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Original Article

The effect of warts on quality of life in Turkish pediatric patients

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ABSTRACT

Background. The negative effect of genital and extragenital warts on adult patient quality of life (QoL) is well known; however, the literature lacks data on the effect of extragenital warts on Turkish pediatric patient QoL. The aim of this study was to determine the effect of extragenital warts that persist for ≥6 months on Turkish pediatric patient QoL, as well as to determine the relationship between patient demographic and clinical characteristics, and QoL.

Methods. The Pediatric Quality of Life Inventory Version 4.0 (PedsQL™ 4.0) was administered to 85 children and their parents (patient group), and 85 age- and gender-matched children without any skin disease and their parents (control group). Children's Dermatology Life Quality Index (CDLQI) was administered to the patients. Higher CDLQI and PedsQL™ are indicative of lower QoL.

Results. Median wart duration and median age at the time of wart onset was 12 months (range 6-84) and 10 years (range 1-16), respectively. In the patient group mean (±Standard deviation [SD]) CDLQI score was 5.20 ± 5.97, and warts had the greatest negative effect on CDLQI symptoms and feelings scores. Mean (±SD) PedsQL™ total score was higher in the affected patients than that for the controls (23.42 ± 12.33 versus 15.81 ± 7.37, P<0.001), and school, social and emotional functionality subscales exhibited the greatest differences between these groups. Mean (±SD) PedsQL™ total score for the patients' parents was higher than that for the controls' parents (25.94 ± 12.49 versus 17.81 ± 6.87, P<0.001), and social and emotional functionality subscales exhibited the greatest difference between these groups.

Conclusions. The findings show that Turkish children with warts that persist for ≥6 months had lower QoL than the controls.

Key words: dermatology, infectious diseases, quality of life.

Warts are common benign skin and mucosa lesions caused by human papillomavirus that can occur anywhere on the body. The disease is more common in children than in adults.[1] The prevalence of cutaneous warts in children varies from 3.3% in the US[2] to 24% in Australia[3] and 33% in Netherlands.[4]

Since both genital and extragenital warts can adversely affect patient quality of life (QoL), it is important for clinicians to understand the effect of warts on patient QoL and improve clinician awareness of the negative effects of skin diseases on QoL.

Most relevant research has focused on QoL in adults with genital warts.[5-8] The persistence and recurrence of genital warts, treatment resistance, and the duration of treatment may have profound negative effects on patient QoL. The effect of skin diseases, including warts, on QoL in children has been reported to be impaired in cross-validation or validation of QoL questionnaire studies with limited number of wart patients.[9-12] This study aimed to determine the effect of extragenital warts on QoL in Turkish pediatric patients, as well as

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to determine the relationship between patient demographic and clinical characteristics, and QoL.

Material and Methods

Study design and patient selection

The Pediatric Quality of Life Inventory Version 4.0 (PedsQL™ 4.0) Generic Core Scales was administered to 85 children aged 8-17 years with warts and their parents (patient group), and 85 age- and gender-matched children without any skin disease and their parents (control group) in this case-control study. Although patients were matched for age and gender, the parents of patients were not matched. In addition, the Children's Dermatology Life Quality Index (CDLQI) was administered only to the patients. All patients had warts that persisted for ≥6 months, were aged 8-17 years, and did not have any learning or intellectual disability. The control group included healthy siblings of any patient aged 8-17 years who were examined for another dermatological disease other than warts. The patients and controls were divided into 2 age subgroups (8-12 and 13-17 years). Demographic data, disease duration, age at the time of disease onset, lesion number and localization, and previous and current treatments were noted. The study protocol was approved by the Hacettepe University Ethics Committee (G-14/258, June 4, 2014), and written informed consent was obtained from all the children's parents. All study procedures were performed in accordance with the ethical principles of the 1964 Declaration of Helsinki.

