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Reliability and Validity of the Korean-Parental Self-Efficacy with Eczema Care Index

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Abstract

Background: Atopic dermatitis is a global problem affecting children, and its prevalence in Korea is steadily increasing. Since it is a chronically relapsing inflammatory skin disease, caregiver management of young children's atopic dermatitis is crucial for positive treatment outcomes. A factor that contributes to adherence to recommended prescriptions is parents' self-efficacy. However, accurate measurements of parental self-efficacy in relation to disease-specific task management are scarce.

Objectives: This study examined the psychometric properties of the Korean language version of the Parental Self-Efficacy with Eczema Care Index (K-PASECI).

Methods: One hundred twenty five mothers of children younger than 13 years old who had atopic dermatitis were recruited from three tertiary hospitals across Korea. The K-PASECI was developed in accordance with the published guidelines. Psychometric testing included factor analysis, internal consistency testing, and concurrent validity analysis by comparing K-PASECI domains with parenting self-efficacy subscales.

Results: Factor analysis revealed a four-factor structure that explained 69.4% of the variance. The four factors were as follows; managing a child's symptoms and behaviour, communicating with medical staff, managing medication, and using moisturizer as part of routine management. The findings showed acceptable internal consistency (α=.94) and a moderate positive correlation with parenting self-efficacy (r=.48, p<.001).

Conclusion: The K-PASECI, a reliable and valid scale for measuring self-efficacy in parents caring for children with atopic dermatitis, may be used in clinical and research settings to measure parents' self-efficacy in Korea, as well as in other English-speaking countries.

Keywords: atopic, child welfare, dermatitis, eczema, psychometrics, self-efficacy

1. Introduction

Atopic dermatitis, often called "atopic eczema," is a chronically relapsing inflammatory skin disease characterized by severe dryness of the skin and pruritus (Thestrup-Pedersen, 2000). It is currently regarded as a multifactorial disorder caused by multiple pathogenetic elements, including genetic predispositions, environmental triggers, immune dysfunctions, and skin barrier defects (Novak, Bieber, & Leung, 2003; Bieber, 2010).

Typically, an episodic event of exacerbation and remission occurs during early childhood. In Korea, the latest 12-month prevalence rate in a national epidemiological study has been reported to be up over 15% among 8-11-year-old children (Jee et al., 2009; Suh et al., 2011), as opposed to 9% among 13-14-year-old children in Malaysia and Singapore (Lee & Detzel, 2015). Thus, atopic dermatitis has become a common child health problem in Asia as well.

In Korea, more than half of all patients visiting hospitals for atopic dermatitis treatment were children less than 9 years of age (Yi & Kim, 2015). Thus, mothers who are the primary caregivers for children with atopic dermatitis

are expected to play an important role in managing their children's symptoms. Because the treatment of atopic dermatitis is based partly on educating the patient about proper skin care and the application of topical steroids and emollients, disease control is highly dependent on parents' management abilities. However, these mothers may experience stress when they fail to manage their children's illness as prescribed and recommended (Lawson, Lewis-Jones, Finlay, Reid, & Owens, 1998). Thus, providing psycho-educational support to primary caregivers, especially mothers, is believed to produce positive treatment outcomes (Ersser, Latter, Sibley, Satherley, & Welbourne, 2007).

Since Bandura introdued the concept of self-efficacy, which refers to a person's beliefs in his/her capabilities to produce given results, this concept has been extensively used in health-related studies (Bandura, 1977, 2006). Parent self-efficacy is thought to be a particularly useful indicator for assessing the effectiveness of managing children's chronic diseases (Ersser et al., 2007; Mitchell & Fraser, 2011).

The Parental Self-Efficacy with Eczema Care Index (PASECI) was originally developed by Ersser et al. in England to measure parent self-efficacy in managing various aspects of their children's atopic dermatitis (Ersser et al., 2008). Thereafter, in Australia Mitchell and Fraser (2011) modified and verified the scale using a community sample of parents of children with atopic dermatitis. Futhermore, self-efficacy as measured by the PASECI was found to mediate the effects of child behaviour difficulties on the performance of atopic dermatitis management tasks (Mitchell, Fraser, Ramsbotham, Morawska, & Yates, 2015).

