

## EVALUATION OF QUALITY OF LIFE, PSYCHIATRIC COMORBIDITY AND OTHER RELATED PSYCHOSOCIAL FACTORS (PEER VICTIMIZATION/SELF-ESTEEM/LONELINESS/SOCIAL SUPPORT) IN ADOLESCENTS WITH WARTS: A CASE-CONTROL STUDY

VİRAL SİĞİLLİ ERGENLERDE YAŞAM KALİTESİ İLE PSİKİYATRİK KOMORBİDİTE VE İLİŞKİLİ DİĞER PSİKOSOSYAL FAKTÖRLERİN (AKRAN ZORBALIĞINA MARUZ KALMA/BENLİK SAYGISI/YALNIZLIK/SOSYAL DESTEK) DEĞERLENDİRİLMESİ: OLGU KONTROL ÇALIŞMASI

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**Cite this article as:** Aktepe E, Akyıldız A, Erturan İ, Erdoğan Y. Evaluation Of Quality Of Life, Psychiatric Comorbidity And Other Related Psychosocial Factors (Peer Victimization/Self-Esteem/Loneliness/Social Support) In Adolescents With Warts: A Case-Control Study. Med J SDU 2021; 28(1): 105-113.

### Öz

#### Amaç

Bu çalışmanın ilk amacı, siğilli ergenlerde komorbid psikiyatrik bozuklukların sıklığının yanı sıra akran mağduriyeti, benlik saygısı, yalnızlık ve sosyal destek özellikleri gibi psikososyal faktörlerin değerlendirilmesidir. Bu çalışmanın ikinci amacı, bu ergenlerdeki yaşam kalitesini etkileyen faktörler ile çeşitli psikososyal faktörler (sosyal destek/yalnızlık/akran zorbalığına maruziyet/benlik saygısı) arasındaki ilişkiyi incelemektir.

#### Gereç ve Yöntem

Çalışma, 62 viral siğilli ergen ile yaş ve cinsiyet açısından olgu grubuna benzer 62 sağlıklı kontrol ile yürütülmüştür. Olgu ve kontrol gruplarına Piers-Harris Öz-kavramı Ölçeği, Çocuklar için Sosyal Destek Değerlendirme Ölçeği, UCLA Yalnızlık Ölçeği-Kısa Formu, Akran Zorbaları Kurbanlarını Belirleme Ölçeği uygulanmıştır. Her iki grup Okul Çağı Çocukları İçin Duygulanım Bozuklukları ve Şizofreni Görüşme Çizelgesi-Şimdi Şekli Türkçe uyarlaması ile değerlendiril-

miştir. Olgu grubuna Çocuklar için Dermatoloji Yaşam Kalite İndeksi uygulanmıştır.

#### Bulgular

Olgu kontrol grupları arasında psikiyatrik komorbidite sıklığı ile benlik saygısı/sosyal destek/yalnızlık/akran zorbalığına maruz kalma düzeyleri açısından anlamlı farklılık olmadığı saptanmıştır. Siğil süresi/sayısı/yerleşim yeri/bölge sayısı gibi faktörlerin yaşam kalitesi üzerinde etkili olduğu tespit edilmiştir. Viral siğilli ergenlerin sosyal destek ve yalnızlık düzeylerinin bu ergenlerin benlik saygıları ve akran zorbalığına maruz kalmaları ile ilişkili faktörler olduğu tespit edilmiştir.

#### Sonuç

Viral siğilli ergenlerin sosyal destek düzeylerini artırarak yalnızlık düzeylerinin azaltılması, bu ergenlerin akran zorbalığına maruz kalma riskini azaltıp yaşam kalitesi ve benlik saygısı düzeyleri üzerinde koruyucu rol oynayabilir.