Data collection and measurements

The 10-item CDLQI was used to measure the effects of warts on QoL in children. The CDLQI is a commonly used dermatology-specific tool used to evaluate the effect of skin disorders on QoL in children and has been used in many studies.[13,14] The CDLQI includes the following subscales: symptoms and feelings (items 1-2), leisure (items 4-6), school or holidays (item 7), personal relationships (items 3 and 8), sleep (item 9), and treatment (item 10). The patient group were instructed to answer the CDLQI items by their selves according to how their warts affected them during the preceding week. The CDLQI total score was calculated by summing the scores of each of the 10 items; the minimum score is 0, versus a maximum score of 30. CDLQI total scores were then assigned to 5 score bands, as previously reported: 0-1, no negative effect on QoL, 2-5, a small negative effect on QoL, 6-10, a moderate negative effect on QoL, 11-20, a large negative effect on QoL, and 21-30, an extremely large negative effect on QoL.[15] Permission to use the CDLQI was obtained from Professor Andrew Y. Finlay.

The PedsQL™ 4.0 Generic Core Scales is used to assess QoL in children aged 2-18 years and includes 23 items and 4 subscales; physical health (8 items), emotional functionality (5 items), social functionality (5 items), and school functionality (5 items).[16] The patients, controls, and their parents were instructed to provide answers to the items based on how much the warts affected the patients during the preceding month. The total PedsQL™ score is calculated by summing the subscale scores; the minimum score is 0, versus a maximum score of 92. Higher PedsQL™ scores indicate poorer QoL. Permission was obtained from J.W. Varni to use the PedsQL™ in this study.

Statistical analysis

Statistical analysis was performed using IBM SPSS Statistics for Windows v.21.0 (IBM Corp., Armonk, NY). Descriptive statistics were used to describe the participants' demographic characteristics. The Shapiro-Wilk test was used to determine the normality of the distribution of numeric variables. Data is expressed as mean ± standard deviation (SD) or median (range) as appropriate. The Mann-Whitney U test was used to compare PedsQL™ scores between patients and controls, as well as between their parents. Additionally, the Mann-Whitney U test was used to identify differences in CDLQI scores according to age at the time of disease

onset and disease duration, and to identify differences in PedsQL™ scores according to lesion localization, gender, and the presence of previous therapies. Spearman's correlation coefficient was used to determine the correlation between CDLQI and PedsQL™ scores, and number of lesions, whereas the Kruskal-Wallis test was used to identify differences in CDLQI and PedsQL™ scores, according to treatment modalities. The level of statistical significance was set at $p < 0.05$.

Results

The study included 85 patients (44 females and 41 males) and their parents (n= 85) and 85 healthy controls (44 females and 41 males) and their parents (n= 85). Warts were most commonly located on the hands (42.4%), followed by the face (41.2%) and feet (32.9%). Table I summarizes the demographic and clinical characteristics of the patients.

Table I. Demographic and clinical characteristics of the participants, and CDLQI total and subscale scores.

Data	Patients (n = 85)
Age in years, median (range)	12 (8-17)
8-12 years, n (%)	49 (57.6%)
13-17 years, n (%)	36 (42.4%)
Gender, n (%)	
Male	41 (48.2%)
Female	44 (51.8%)
Disease duration in months, median (range)	12 (6-84)
Age at the time of disease onset in years, median (range)	10 (1-16)
Number of lesions, median (range)	3 (1-50)
Lesion site, n (%)	
Hands	36 (42.4%)
Face	35 (41.2%)
Arms	5 (5.9%)
Legs	4 (4.7%)
Feet	28 (32.9%)
Previous treatments, n (%)	
Cryotherapy with liquid nitrogen	41 (48.2%)
Topical salicylic acid	14 (16.5%)
Other therapies (TCA, tea tree oil, and topical tretinoin cream)	6 (7.1%)
No treatment	24 (28.2%)
Family history of warts, n (%)	
Yes	32 (37.6%)
No	53 (62.4%)
CDLQI Total score, mean ± SD	5.20 ± 5.97
Symptoms and feelings	1.66 ± 1.53
Leisure	1.27 ± 2.17
School or holidays	0.47 ± 0.87
Personal relationships	0.79 ± 1.39
Sleep	0.39 ± 0.77
Treatment	0.59 ± 0.93

IR: interquartile range, TCA: trichloroacetic acid, n: number, %: percentage, CDLQI: Children's Dermatology Life Quality Index.

