

# Impact of atopic dermatitis on the quality of life of Saudi children

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## ABSTRACT

**الأهداف:** تقييم أثر حساسية الجلد التأتبية على نوعية الحياة لدى الرضع والأطفال السعوديين باستخدام النسخة العربية المطورة حديثاً من مؤشر جودة الحياة في الحساسية الجلدية لدى الأطفال وكذلك فحص العلاقة بين المؤشر وشدة الحساسية.

**الطريقة:** تم إجراء هذه الدراسة في عيادات الأمراض الجلدية والمستشفيات التابعة للجامعة القصيم، بريدة، المملكة العربية السعودية في الفترة من سبتمبر 2012م إلى أغسطس 2013م. وقد تم تصميم هذه الدراسة للتحقق من مدى ارتباط مؤشر جودة الحياة في الحساسية الجلدية لدى الأطفال مع مستويات شدة المرض وأجري تقييم عدد 630 من المرضى الأطفال بواسطة مؤشر جودة الحياة في الحساسية الجلدية لدى الأطفال وتحديد شدة المرض بواسطة مؤشر شدة الحساسية SCORAD index.

**النتائج:** كان متوسط مؤشر جودة الحياة في الحساسية الجلدية هو  $12.3 \pm 5.1$  لجميع الحالات. وهو يختلف اختلافاً معنوياً كبيراً بين المجموعات الثلاث وذلك حسب شدة المرض مع وجود أعلى الدرجات في المجموعة الشديدة ( $p=0.000$ ) وقد لوحظ وجود ارتباط إيجابي بين شدة المرض ومؤشر جودة الحياة في الحساسية الجلدية ( $p=0.000$ ) وكانت ثلاثة بنود ذات تأثير سلبي على مؤشر جودة الحياة في الحساسية الجلدية هي الحكمة (الهرش) ومزاج الطفل والوقت المطلوب لنوم الطفل. وهذه الثلاث بنود حصلت على تأثير أعلى في المجموعة الأشد مقارنة مع المجموعتين البسيطة والمتوسطة الشدة ( $p=0.000$ ). لم يلاحظ أي فروق ذات دلالة إحصائية بين الجنسين أو مع وجود الأمراض الحساسية الأخرى ( $p=0.99$  and  $p=0.79$ )

**الخلاصة:** أثبتت هذه الدراسة أن أعراض حساسية الجلد التأتبية تؤثر سلباً على مؤشر جودة الحياة لدى الأطفال السعوديين المصابين بها وهذا التأثير السلبي مرتبط بشدة المرض.

**Objectives:** To assess the impact of atopic dermatitis (AD) on the quality of life (QoL) of Saudi infants and children using a validated/culturally adapted Arabic version of the infants' dermatitis quality of life (IDQoL) index, and to investigate the correlation between IDQoL and disease severity.

**Methods:** This study was performed in the Dermatology Clinics and Hospitals affiliated to Qassim University, Buraidah, Saudi Arabia between September 2012 and August 2013. The study was designed to investigate the role of IDQoL in AD patients with different severities. The AD patients ( $n=630$ ) were evaluated for IDQoL and disease severity using the SCORing of Atopic Dermatitis index.

**Results:** The average ( $\pm$ standard deviation) of IDQoL score was  $12.3 \pm 5.1$  for all studied subjects. The IDQoL scores were significantly different among the 3 studied severity groups, with a highest score in the severe group ( $p=0.000$ ). A positive correlation was observed between the severity of AD and IDQoL scores ( $r=0.596$ ,  $p=0.000$ ). Three items with a negative impact on IDQoL were "itching and scratching," "the child's mood," and "time to get the child to sleep." All these reached a significantly higher value in the severe group compared with the moderate or mild groups ( $p=0.000$ ). No significant differences were observed concerning gender or the association with other atopic disorders ( $p=0.99$ , and  $p=0.79$ ).

**Conclusion:** This study demonstrates that AD manifestations impaired the IDQoL of Saudi patients and were also well correlated with the disease severity score.