**Anahtar Kelimeler:** Siğil, psikodermatoloji, yaşam kalitesi

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Müracaat tarihi/Application Date: 19.06.2020 • Kabul tarihi/Accepted Date: 14.08.2020

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## Abstract

### Objective

The first aim of this study was to evaluate the frequency of comorbid psychiatric disorders as well as psychosocial factors such as peer victimization, self-esteem, loneliness and social support properties in adolescents with warts. The second aim of this study was to investigate the relationship between factors affecting quality of life and the various psychosocial factors (social support/loneliness/ peer victimization/self-esteem) in these adolescents.

### Materials and Methods

This study included 62 adolescents with viral warts and 62 age and gender-matched healthy controls. The Piers-Harris Self-Concept Scale, Social Support Scale for Children, short-form UCLA Loneliness Scale, and Peer Victimization Scale were administered to the case and control groups. Both groups were evaluated with the Schedule for Affective Disorders and Schizophrenia for School Age Children- Present and Li-

fetime Version-Turkish Version. The Dermatology Life Quality Index was administered to the case group.

### Results

There were no significant differences in the frequency of comorbid psychiatric disorders and the levels of peer victimization, self-esteem, loneliness and social support between the case and control groups. It was determined that the duration of presence of warts/number of warts/location of warts/number of involved sites significantly affected the quality of life. The levels of loneliness and social support were related to the levels of peer victimization and self-esteem in adolescents with viral warts.

### Conclusion

Amelioration of loneliness by increasing social support can play a protective role on the levels of quality of life and self-esteem by reducing the risk of peer victimization in adolescents with viral warts.

**Keywords:** Wart, psychodermatology, quality of life

## Introduction

Warts are benign lesions of the skin and mucus membranes caused by human papillomaviruses (HPVs) and are very frequently seen among children aged 12-16 years [1]. Skin diseases can often lead to psychiatric disorders and about 30% of dermatology outpatients have mental health problems [2]. The frequency of psychiatric comorbidity was reported to be lower in patients with viral warts than in patients with acne, alopecia and psoriasis vulgaris [3].

Quality of life (QOL) is defined as the subjective assessment of the impact of disease and its treatment [4]. Skin diseases can variously affect the QOL. QOL was less deteriorated in children and adolescents with viral warts compared to children and adolescents with other dermatological diseases [5,6]. Skin diseases can lead to low self-esteem especially in adolescents; however, a previous study found that self-esteem did not differ between individuals with warts and healthy controls [6].

Many skin diseases are mistakenly considered to be infectious due to their appearance. This may lead to patients being exposed to peer victimization and the development of psychiatric comorbidity [7]. Skin diseases that have been reported to be associated with peer victimization are atopic dermatitis, psoriasis, acne, and congenital melanocytic nevus [7]. In the lit-

erature, there are no studies that have examined the exposure of adolescents with viral warts to peer victimization.

It is known that a deterioration in physical appearance creates risks for limitation and exclusion in social relationships of adolescents [8]. Adolescents who think they are not socially accepted due to their skin diseases can be pushed into loneliness because of social withdrawal [9]. Social support is considered to be a protective factor for psychological health and plays an important role in the adaptation process of the patient to his/her own disease [10]. In the literature, there are no studies investigating the levels of loneliness and social support in adolescents with viral warts.

The first aim of this study was to evaluate the frequency of comorbid psychiatric disorders and the levels of peer victimization, self-esteem, loneliness and social support in adolescents with viral warts in comparison to healthy adolescents. The second aim of this study was to investigate the relationships between factors affecting quality of life and various psychosocial factors (peer victimization/self-esteem/loneliness/social support) in these adolescents.

### Materials and Methods

This study was approved by the Clinical Research Ethics Committee of Suleyman Demirel University

Faculty of Medicine (Decision Date: 31/05/2017 and Decision No: 110). The case group consisted of 62 adolescents with viral warts between the ages of 14 and 16 who were admitted to the Dermatology Department of Suleyman Demirel University Faculty of Medicine within the last one year. The control group consisted of 62 age and gender-matched healthy adolescents. The exclusion criteria for the study were as follows: having severe cognitive impairment and/or a history of chronic diseases (psychiatric/systemic/dermatological diseases) other than viral warts. Written informed consent was obtained from all participants included in the study.