CDLQI score

Among the patients, the mean (±SD) CDLQI score was 5.20 ± 5.97. In 32.9% (n= 28) of patients the negative effect on QoL was categorized as a small, whereas warts had extremely large effect on QoL in 5.9% (n= 5) of the patients (Fig. 1).

CDLQI subscale analysis showed that warts had the greatest negative effect on CDLQI symptoms and feelings scores, with a mean (±SD) score of 1.66 ± 1.53, whereas school or holidays, leisure, personal relationships, sleep, and treatment subscales were not affected by warts in any of the patients (Table I). There was not a significant correlation between CDLQI score, and age, age subgroup, age at the time of disease onset, lesion site, disease duration, treatment option, or previous treatments; however, there was a weak positive correlation between the number of lesions and CDLQI score (r=0.26, P=0.02).

PedsQL™ 4.0 Generic Core Scales

The mean (±SD) PedsQL™ total score was higher in the children in the patient group than in those in the control group (23.42 ± 12.33 versus 15.81 ± 7.37, P<0.001). The mean (±SD) school functionality subscale score (6.20 ± 3.19 versus 4.11 ± 2.67, P<0.001), social functionality subscale score (4.38 ± 3.63 versus 1.69 ± 1.67, P <0.001), and emotional functionality subscale scores (5.56 ± 3.98 versus 4.05 ± 2.69, P= 0.029) exhibited the greatest difference between the children in the patient and control groups (Table II and Fig. 2).

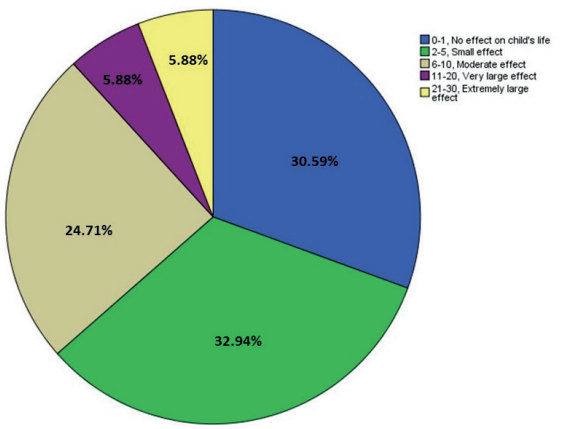

Fig. 1. Distribution of the patients according to CDLQI score.

The mean PedsQL™ total score in the patients' parents was higher than in the controls' parents (25.94 ± 12.49 versus 17.81 ± 6.87, P<0.001). The mean social functionality and emotional subscale scores exhibited the greatest difference between the parents of the patients and controls (5.07 ± 3.68 versus 2.19 ± 2.22, P<0.001 and 6.54 ± 4.05 versus 4.09 ± 2.58, P<0.001, Table II and Fig. 2). There was not a significant correlation between PedsQL™ score (patients, parents, and controls), and age, age group, and gender. There was not a significant correlation between PedsQL™ total score (patients), and lesion number, disease duration, age of disease onset, treatment option, or previous treatments. The localization of warts did not significantly affect the PedsQL™ total scores of the patients. However, the presence of warts on legs significantly decreased PedsQL™ social functionality subscale score, and the presence of warts on feet significantly decreased PedsQL™ school functionality subscale score (P=0.04 and P=0.04, respectively).

Discussion

The literature includes several studies on the effect of anogenital warts on QoL in adults.[5,6,17]; however, few studies have investigated the role of extragenital warts on patient QoL. Salah[18] administered the Dermatology Life Quality Index to adults with genital warts and adults with extragenital warts to compare the effect of warts on QoL, and observed that extragenital warts had a greater negative effect on patient QoL than genital warts.

Chronic skin diseases in children, including atopic dermatitis, psoriasis, acne, and vitiligo, can negatively affect QoL due to their associated social, psychological, and physical burden.[19-22] Lewis-Jones and Finlay[9] administered the CDLQI to 233 children with psoriasis, eczema, molluscum contagiosum, acne, moles, scabies, and alopecia, as well as 34 children with warts,

Table II. Comparison of PedsQLTM total and subscale scores in patients, controls, and their parents.