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Atopic dermatitis (AD), also known as atopic eczema is the most common chronic inflammatory skin disease in children worldwide causing psychological, social, and functional disabilities in the affected patients and their families.<sup>1-4</sup> The frequency of this disease is reported to be increasing gradually and mainly affecting children.<sup>5-7</sup> Most AD patients had family histories of asthma, allergic rhinitis, allergic conjunctivitis, and other atopic diseases.<sup>2</sup> The diagnosis of AD can be reached by clinical investigations,<sup>8</sup> whereas its severity is characterized by other tools including Rajka-Langeland; severity SCORing of Atopic Dermatitis (SCORAD); and Eczema Area Severity Index.<sup>9-12</sup> Out of these, SCORAD is the most useful disease severity instrument.<sup>13-18</sup> Quality of life (QoL) is a very broad concept and generally concerns whether a disease or functional impairment restricts an individual's ability to complete daily activities. However, it can be used to assess the burden of illness and the outcomes of related medical treatments.<sup>4,19</sup> Several questionnaires are available to investigate QoL in patients with AD, these include for example: the Dermatitis Family Impact,<sup>20</sup> which measures the impact of the disease on the whole family; the Children's Dermatology Life Quality Index,<sup>21</sup> which demonstrates the impact of dermatological disorders in general on QoL; the Quality of Life in Atopic Dermatitis,<sup>22</sup> which can be used in adults; the Childhood Atopic Dermatitis Impact Scale,<sup>23</sup> and the Infant's Dermatitis Quality of Life Index (IDQoL).<sup>24,25</sup> Of these questionnaires, the IDQoL appears to be a reliable and easy-to-use questionnaire, which is specifically designed for children aged  $\leq 4$  years with AD. The IDQoL was developed in 2001 by Drs. Lewis-Jones, Finlay, and Dykes to assess QoL in infants with AD.<sup>24</sup> Despite the widespread prevalence of AD in Saudi Arabia, little is known about how the QoL of AD patients is affected by the disease severity. The main objective of the present study was to assess how AD affects the QoL of Saudi infants and young children using a recently validated and culturally adapted Arabic version of the IDQoL index.<sup>26</sup>

**Methods. Study design and human subjects.** This study was designed to evaluate the cross-sectional survey for assessment of QoL in Saudi children with AD. All infants and children aged 0-4 years fulfilling the standard criteria of AD<sup>27</sup> were consecutively collected from the Dermatology clinics of Qassim University, Buraidah, Saudi Arabia, and its affiliated hospitals to build up a convenient sample of 630 participants. The study was carried out between September 2012 and August 2013.

Inclusion criteria of the patients were based on the clinical diagnosis of AD and patients must not be more than 4 years of age. Exclusion criteria of the patients were based on the following points: patients have other active skin diseases, have evidence or test positive for cardiac, neurological, musculoskeletal, or endocrine/metabolic disorders. All the recruited cases responded positively to the applied questionnaire and consented to participate in the study. The study was carried out in accordance with the code of ethics of the Declaration of Helsinki for humans. An informed consent was obtained from each parent of an affected child, and an approval was also obtained from the ethical review board committee, College of Medicine, Qassim University.

**The IDQoL questionnaire.** In the present study, an Arabic version of the IDQoL questionnaire was administered to all participating parents of affected children prior to consultation. The questionnaire consists of 10 major questions on an infant or young child's mood, sleep, bathing, dressing, play, mealtimes, in addition to family activities, and treatment in the preceding 7 days.<sup>24</sup> Each question was graded from 0-3 with a maximum total score of 30. A higher number correlates with a greater impairment of QoL. Furthermore, an additional question was asked for the parents' overall assessment of eczema severity on a scale of 0-4. This questionnaire was originally developed by Drs. Lewis-Jones, Finlay, and Dykes in 2001.<sup>24</sup> It is intended for use in children with AD, it is self-explanatory and must be completed by the patients' parents or guardians. The IDQoL appears to be reliable and easy-to-use, was translated into 21 languages, and is now being used in 18 countries. Thirty-one studies demonstrated its psychometric properties, such as test-retest reliability, internal consistency, validity, responsiveness to change, and interpretability.<sup>25</sup> Recently, an Arabic version was also developed and tested for its validity, reliability, and adaptability on Saudi communities.<sup>26</sup> The severity of AD was evaluated by SCORAD Index as described previously.<sup>18</sup> The SCORAD index consists of: (i) the interpretation of the extent of the disorder according to the rule of nines (20% of the score); (ii) the measurement of disease intensity by 6 items including erythema, edema/papules, effect of scratching, oozing/crust formation, lichenification, and dryness, each graded on a scale of 0-3 (60% of the score); and (iii) assessment of subjective symptoms, for example, itching or sleeplessness (20% of the score). These aspects combine to give a maximum possible score of 103. The most representative lesion is used for scoring purposes rather than the most severe or the mildest lesion.<sup>18</sup>