The Piers-Harris Self-Concept Scale (PHSCS), Social Support Scale for Children (SSSC), short-form UCLA Loneliness Scale (ULS-4), and Peer Victimization Scale (PVS) were administered to the case and control groups. Both groups were evaluated with the Schedule for Affective Disorders and Schizophrenia for School Age Children- Present and Lifetime Version-Turkish Version (K-SADS-PL-T). The Dermatology Life Quality Index (DLQI) as well as the Evaluation Form for Wart-Related Descriptive Characteristics were administered to the case group.

#### Data Collection Tools

Evaluation Form for Wart-Related Descriptive Characteristics is a questionnaire that determines descriptive characteristics such as age, gender, duration of warts, number of warts, location of warts, and number of involved sites. This form is prepared by the researchers.

DLQI is a dermatology-specific quality of life tool developed for children aged 5-16 years [11]. The validity and reliability study of the Turkish version of the scale was performed in children and adolescents aged 5-16 years [12]. It consists of 10 questions across six domains: symptoms/feelings, leisure, school/holiday, personal relationships, sleep, and treatment. High scores indicate greater impairment of the quality of life.

K-SADS-PL-T is a semi-structured interview tool used to determine psychiatric disorders in children and adolescents aged 6-18 years. This tool was developed by Kaufman et al. to determine the past and current psychopathologies in children and adolescents according to DSM-IV [13]. It was translated into Turkish by Gökler et al. and has been reported to be a valid and reliable tool for identifying common mental disorders in children and adolescents [14]. The K-SADS-P-T tool was used in the current study.

PHSCS was developed to determine self-concept levels of individuals aged 9-20 years [15]. It has six sub-scales covering physical appearance and attributes, freedom from anxiety, intellectual and school status, behavioural adjustment, happiness and satisfaction, and popularity. Higher scores indicate high self-concept, while low scores indicate low self-concept. The validity and reliability study of the Turkish version of the scale was conducted in individuals with a wide age range from primary school students to university students [16].

SSSC is a tool where each item is rated on a 5-point Likert scale and consists of three sub-dimensions including peer support, family support, and teacher support [17]. High scores indicate that the individuals receive more social support. The validity and reliability study of the Turkish version of the scale was performed in children and adolescents aged 9-17 years [18].

ULS-4 was developed by Russell, Peplau and Ferguson and consists of a four item short form, which was revised by Eskin and developed for patients aged 12 and over [19,20]. Higher scores indicate higher levels of loneliness.

PVS: Mynard and Joseph developed the Multidimensional Peer Victimization Scale (MPVS) to assess direct and indirect forms of peer victimization among secondary school students [21]. The scale was adapted to Turkish by Gültekin and Sayil for use with Turkish students aged 11-16 years and contains 27 items answered on a 3-point Likert scale [22]. The scale consists of five dimensions: terror, overt victimization, teasing, relational bullying, and attacks on property. Higher scores indicate higher levels of peer victimization.

#### Statistical Analysis

Statistical analysis was performed using SPSS 21.0 for Windows (SPSS Inc., Chicago, IL, USA) package program. While categorical variables were presented as number and percentage, continuous variables were presented as mean with standard deviation (SD). The Chi-square test was used to compare categorical variables. Student's t-test was used to compare continuous variables. Pearson correlation analysis was used to analyze the direction and severity of the relationship between two variables. Multiple linear regression analysis was performed to determine the influencing factors on the scales. A p-value of less than 0.05 was considered as statistically significant.

## Results

The gender distribution was equal among the case and control groups. The mean age was  $14.90 \pm 0.92$  years in the case group and  $15.05 \pm 0.84$  years in the control group ( $p=0.360$ ).