PedsQL™ scales	Children		P	Parents		P
	Patients (n = 85)	Controls (n = 85)		Patients (n = 85)	Controls (n = 85)	
Physical health	7.26 ± 5.18	5.98 ± 3.53	0.209	8.80 ± 6.13	6.92 ± 3.98	0.059
Emotional functionality	5.56 ± 3.98	4.05 ± 2.69	0.029	6.54 ± 4.05	4.09 ± 2.58	<0.001
Social functionality	4.38 ± 3.63	1.69 ± 1.67	<0.001	5.07 ± 3.68	2.19 ± 2.22	<0.001
School functionality	6.20 ± 3.19	4.11 ± 2.67	<0.001	5.53 ± 3.37	4.61 ± 2.67	0.098
PedsQL™ total score	23.42 ± 12.33	15.81 ± 7.37	<0.001	25.94 ± 12.49	17.81 ± 6.87	<0.001

P < 0.05 is shown as bold.
n: number; PedsQL™: Pediatric Quality of Life Inventory.

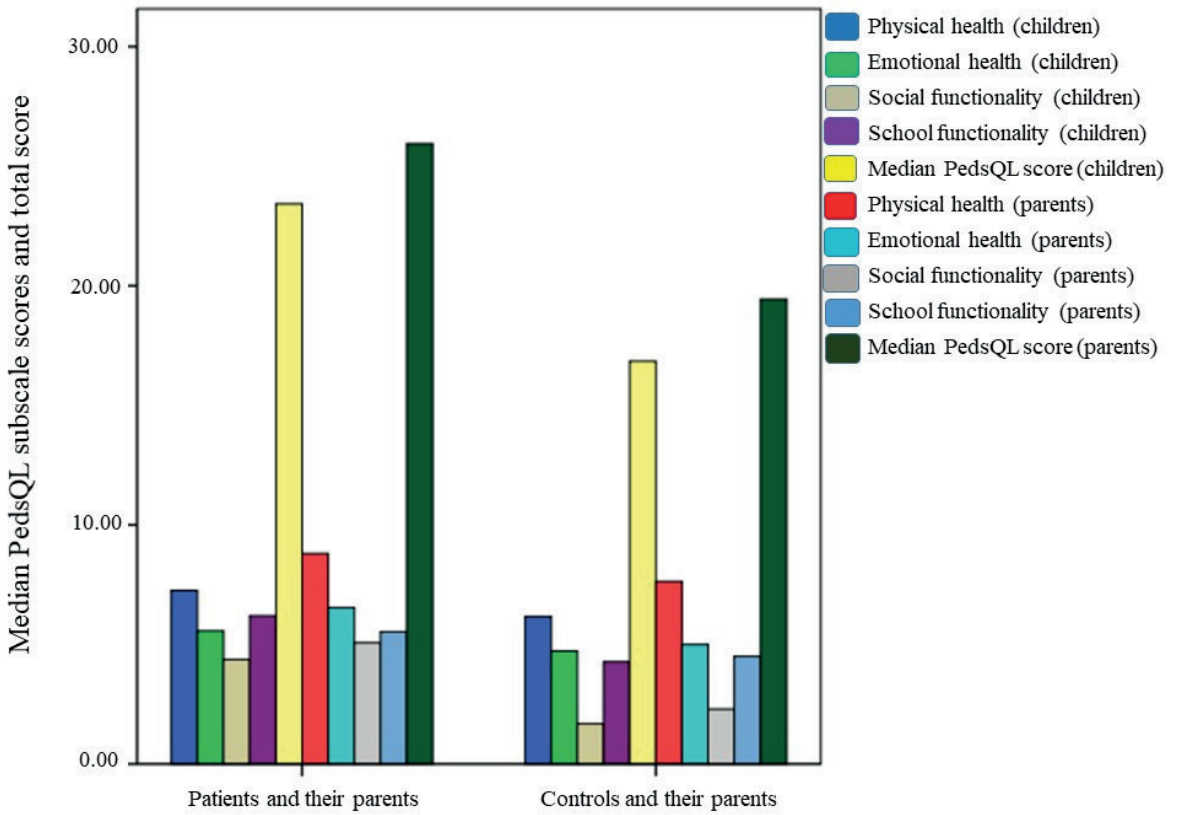

Fig. 2. PedsQL™ total and subscale score in the patients, controls, and their parents.