The purpose of this study was to adapt the PASECI developed in English language countries to the Korean language and evaluate its psychometric properties for use in the accurate measurements of mothers' self-efficacy when caring for children with atopic dermatitis in Korea.

2. Method

2.1 Study Design

This study used a prospective cross-sectional design.

2.2 Development of the Korean version of the PASECI (K-PASECI)

Beaton et al. (2000)'s guidelines for the cross-cultural adaptation of self-report measures were used to develop the Korean version of the PASECI (K-PASECI) in this study (Beaton, Bombardier, Guillemin, & Ferraz, 2000). Permission to use the scale was received from the author (Mitchell) prior to the implementation of the study.

For the first step, two bilingual translators whose mother tongue was Korean independently translated the original questionnaire into Korean. One translator was aware of the concept of atopic dermatitis and provided equivalency from a more clinical perspective, whereas the other translator did not have a medical or clinical background and was not informed concerning atopic dermatitis. Following completion of the independent translation into Korean, two translators reviewed and agreed on the synthesized version of the questionnaire. Two other bilingual translators whose mother tongue was English back-translated the synthesized questionnaire into English and checked the validity of the translated version.

Next, an expert committee comprising two atopic dermatitis specialists and a paediatric nursing faculty member independently reviewed the translated scale for cross-cultural equivalence and readability. The content validity index (CVI) was used to objectively assess the measure's content validity on a 4-point scale (1=very reasonable; 4-point=very reasonable). All items but one was rated as either 3 or 4, resulting in an average of 3.95 points for all items. In addition, one research scientist specializing in Korean literature evaluated the appropriateness of the vocabulary order and the propriety of the words used in the translated questionnaire, and the scale was revised to improve word order and vocabulary, as recommended.

Finally, the K-PASECI was evaluated for clarity and readability through pre-testing with conducted with three mothers of children with atopic dermatitis. Two mothers had children under the age of 4 years, and one mother had an 8-year-old child. All mothers reported an understanding of the K-PASECI, except for one mother's question about the application of a bandage on a child. Since a bandage may be prescribed in treating severe atopic deramtitis, this item was retained in the scale under development. In addition, the expert committee validating the content of the scale did not question it.

The final 25-item K-PASECI was used in the validation of psychometric properties. Each item was scored on an 11-point Likert scale, with response options ranging from 0 (cannot do at all) to 10 (highly certain can do) points. A higher score indicated greater self-efficacy. This response format was used to maintain congruence with the original study. The participants were asked to think about their most recent experiences and select their best responses from the full range of choices for each item.

2.3 Sample and Setting

Mothers of children with atopic dermatitis were recruited from outpatient clinics in three tertiary hospitals across Korea with paediatric allergy specialists. These clinics were chosen to recruit a representative sample of children with varying atopic dermatitis severity in various areas. We used the following inclusion criteria for the children with atopic dermatitis: (a) being under 13 years of age; (b) not presenting with other known disease(s) requiring medical treatment; (c) having a mother as the primary caregiver.

2.4 Data Collection

Mothers who visited the outpatient clinics were referred to the study by their primary care physicians. Parents completed the self-reported questionnaire for 15 minutes in the outpatient clinics. The researchers provided monetary rewards to all participants.

A total of 134 mothers participated in this study from March 2013 to August 2014. Nine questionnaires with a considerable number of incomplete values were excluded from the final data analysis. The sample size of 125 was satisfactory for an exploratory factor analysis of the K-PASECI's 25 items, since about 5 participants per item is considered an adequate number (Gorsuch, 1983).

2.5 Measurements

The parenting self-efficacy (PSE) scale is used to measure a mother's general sense of self-efficacy in parenting her child (Choe & Chung, 2001). It contains 37 items, including questions on general parenting (11 items), health (7 items), communication (9 items), education (6 items), and control (4 items). A 5-point Likert scale, ranging from 1 (agree not at all) to 5 (very much agree), was used. A higher total score indicates greater parental self-efficacy. This scale demonstrates high internal consistency, with a Cronbach's α coefficient of .96 for this study and .92 in Choe and Chung's (2001) study.