The mean duration of the presence of warts was  $11.90 \pm 8.59$  months (range 1-36) and the mean number of warts was  $4.48 \pm 5.39$  (range 1-25) in the patient group. In the same group, 38.7% ( $n=24$ ) had viral warts for 0-6 months, 24.2% ( $n=15$ ) for 7-12 months, 14.5 ( $n=9$ ) for 13-18 months, and 22.6% ( $n=14$ ) for over 18 months. While 52 (83.9%) cases had single-site involvement, 10 (16.1%) had multiple-site involvement. Of the cases with single-site involvement, 40.3% ( $n=25$ ) had hand involvement, 35.5% ( $n=22$ ) had foot involvement, 1.6% ( $n=1$ ) had face involvement, and 6.5% ( $n=4$ ) had involvement of other regions (neck, elbow, knee, hair).

The frequency of comorbid psychiatric disorders was 64.5% ( $n=40$ ) in the case group and 62.9% ( $n=39$ ) in the control group ( $p=1.000$ ). No significant difference was found between the two groups for the types of comorbid psychiatric disorders (Table 1). The DLQI scores of the case group are shown in Table 2. No significant differences in the levels of peer victimization, self-esteem, loneliness and social support could be determined between the two groups (Table 3).

The patients with foot involvement and with multiple site involvement had significantly lower quality of life compared to the other patients (Table 4). Correlation coefficients between the descriptive characteristics such as the duration and number of warts and the DLQI/PVS total and subscale scores are shown in Table 5. As the number of warts increased, the severity of symptoms increased and the quality of life and participation in leisure activities decreased. As the dura-

**Table 1** Comparison of Psychiatric Comorbidities between Case and Control Groups

Psychiatric comorbidities	Case, n (%)	Control, n (%)	P*
<b>Specific phobia</b>			
Yes	29 (46.8)	23 (37.1)	0.363
No	33 (53.2)	39 (62.9)	
<b>Social phobia</b>			
Yes	15 (24.2)	9 (14.5)	0.256
No	47 (75.8)	53 (85.5)	
<b>ADHD</b>			
Yes	2 (3.2)	7 (11.3)	0.163
No	60 (96.8)	55 (88.7)	
<b>Depression</b>			
Yes	1 (1.6)	0 (0.0)	0.500
No	61 (98.4)	62 (100.0)	
<b>GAD</b>			
Yes	2 (3.2)	5 (8.1)	0.220
No	60 (96.8)	57 (91.9)	
<b>OCD</b>			
Yes	2 (3.2)	1 (1.6)	0.500
No	60 (96.8)	61 (98.4)	
<b>Enuresis</b>			
Yes	2 (3.2)	0 (0.0)	0.248
No	60 (96.8)	62 (100.0)	
<b>Tic disorder</b>			
Yes	2 (3.2)	3 (4.8)	0.500
No	60 (96.8)	59 (95.2)	

#: Column percentage. \*Pearson's chi-square test ADHD: Attention Deficit Hyperactivity Disorder GAD: Generalized Anxiety Disorder OCD: Obsessive Compulsive Disorder

tion of warts increased, the level of overt victimization of the cases by peers increased.

In the case group, the DLQI scores were found to be significantly negatively correlated with the PHSCS and SSSC scores and to be significantly positively correlated with the PVS scores. In the case group, the PHSCS scores were found to be significantly pos-

itively correlated with the SSSC scores and to be significantly negatively correlated with the PVS and ULS-4 scores. In the case group, the SSSC scores were found to be significantly negatively correlated with the PVS and ULS-4 scores. In the case group, the ULS-4 scores were found to be significantly positively correlated with the PVS scores (Table 6).

**Table 2** Evaluation of Dermatology Life Quality Index Scores in Case Group

	Cases (n:62)
DLQI_total, mean±sd	3.97±3.39
DLQI_symptoms/feelings, mean±sd	1.50±1.26
DLQI_leisure, mean±sd	1.31±1.79
DLQI_school/holiday, mean±sd	0.32±0.57
DLQI_personal relationships, mean±sd	0.27±0.75
DLQI_sleep, mean±sd	0.19±0.44
DLQI_treatment, mean±sd	0.37±0.55

DLQI: Dermatology Life Quality Index

**Table 3** Comparison of Scores on Piers-Harris Self-Concept Scale, Social Support Scale for Children, Short-form UCLA Loneliness Scale, and Peer Victimization Scale between Case and Control Groups