all aged 4-16 years. Their findings showed that the mean CDLQI score in the children with warts was significantly higher than in those in the control group (3.3 versus 0.38). Balci et al.[10] examined the validity of the Turkish version of the CDLQI in a study that included 154 children with skin diseases and 58 children with health problems unrelated to skin. Among the 154 children included, 21 had warts. They reported that warts had a mild to moderate negative effect on the CDLQI score. Beattie et al.[11] studied 379 children with chronic skin diseases and their parents, including 24 patients with warts, and compared them to 161 children with other chronic diseases, such as cerebral palsy, renal disease, diabetes, and cystic fibrosis. The mean CDLQI score in the patients with warts was 2.87. In the present study the mean CDLQI score in the children with warts was 5.20, which is higher than that in the earlier studies, this

may be explained by the fact that patients that have warts greater than 6 months are more likely to seek medical attention and more likely frustrated.[9-11]

This study is the first to use PedsQL™ to determine the effect of warts on QoL in children. The PedsQL™ Version 4.0 Generic Core Scales is widely used for measuring patient and parental perceptions of health-related QoL in pediatric patients with acute and chronic diseases. It is a brief, practical, developmentally appropriate, reliable, and valid scale designed to measure physical, emotional, social, and school functioning, and is available in multiple languages. The fact that PedsQL™ is not commonly used in QoL studies related to dermatological diseases and the present study is the first to use this scale to investigate children with warts is a particular strong suit of the present study. Varni et al.[23] showed that pediatric patients with moderate-to-severe plaque psoriasis had significantly lower physical, emotional, social, and school functioning, as compared to healthy children, based on PedsQL™ scores. In the present study, mean PedsQL™ total score for the patient group was higher than that for the control group. Additionally, the decreased PedsQL™ social functionality subscale score in patients with warts on legs, and the decreased PedsQL™ school functionality subscale score in patients with warts on feet may be explained by the fact that these areas are covered by clothing.

The present study has a few limitations, including its small study sample. As the study was conducted at a single research center, the findings lack generalizability. Another limitation is that the patient group only comprises those who were already motivated to seek treatment which may lead a possible sampling bias in this study because the warts are already symptomatic or affecting QoL enough to seek treatment.

In conclusion, this study shows that warts persisting for ≥6 months had a small negative effect on QoL in pediatric wart patients, as compared to the controls. Warts had the greatest negative effect on PedsQL™ school, social, and emotional functionality scores, and CDLQI symptoms and feelings scores, based on patient scores. According to the parents' PedsQL™ scores, warts primarily had a negative effect on children's social and emotional functioning. Clinicians should be aware of the negative effect of warts on pediatric patient QoL and treat kids that are severely affected more aggressively than watch and wait. QoL screening should be included in the routine evaluation of childhood warts and the findings should be incorporated into the therapeutic decision-making process. In addition to the effects of wart treatment on QoL, the degree of discomfort children of different ages is willing to undergo to eliminate warts should also be investigated in future studies.

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REFERENCES

1. Kirnbauer R, Lenz P. Human papillomaviruses. In: Bolognia JL, Jorizzo JL, Schaffer JV, (eds). Dermatology (4th ed). London: Saunders, 2018: 1383-1399.
2. Silverberg JI, Silverberg NB. The U.S. prevalence of common warts in childhood: a population-based study. J Invest Dermatol 2013; 133: 2788-2790.
3. Kilkenny M, Merlin K, Young R, Marks R. The prevalence of common skin conditions in Australian school students: 1. Common, plane and plantar viral warts. Br J Dermatol 1998; 138: 840-845.
4. van Haalen FM, Bruggink SC, Gussekloo J, Assendelft WJ, Eekhof JA. Warts in primary schoolchildren: prevalence and relation with environmental factors. Br J Dermatol 2009; 161: 148-152.