**Statistical analysis.** The Statistical Package for Social Sciences version 16.0 (SPSS Inc., Chicago, IL, USA) and Graph Pad Prism software version 5.0 (Graph Pad Inc., San Diego, CA, USA) were used for all analyses. The data were proven to be normally distributed using the Kolmogorov-Smirnov, and Shapiro-Wilk tests in addition to histograms and scatter plots. One-way ANOVA followed by Tukey-Kramer post-hoc tests in addition to the student t-test were used for comparative analysis, while Spearman's rank correlation was used to measure an association between QoL index and severity scores.  $P < 0.05$  was considered significant.

**Results.** The affected children with AD (630) included 346 (54.9%) males of a mean $\pm$ SD age of  $2.4 \pm 1.2$  years, and 284 (45.1%) females of a mean $\pm$ SD age of  $2.5 \pm 1.3$  years. The patients were subdivided into 2 groups: atopic disease including AD associated with other atopic diseases such as asthma, allergic rhinitis, or allergic conjunctivitis ( $n = 332$ ; 207 males and 125 females), and AD alone ( $n = 298$ ; 139 males and 159 females). According to the categories of the SCORAD index, 53.5% of children showed mild AD (SCORAD  $< 15$ ), 31.6% of children had moderate AD (SCORAD 16-40) and 14.9% had severe AD (SCORAD 41-103). The total scores for the different QoL questionnaires are shown in Table 1. The total IDQoL mean ( $\pm$ SD)

score was  $12.3 (\pm 5.1)$  with no significant difference in males versus females ( $p=0.99$ ). Similarly, there was no significant difference in the mean IDQoL scores comparing patients with AD alone, with those of AD associated with other atopic disease ( $p=0.79$ ). On the other hand, IDQoL scores were significantly different when comparing the mild, moderate, and severe groups noting that the highest IDQoL score value was in the severe group ( $p=0.000$  for mild versus moderate and severe groups, and  $p=0.02$  for the moderate versus the severe group) (Table 1). Correlation between the severity of AD represented in their SCORAD scores and IDQoL scores was significantly positive ( $r$  value= $0.596$  in the total cases,  $p=0.000$ ) (Table 2). The 10 detailed dimensions of the IDQoL score have been summarized in Table 3. The 3 items showing the highest mean $\pm$ SD values of the IDQoL questionnaire scores (namely, the variables that mostly impacting the patients' QoL) were: "itching and scratching," "the child's mood," and "time to get the child to sleep," whereas the lowest-scored item was "problems caused by the treatment." All reached a significantly higher value in the severe group compared with the moderate and mild groups ( $p$ -value either 0.001 or 0.000).

**Discussion.** This study was undertaken to measure the impact of AD on the QoL of Saudi infants and children. Special attention was given to the recruitment of children less than 4 years of age, and to careful mapping of the disease severity and concomitant atopic disorders. Even with the availability of severity scores like the SCORAD index,<sup>12</sup> patients' parents do not efficiently disclose the difficulties or sufferings in daily life activities even among the affected families.

**Table 1** - Infants' dermatitis quality of life (IDQoL) scores related to the clinical characteristics of the studied children with atopic dermatitis.