	Cases (n:62)	Controls (n:62)	p*
PHSCS-total, mean±sd	61.53±9.82	62.16±7.70	0.692
PHSCS-happiness and satisfaction, mean±sd	10.71±2.60	11.10±2.16	0.369
PHSCS-freedom from anxiety, mean±sd	7.82±3.03	8.35±2.52	0.290
PHSCS-popularity, mean±sd	9.87±2.08	9.60±1.51	0.402
PHSCS-behavioural adjustment, mean±sd	12.52±2.35	14.92±17.68	0.291
PHSCS--physical appearance and attributes, mean±sd	7.23±2.01	6.94±2.30	0.455
PHSCS-intellectual and school status, mean±sd	5.15±1.56	5.16±1.63	0.955
SSSC-total, mean±sd	178.02±19.65	178.73±12.49	0.811
SSSC-peer, mean±sd	80.21±11.16	81.56±6.88	0.418
SSSC-family, mean±sd	55.31±5.49	54.53±6.29	0.467
SSSC-teacher, mean±sd	42.05±6.18	41.82±5.60	0.832
PVS- total, mean±sd	3.61±5.50	3.21±4.71	0.620
PVS-terror, mean±sd	0.27±1.00	0.31±0.80	0.442
PVS-teasing, mean±sd	1.31±2.03	1.06±1.78	0.803
PVS-overt victimization, mean±sd	0.31±0.90	0.34±0.87	0.644
PVS-relational bullying, mean±sd	0.98±1.81	0.82±1.64	0.844
PVS-attacks on property, mean±sd	0.73±1.53	0.66±1.23	0.738
ULS-4	6.89±2.47	6.69±2.08	0.929

\*Student's t-test PHSCS:Piers-Harris Self-Concept Scale.SSSC:Social Support Scale for Children. PVS: Peer Victimization Scale. ULS-4: short-form UCLA Loneliness Scale

According to multiple linear regression analysis performed between the PHSCS scores (dependent variable) and the duration and number of warts and DLQI, SSSC, PVS, ULS-4 scores (independent variables), it

was determined that the most important independent variable affecting the PHSCS scores was the ULS-4 scores ( $\beta = -0.475$ ,  $p \approx 0.000$ ).

Table 4

Evaluation of DLQI Total and Subscale Scores according to Location of Warts in Case Group

Location of warts	Hand (n=25)	Foot (n=22)	P*	Single involvement	Multiple involvement	P*
DLQI-total, mean±sd	2.20±1.89	5.23±3.38	<b>0.001*</b>	3.58±3.18	6.00±3.89	<b>0.037</b>
DLQI-symptoms/feelings, mean±sd	1.32±1.41	1.59±1.14	0.476	1.46±1.29	1.70±1.16	0.589
DLQI-leisure, mean±sd	0.28±0.68	2.05±1.84	<b>0.001*</b>	1.08±1.61	2.50±2.27	<b>0.020</b>
DLQI-school/holiday, mean±sd	0.08±0.28	0.59±0.73	0.115	0.31±0.58	0.40±0.52	0.641
DLQI-personal relationships, mean±sd	0.04±0.20	0.32±0.89	0.167	0.15±0.61	0.90±1.10	0.064
DLQI-sleep, mean±sd	0.12±0.33	0.23±0.43	0.340	0.17±0.38	0.30±0.68	0.405
DLQI-treatment, mean±sd	0.36±0.57	0.45±0.51	0.554	0.40±0.57	0.20±0.42	0.207

DLQI: Dermatology Life Quality Index. \*Independent samples T test

Table 5

Correlations between Descriptive Characteristics and DLQI and PVS scores in Case Group

	Duration of warts	Number of warts
DLQI_total (r)	.264	<b>.414</b>
DLQI_symptoms/feelings (r)	.165	<b>.455</b>
DLQI_leisure (r)	.166	<b>.266</b>
DLQI_school/holiday (r)	.100	.203
DLQI_personal relationships (r)	.436	.178
DLQI_sleep (r)	-.072	-.025
DLQI_treatment (r)	.197	.238
PVS_total (r)	.122	-.088
PVS_terror (r)	-.085	-.167
PVS_teasing (r)	0.97	0.52
PVS_overt victimization (r)	<b>.272*</b>	0.75
PVS_relational bullying (r)	.034	-.109
PVS_attacks on property (r)	0.65	-.229

r: Pearson's correlation coefficient. DLQI: Dermatology Life Quality Index. PVS: Peer Victimization Scale.