The severity of atopic dermatitis was also measured using the Patient-Oriented Eczema Measure (POEM) (Charman, Venn, & Williams, 2004). The POEM consists of 7 items related to atopic dermatitis symptoms such as itching, soreness, sleep disturbance, and skin bleeding. A 5-point scale of frequency of occurrence during the previous week was used, ranging from 0 (no days) to 4 (every day), with a higher score indicating greater severity of atopic dermatitis. Cronbach's α was .88 in Charman, Chambers, and Williams's (2003) study and .92 in this one.

Participant demographics, including mother's age and socioeconomic status, child's age and gender, and additional allergic disease(s) and treatment types, were assessed.

2.6 Data Analysis

Statistical analysis was performed using SPSS/WIN 21.0. A significance level of .05 was used to indicate statistically significant associations. The data were analysed using descriptive statistics based on participant demographics. Exploratory factor analysis with varimax rotation was used to verify the internal structure of the K-PASECI. Concurrent validity was assessed by examining Pearson's correlation coefficient between the K-PASECI and the PSE. The reliability of the K-PASECI was tested by assessing internal consistency using Cronbach's alpha. Item analysis was conducted to assess inter-item and corrected item-total correlations for indications of item incongruence or redundancy.

2.7 Ethical Consideration

This study was approved by the Institutional Review Board (IRB) at Y University (No. 2013-0049), with which the principal researcher is affiliated. An approval (BD2014-026) was also obtained from C Hospital, one of the data collection sites. The other two data collection sites accepted the approval of Y University's IRB. All participants were informed they could withdraw from the study at any time, and they completed a written informed consent form in advance of their participation in this study.

3. Results

3.1 Demographic Characteristics

Participant demographics are shown in Table 1. Mothers' mean (SD) age was 36.84 (3.84) years (range: 28-45 years). Most mothers had more than a college education, and there was a wide range for family income. Regarding children's characteristics, 77 (61.6%) were boys, and the mean age (SD) was 4.59 (3.47) years (range: 1-13 years). Forty-eight (38.4%) children had no comorbidity, 38 (30.4%) had rhinitis, 13 (10.4%) had urticarial, and 10 (8%) had asthma. Most of the mothers reported using moisturizers (80.0%) and ointments (including steroids) (79.2%). The mean severity of the children's atopic dermatitis was 8.16 (7.78), ranging from 0 to 28.

Table 1. Participant demographics (n=125)

Characteristics	Category or Range	Mean (SD) or Frequency (%)
Mother's characteristics		
Age (years)	28-45	36.84 (3.84)
Education level	High school	19 (15.2)
	University/College	85 (68.0)
	Graduate school	19 (15.2)
Economic status (thousand won)	<3000	14 (11.2)
	≥3000 and <5000	55 (44.0)
	≥5000 and <7000	32 (25.6)
	≥7000	24 (19.2)
Child's characteristics		
Age (years)	1-13	4.59 (3.47)
Gender	Boy	77 (61.6)
	Girl	48 (38.4)
Comorbid allergic disease	None	48 (38.4)
	Allergic rhinitis	38 (30.4)
	Urticaria	13 (10.4)
	Asthma	10 (8.0)
Eczema treatment (multiple choice)	Oral medication	40 (32.0)
	Ointment (including steroids)	99 (79.2)
	Moisturizer	100 (80.0)
	Immunotherapy	38 (30.4)
	Others (including probiotics)	9 (7.2)
Atopic dermatitis severity	0-28	8.16 (7.78)
Atopic dermatitis management self-efficacy	72-250	175.88 (37.47)
General parenting self-efficacy	72-182	137.68 (17.54)

3.2 Factor Analysis of the K-PASECI

In the preliminary assessment for factor analysis, the Kaiser-Meyer-Olkin (KMO) assessment exceeded 0.90 for the K-PASECI, indicating very high sampling adequacy (Charman et al., 2004). Bartlett's test of sphericity reached statistical significance (χ^2=2611.575, p<.001), indicating that the K- PASECI was suitable for factor analysis. Principal components analysis for the K-PASECI revealed the presence of four components with eigenvalues exceeding 1. These four factors together explained 69.35% of the variance, with each component explaining between 7.95% and 27.85% of the variance (Table 2). The four factors were as follows: managing children's symptoms and behaviours (Factor 1), communicating with medical staff (Factor 2), managing medication (Factor 3), and using a moisturizer as routine management (Factor 4). The loading of each of these items was between .46 and .86, exceeding .40.