5. Drolet M, Brisson M, Maunsell E, et al. The impact of anogenital warts on health-related quality of life: a 6-month prospective study. Sex Transm Dis 2011; 38: 949-956.

6. van der Snoek EM, Couwenberg SM, Lammers AM, van Loon AM. Anogenital warts: influence on quality of life in Dutch soldiers. Sex Transm Dis 2013; 40: 650-651.

7. Sénécal M, Brisson M, Maunsell E, et al. Loss of quality of life associated with genital warts: baseline analyses from a prospective study. Sex Transm Infect 2011; 87: 209-215.

8. Khopkar US, Rajagopalan M, Chauhan AR, et al. Prevalence and burden related to genital warts in India. Viral Immunol 2018; 31: 346-351.

9. Lewis-Jones MS, Finlay AY. The Children's Dermatology Life Quality Index (CDLQI): initial validation and practical use. Br J Dermatol 1995; 132: 942-949.

10. Balci DD, Sangun O, Inandı T. Cross validation of the Turkish version of Children's Dermatology Life Quality Index. J Turk Acad Dermatol 2007; 1: 71402a.

11. Beattie PE, Lewis-Jones MS. A comparative study of impairment of quality of life in children with skin disease and children with other chronic childhood diseases. Br J Dermatol 2006; 155: 145-151.

12. Chuh AA. Validation of a Cantonese version of the Children's Dermatology Life Quality Index. Pediatr Dermatol 2003; 20: 479-481.

13. Olsen JR, Gallacher J, Finlay AY, Piguet V, Francis NA. Quality of life impact of childhood skin conditions measured using the Children's Dermatology Life Quality Index (CDLQI): a meta-analysis. Br J Dermatol 2016; 174: 853-861.

14. Salek MS, Jung S, Brincat-Ruffini LA, et al. Clinical experience and psychometric properties of the Children's Dermatology Life Quality Index (CDLQI), 1995-2012. Br J Dermatol 2013; 169: 734-759.

15. Hongbo Y, Thomas CL, Harrison MA, Salek MS, Finlay AY. Translating the science of quality of life into practice: what do dermatology life quality index scores mean? J Invest Dermatol 2005; 125: 659-664.

16. Varni JW, Seid M, Rode CA. The PedsQL: measurement model for the pediatric quality of life inventory. Med Care 1999; 37: 126-139.

17. Nahidi M, Nahidi Y, Saghebi A, et al. Evaluation of psychopathology and quality of life in patients with anogenital wart compared to control Group. Iran J Med Sci 2018; 43: 65-69.

18. Salah E. Impact of multiple extragenital warts on quality of life in immune-competent Egyptian adults: a comparative cross-sectional study. Clin Cosmet Investig Dermatol 2018; 11: 289-295.

19. Manzoni AP, Pereira RL, Townsend RZ, Weber MB, Nagatomi AR, Cestari TF. Assessment of the quality of life of pediatric patients with the major chronic childhood skin diseases. An Bras Dermatol 2012; 87: 361-368.

20. Tekin B, Gurel MS, Topkarci Z, et al. Assessment of quality of life in Turkish children with psoriasis and their caregivers. Pediatr Dermatol 2018; 35: 651-659.

21. Tasoula E, Gregoriou S, Chalikias J, et al. The impact of acne vulgaris on quality of life and psychic health in young adolescents in Greece. Results of a population survey. An Bras Dermatol 2012; 87: 862-869.

22. Silverberg JI, Silverberg NB. Quality of life impairment in children and adolescents with vitiligo. Pediatr Dermatol 2014; 31: 309-318.

23. Varni JW, Globe DR, Gandra SR, Harrison DJ, Hooper M, Baumgartner S. Health-related quality of life of pediatric patients with moderate to severe plaque psoriasis: comparisons to four common chronic diseases. Eur J Pediatr 2012; 171: 485-492.