Atopic dermatitis	No (%)	IDQoL (mean $\pm$ SD)
Total cases	630 (100)	12.3 $\pm$ 5.1
<i>Gender</i>		
Male	346 (54.9)	12.3 $\pm$ 5.3
Female	284 (45.1)	12.3 $\pm$ 5.1
<i>Severity</i>		
Mild (1-15)	337 (53.5)	7.8 $\pm$ 3.6 <sup>*</sup>
Moderate (16-40)	199 (31.6)	12.3 $\pm$ 5.2 <sup>†</sup>
Severe (41-103)	94 (14.9)	18.3 $\pm$ 6.7 <sup>‡</sup>
<i>Atopy</i>		
Atopic disease	332	12.9 $\pm$ 5.9
AD alone	298	12.1 $\pm$ 5.1

AD - atopic dermatitis, atopic disease - AD with concomitant asthma, allergic rhinitis, and/or allergic conjunctivitis, SCORAD score - SCORing Atopic Dermatitis score, male versus female  $p=0.99$ , \* versus <sup>†</sup>  $p=0.000$ , \* versus <sup>‡</sup>  $p=0.000$ , <sup>†</sup> versus <sup>‡</sup>  $p=0.02$ , atopic disease versus AD alone  $p=0.79$

**Table 2** - Correlation between IDQoL score and SCORAD score in total cases and cases subgroups related to severity and atopy.

Variable	r	P-value
Total cases	0.596	0.000
<i>Severity</i>		
Mild	0.465	0.000
Moderate	0.534	0.000
Severe	0.621	0.000
<i>Atopy</i>		
Atopic disease	0.506	0.000
AD alone	0.561	0.000

IDQoL - Infants' dermatitis quality of life index, SCORAD - SCORing Atopic Dermatitis, AD - atopic dermatitis

**Table 3** - The IDQoL 10 items scores in total cases and in subgroups related to severity of atopic dermatitis.

Items of IDQoL	Total	Mild	Moderate	Severe	Severe versus mild	Severe versus moderate
1. Itching and scratching	2.03 ± 0.62	1.40 ± 0.64	2.20 ± 0.72	2.49 ± 0.50	0.000	0.001
2. Mood	1.84 ± 0.65	1.15 ± 0.64	2.01 ± 0.75	2.36 ± 0.56	0.000	0.001
3. Time to get to sleep	1.71 ± 0.65	1.30 ± 0.67	1.81 ± 0.63	2.03 ± 0.65	0.000	0.000
4. Sleep disturbances	1.41 ± 0.64	0.93 ± 0.55	1.50 ± 0.66	1.79 ± 0.70	0.000	0.001
5. Disturbed playing or swimming	1.31 ± 0.71	0.91 ± 0.62	1.30 ± 0.74	1.72 ± 0.77	0.000	0.001
6. Disturbed family activities	1.34 ± 0.49	0.84 ± 0.71	1.24 ± 0.54	1.94 ± 0.24	0.000	0.000
7. Problems during mealtimes	1.07 ± 0.57	0.61 ± 0.57	1.03 ± 0.49	1.56 ± 0.65	0.000	0.001
8. Problems from treatment	0.86 ± 0.44	0.54 ± 0.51	0.75 ± 0.29	1.29 ± 0.56	0.000	0.000
9. Dressing problems	1.05 ± 0.49	0.71 ± 0.49	0.93 ± 0.51	1.52 ± 0.47	0.000	0.000
10. Problems at bath time	1.16 ± 0.61	0.73 ± 0.51	1.10 ± 0.71	1.64 ± 0.61	0.000	0.001

IDQoL - Infants' dermatitis quality of life index  
Comparison analysis was performed using one-way ANOVA followed by Tukey's post-hoc test

Therefore, the assessment of the QoL by questionnaires has emerged as an important consideration.<sup>20-25,27</sup> The National Institute for Health and Clinical Excellence (NICE) has also recommended that the assessment of patients' QoL should be performed in addition to the measurement of disease severity for the proper evaluation of AD.<sup>28</sup> The IDQoL is a questionnaire completed by parents to assess the impact of AD on the QoL of infants.<sup>29</sup> The IDQoL studies from the western world demonstrated that infants with AD showed major complications such as itching, sleep loss, mood, and behavioral changes.<sup>3,24,25,30,31</sup> Other reported problems were discomfort with treatment and difficulties with playing, bathing, dressing, and eating.<sup>24</sup> Even though this type of study was not the first one to be carried out internationally, it was relevant to evaluate the impairment of QoL of our national patients using the recently validated and culturally adapted Arabic version of the IDQoL index.<sup>26</sup>