3.3 Internal Consistency

The internal consistency for the K-PASECI was acceptable, with a Cronbach's α coefficient of .94. Internal consistency was marginally improved by the deletion of Items 3 and 5 (α=.95) (Table 2).

Table 2. Principal components analysis for K-PASECI and corrected item-total correlations (n=125)

Items	Factor loadings				Alpha if item deleted
	Factor1 (a=.94)	Factor2 (a=.93)	Factor3 (a=.70)	Factor4 (a=.86)	
Original factor 1. Performing routine atopic dermatitis management tasks (a=.84)					
Q2 Apply moisturisers to your child's eczema				.86	.94
Q1 Choose a moisturiser that is suitable for your child				.82	.94

Q4 Correctly use steroid creams for your child			.81		.94
Q3 Apply antibiotic creams to your child's eczema			.73		.95
Q5 Apply dressings/bandages to your child's eczema when necessary			.59		.95
Q8 Judge whether the treatments/medication for your child's eczema works			.46		.94
Q22 Ask the GP to explain things when you don't understand		.85			.94
Q21 Tell the GP when your child's eczema is not getting better		.83			.94
Q24 Decide when to call in help form the GP or nurse		.81			.94
Q25 Ask to see a specialist doctor		.80			.94
Q9 Ask a GP if you want to change your child's medications		.75			.94
Q23 Tell the GP when you disagree with him/her		.73			.94
Q10 Ask a specialist if you want to change your child's medications		.64			.94
Q6 Make the right choice of treatment options if the symptoms of your child's eczema become worse	.59				.94
Q7 Take appropriate action if you think your child's eczema has become infected	.64				.94
Original factor 2. Managing the child's symptoms and behaviour (a=.85)					
Q12 Help your child to get involved in managing their eczema	.82				.94
Q14 Help your child fit his/her eczema into a normal lifestyle	.82				.94
Q15 Manage to avoid things that irritate/aggravate your child's Eczema	.79				.94
Q11 Manage your child's scratching behaviour so as to stop further skin damage	.77				.94
Q13 Get your child to follow his/her management plan even when s/he may be reluctant	.77				.94
Q17 Control your child's eczema so that he/she can play like other children	.77				.94
Q18 Manage your child's eczema so that his/her symptoms are under control	.73				.94
Q19 Reduce any sleep disturbance brought about by your child's eczema	.72				.94
Q16 Adjust your child's management plan to allow for changes in your family's schedule	.69				.94
Q20 Get access to a health care professional if you need to speak to them about your child's eczema		.73			.94
Rotated eigenvalue	6.96	5.76	2.63	1.99	
Percentage of variance explained (%)	27.85	23.05	10.50	7.95	
Cumulative percentage of total variance explained (%)	27.85	50.90	61.40	69.35	

3.4 Construct Validity

There was a moderate positive correlation between the K-PASECI and the PSE (r=.48, p<.001), with higher K-PASECI scores being associated with higher PSE scores. A moderate positive correlation was found between the K-PASECI and all PSE subscales: general parenting (r=.41, p<.001), health (r=.50, p<.001), communication (r=.35, p<.001), education (r=.44, p<.001), and control (r=.52, p<.001) (Table 3).

Table 3. Correlations between K-PASECI and parenting self-efficacy (n=125)

	Subscale of Parenting self-efficacy					Total
	General parenting efficacy	Health	Communication	Education	Control	
K-PASECI	.41**	.50**	.35**	.44**	.52**	.48**

** $p<.001$

4. Discussion

In Mitchell and Fraser's (2011) study, a community-based population was used to validate the scale; however, this study recruited mothers of children with atopic dermatitis from three hospital-based clinics to represent the diversity in the atopic dermatitis child population. The children in this study were younger, with a mean age of 4.59 years, than those in the previous study, who had a mean age of 6.68 years (Mitchell & Fraser, 2011). Mothers of younger children may have more difficulty managing their children's symptoms, especially in terms of communication and behavioural problems (Gelmetti et al., 2012). Disease severity in this study was also higher than that reported in several previous studies (Charman et al., 2004; Schram et al., 2012). This seems to reflect the younger ages and enhanced severity of atopic dermatitis among Korean children, further supporting the use of this scale.