Table 6

Correlations between Scores on DLQI, PHSCS, SSSC,PVS and ULS-4 in Case Group

	DLQI (r)	PHSCS (r)	SSSC (r)	PVS (r)	ULS-4 (r)
DLQI	1				
PHSCS	<b>-.348**</b>	1			
SSSC	<b>-.263*</b>	<b>0.549**</b>	1		
PVS	<b>.373**</b>	<b>-0.560**</b>	<b>-0.576**</b>	1	
ULS-4	.098	<b>-0.620**</b>	<b>-0.449**</b>	<b>0.497**</b>	1

r: Pearson's correlation coefficient. \*p<0.05. \*\*p<0.01. DLQI: Dermatology Life Quality Index. PHSCS:Piers-Harris Self-Concept Scale.SSSC:Social Support Scale for Children.PVS: Peer Victimization Scale. ULS-4: short-form UCLA Loneliness Scale.

## Discussion

In the literature, the frequency of psychiatric comorbidity in children with dermatological diseases ranges from 37.5% to 80% according to the K-SADS-PL [9]. Consistent with published data, the frequency of comorbid psychiatric disorders in adolescents with viral warts was found to be 64.5% in the current study, and no significant difference was found between the case and control groups in the frequency of psychiatric comorbidity. This lack of difference may have resulted from the recruitment of a limited number of cases in our study. There is a need for further studies with a larger number of cases to better assess the frequency of psychiatric comorbidity.

The most common psychiatric comorbidities identified in the adolescents with viral warts in the current study were specific phobia, followed by social phobia. It has been reported that social phobia usually begins in adolescence and is one of the serious mental health problems in adolescents [23]. Social phobia was the second most common diagnosis in both case and control groups in our study, in accordance with the published literature. Only one adolescent from our sample had facial viral warts; most of the participants had warts that were localized predominantly in less visible body parts (such as hand and foot). The absence of any significant difference in the frequency of social phobia between the case and control groups could have emerged from the limited number of cases presenting with warts in visible areas (such as face). This enabled most of the patient cohort to continue with social interactions, unlike other dermatological diseases such as acne and vitiligo.

Studies performed in children and adolescents with viral warts reported QOL scores of  $3.30 \pm 2.90/3.71 \pm 2.65$

[11,12]. These scores are low, showing that QOL was less impaired in patients with viral warts compared to patients with other dermatological diseases [11,12]. Consistent with the published data, our study found that the mean DLQI score in adolescents with viral warts was  $3.97 \pm 3.39$ .

It has been reported previously that there is a negative relationship between the duration and number of lesions and QOL in dermatology patients [24]. Similarly, we observed in the current study that as the duration and number of warts increased, QOL decreased. Additionally, it was determined that as the number of warts increased, the number of symptoms increased and the level of participation in leisure activities decreased, both of which could culminate in a reduction in QOL. We also determined that as the duration of the presence of warts increased, the level of interpersonal relationships decreased and the level of overt victimization increased, which could also have negatively impacted the QOL.

Participation in leisure activities is one of the factors that can increase the QOL of individuals. Various studies have revealed that insufficient participation in leisure activities among patients with dermatological diseases has a negative impact on QOL. The degree of influence on QOL can also vary according to the location of the warts. Another study reported that patients with plantar warts were less likely to participate in leisure activities (such as sports) and therefore QOL was more impaired [25]. Consistent with published data, our study shows that cases with plantar warts had significantly lower QOL compared to other cases because they had lower levels of participation in leisure activities.

