clothes in women depends on traditional and religious dressing factors. We found that the use of sunglasses was associated with skin type 1, education and socioeconomic levels. We believe that the use of sunglasses depends on socioeconomic factors.

According to study of Cogan et al.[14], the use of risk factors for other health conditions, such as smoking and alcohol, were higher in those who did not use sunscreen cream.[14] In the study done by Ermertcan et al.[2], there was no relationship between sun protection behaviors and obesity, smoking and alcohol use. In our study, we found no association between sun protection behaviors and diet, smoking and alcohol use.

In general literature, when sun protection measures are applied in the first years of life, cumulative sun exposure and skin damage are reduced. These factors are important risk factors for both basal cell carcinoma and malignant melanoma. For this reason, protection from sunlight in the early stages of life is very important for skin cancer prevention.[2] The different outcomes of diseases that result in UV exposure at different age groups in our study are attributable to the fact that people from different regions of the country are not adequately educated and informed in consequence of different cultural, religious and geographical influences.

These findings indicate that the first method of protecting against harmful effects of the sun is through education. Thus, there is a need for campaigns to increase the knowledge of public about the harmful effects of the sun. As mentioned in the literature, education at early ages and regular campaigns are required.8 Education programs that are used for alcohol and cigarette in the public health studies can be used for training of sun protective behavior.[8,15,16]

According to our findings, it seems that the most important obstacle in prevention of skin cancer is the low education and socioeconomic level. In our study, these groups were less likely to show sunbathe and less sunscreen behaviors during the summer months. In previous studies in our country, behaviors show differences between groups.[2] The first step towards promoting sun protection for this group in our country is to increase the risk awareness of unprotected sun exposure and supporting sunscreen creams by the government.

Our country is a Mediterranean country where the sea and the sun coexist. Tanned skin is still accepted as healthy appearance in our society and it is very popular. However, the incidence of malignant melanoma and other skin cancers is increasing. Therefore, we consider that the researches and notices in these cases are still insufficient.

In the future, efforts should be directed to change the perception of tanned skin. Especially, media should avoid from programs that encourage tanning, and education programs about harmful effect of the sun and protection

methods should be done. As a target group in protection programs, not only adults but especially children and young people should be included. Since childhood are in an important period in which behaviors and lifestyle are developed, the number and content of education programs for awareness of sun protection are needed to be intensified in this period.

The limitations of our study were as follows; 1) the cross-sectional design of our study did not allow us to specify the causality of the identified relationships, 2) the study data were based on the statements of the participants, 3) as the study was held during the education period (January-March) of the university, the examination of information from the previous summer may have been the cause of various information errors.

It is important to explore country-specific factors to explain differences in the incidence of skin cancer in Europe. A large sample of participants aged 15-62 years (n = 2005) were selected to allow us to identify differences between age groups. Our work provides a significant contribution to the identification of sunscreen behavior and exposure to sunlight. To our knowledge, our study is the largest community-based study that identifies concurrent sunscreen behavior and sun exposure in the population of our country. The university community is a small reflection of the society because it involves people from every region and territory of the country.

Ethics Committee Approval: The study was approved by the local ethical authority.

Conflict of Interest: No conflict of interest was declared by the authors.

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