In the present study, the total IDQoL score was found to be 12.3, which was higher than results reported by others.<sup>3,24</sup> This high score of IDQoL may be due to the involvement of a relatively large number of infants with severe AD. Chernyshov et al<sup>32</sup> also reported nearly similar total IDQoL scores for Ukrainian and Czech patients. This data was also well supported by Ricci et al.<sup>33</sup> As a matter of fact, it seems reasonable that patients referred to a specialist unit, such as Medical University clinics, would score higher than patients from general practice. Moreover, this study showed

that the impairment of the QoL in Saudi infants and children with AD was directly proportional to the disease severity. The IDQoL scores showed significant correlation with the AD severity scores estimated by the SCORAD index. These findings are well supported by the reports published by Kim et al,<sup>30</sup> Lewis-Jones et al,<sup>24</sup> Lee et al,<sup>34</sup> and Monti et al.<sup>35</sup>

Numerous studies demonstrate the adverse impact of AD on patients' QoL with increasing disease severity;<sup>33,35</sup> this correlation is not necessarily straightforward, but is dependent upon many factors including body localization of eczema lesions and the patients control ability.<sup>24</sup> On the contrary, other studies where more subjects with moderate to severe AD were enrolled,<sup>21,36</sup> reported that the QoL score is less sensitive in reflecting disease severity among AD patients with severer disease. In the present study, the negative factors on patients' QoL, were found to be "itching and scratching," "the child's mood," and "time to get the child to sleep," and the lowest-scored item was "problems from treatment." These findings are supported by other studies<sup>24,25,31</sup> that showed the IDQoL item with the highest score was itching and scratching. Similarly, this was in accordance with the Dutch College of General Practitioners' guideline on AD,<sup>37</sup> where itching was considered to be the most prominent feature. Also, it is well supported by Kim et al,<sup>30</sup> Van Valburg et al,<sup>19</sup> and Ganemo et al.<sup>3</sup> Whereas, Chernyshov et al<sup>32</sup> reported that problems at bath time showed higher impact on Czech patients, and problems at meal time and by treatment showed higher impact on Ukrainian patients.

This study did not detect a significant gender difference in IDQoL scores, which clearly points toward life awareness similarities in both males and females in the studied population. In contrast with these findings, previous studies showed significant gender differences in the IDQoL.<sup>38</sup> Furthermore, this study did also not detect significant differences in QoL scores between infants with AD alone and infants with asthma, allergic rhinitis, or allergic conjunctivitis. It may be expected that the IDQoL score would be significantly higher in infants with atopic disease including AD with concomitant asthma, allergic rhinitis, or allergic conjunctivitis, than for those with AD alone. These findings were well supported by others,<sup>30</sup> and contrary findings were also reported.<sup>3</sup> However, it is important to express a concern toward the limitations of this study; the most obvious limitation of the study is the absence of a control group; therefore, the comparative analysis between IDQoL of healthy and affected patients is missing. The other obvious limitation is that all assessments were performed in a dermatology clinic affiliated with teaching hospitals, instead of primary health care centers. In addition, the seasonal variation in the disease was also not considered. Furthermore, male and female infants enrolled in the study were not matched with age or severity of AD prior to the study analysis. It is also important to mention that all patients in the present study were recruited from Qassim region only, and is by no means representative of the whole of Saudi Arabia. Therefore, we recommend undertaking a large-scale study including multiple dermatology centers from the whole country, in which investigators take into consideration all environmental and individual family factors that might contribute to the expression of the QoL of these cases.

In conclusion, this study has shown that AD did have a negative impact on the QoL of Saudi infants and children along with their families. This impairment is directly proportional to the severity of the disease no matter what the gender of the patient and whether he/she was affected by another atopic disease.

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