Studies in children and adolescents with various der-

matological diseases revealed that greater the total number of involvement sites, more impaired was the patients' quality of life [26]. Consistent with this idea, we found that multiple site involvement negatively affected QOL by reducing participation in leisure activities.

Besides the fact that social support is a protective factor for psychological and physical health, high self-esteem is a factor that increases the QOL. Studies conducted on individuals with skin diseases have reported that QOL increases as the levels of self-esteem and social support increase [27]. Similarly, our data suggests that QOL increased as the levels of self-esteem and social support increased in adolescents with viral warts. It is therefore suggested that higher self-esteem and social support may positively affect the QOL in adolescents with viral warts.

The level of peer victimization is known to increase as the level of social support decreases [28]. Similarly, we observed that the level of peer victimization increased as the level of social support decreased in adolescents with viral warts indicating that social support may be considered as a protective factor for peer victimization. In parallel with this interpretation, case and control groups in the current study showed similar levels of social support with no significant difference between the two groups in terms of peer victimization. It has been reported that children who are exposed to peer bullying are more lonely than other children and that peer victimization was associated positively with loneliness in adolescents [29]. Similarly, the level of peer victimization was observed in the current study to increase as the level of loneliness increased in adolescents with viral warts. Thus, interventions that can increase the level of social support and decrease the level of loneliness may reduce peer victimization in adolescents with viral warts.

Self-esteem and self-image of children and adolescents with dermatological diseases such as atopic dermatitis, acne, psoriasis are known to be negatively affected due to their exposure to peer bullying [7]. We also observed that the level of self-esteem decreased as the level of peer victimization increased in adolescents with viral warts. Therefore, interventions that can prevent peer-bullying may play a protective role on the self-esteem of adolescents with viral warts.

Adolescents with dermatological diseases such as acne and psoriasis tend to withdraw from social life and exhibit higher levels of loneliness because they experience negative emotions like stigma and shame, and have body image issues [30]. According to our

knowledge, there is no published study investigating the level of loneliness in adolescents with viral warts. Interestingly, there were no significant differences between the adolescents with viral warts and the healthy controls in the levels of loneliness and social support in the current study; moreover, the levels of loneliness decreased as the level of social support increased in adolescents with viral warts. Perceived social support by adolescents with viral warts may have played a role in protecting them against loneliness. This corroborates with data available in the literature that indicate that increased social support can mitigate loneliness [30]. We also found that the level of self-esteem increased as the level of loneliness decreased in adolescents with viral warts and that loneliness was the most important factor in predicting self-esteem. The absence of any significant difference in the level of self-esteem between the case and control groups is most likely related to the fact that both groups were exposed to similar levels of loneliness.

There are some limitations in our study. The case group is not representative of all adolescents with viral warts in Turkey because the study was performed on adolescents aged 14-16 years who were admitted to a specific dermatology outpatient clinic. The lack of a temporal causal relationship is a general limitation of case-control studies and is another limitation of our study. The most important strength of our study is the fact that psychiatric comorbidities were determined by a semi-structured interview tool such as the K-SADS-PL. In addition, our study is the first to examine the levels of social support, loneliness and peer victimization in adolescents with viral warts.

## Conclusion

In conclusion, our study demonstrates that the frequency of comorbid psychiatric disorders was similar among adolescents with viral warts and healthy controls. There were no significant differences between the two groups in the levels of peer victimization, self-esteem, loneliness and social support. Descriptive characteristics (such as duration of warts, number of warts, location of warts, and number of involved sites) affected the QOL of adolescents with viral warts. Preventing an increase in the number of warts and the rapid spread of warts with effective treatments can reduce their negative impact on QOL. It was observed that the levels of loneliness and social support were related to the levels of peer victimization and self-esteem in adolescents with viral warts. Factors affecting QOL in adolescents with viral warts included social support and self-esteem. Decreasing the level of loneliness by increasing the level of social support



can play a protective role on the levels of QOL and self-esteem by reducing the risk of peer victimization in adolescents with viral warts.

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