Parents who have to handle severe atopic dermatitis may need more instruction regarding management tasks to follow the prescriptions and to increase their self-efficacy to produce more positive outcomes. Caring for children with moderate to severe atopic dermatitis has been shown to be more stressful for parents and families than caring for children with insulin-dependent diabetes mellitus (Beattie & Lewis-Jones, 2006; Su, Kemp, Varigos, & Nolan, 1997). In addition, more than half the children who participated in this study had comorbid allergic diseases such as asthma, allergic rhinitis, and urticaria. A comorbid disease and moderate to severe atopic dermatitis may negatively affect both parental self-efficacy and quality of life for mothers caring for children with atopic dermatitis. The K-PASECI can thus be used for parents of younger children with moderate disease severities, which likely play an important role in effectively managing atopic dermatitis.

The principal component factor analysis revealed the presence of four components that explained 69.35% of the total variance. In contrast, the original instruments were reported to have two factors: performing routine atopic dermatitis management tasks (Factor 1) and managing children's symptoms and behaviours (Factor 2). The K-PASECI comprises four factors: managing children's symptoms and behaviours (Factor 1), communicating with medical staff (Factor 2), managing medication (Factor 3), and using a moisturizer as part of the routine management (Factor 4). Factor 1 in the original scale, performing routine atopic dermatitis management tasks, was broken down into three factor structures to include communicating with medical staff, managing medication, and using a moisturizer. In Korea, parents seem to believe that a requirement for self-efficacy regarding the management of atopic dermatitis is the ability to communicate with medical staff. A good relationship with the physician has been frequently reported as an important contributing factor in the adherence to prescriptions (Ohya et al., 2001). Parental self-efficacy concerning treatment management can therefore be strengthened by good doctor-mother relationships.

Interestingly, the structure regarding the management of medication was separated from using moisturizers in the performing routine atopic dermatitis management task structure. This indicates that the self-efficacy of moisturizer use was considered to be different from that of managing medications. This suggests that information on how to select and apply the appropriate moisturizer needs to be provided in clinics as well.

The construct validity of the K-PASECI has been confirmed, and the measure was shown to have a moderate correlation with parenting self-efficacy. The strength of correlation is higher than that between the original modified PASECI and the general perceived self-efficacy scale, as reported in the study by Mitchell and Fraser (2011). The general perceived self-efficacy scale is supposed to measure an individual's global and stable confidence in his/her ability to deal effectively with challenging or stressful situations. Although the K-PASECI focuses on confidence in atopic dermatitis task management while parenting self-efficacy focuses on typical child-rearing task-oriented confidence, both scales seem to have similar attributes regarding the concept of self-efficacy. Therefore, studies investigating mothers' disease-specific self-efficacy may be better suited to measure self-efficacy as an outcome of intervention with parents of children with atopic dermatitis.

The internal consistency of the K-PASECI proved to be acceptable, with a value higher than the .89 found in a previous study (Mitchell & Fraser, 2011). In the corrected item-total correlation, two items-antibiotic cream application and dressing/bandage application-were lower, although they were still within the acceptable ranges

of>.30. This seems to reflect the cultural respondent situation in that these items are rarely prescribed by outpatient clinic physicians in Korea.

Although it has satisfactory validity and reliability for use in hospital-based populations of children with moderate atopic dermatitis, the K-PASECI must be tested in more diverse demographic samples with varying degrees of disease severity. It is recommended that future research examine other family members and/or caregivers, since many young children are cared for and educated in preschools due to high maternal employment rates. Future studies may also need to investigate the characteristics of mothers with low self-efficacy to identify these mothers and provide them with intensive psychosocial and educational care. Studies are also needed to evaluate the factor model using confirmatory factor analysis with large samples.

The self-efficacy of a primary caregiver, such as a mother, is a key component to producing positive outcomes in the treatment of a child's atopic dermatitis. Assessing mothers' self-efficacy using the K-PASECI may prove helpful in investigating the effectiveness of educational interventions provided in relation to managing children's atopic dermatitis in clinical practice and research settings.

5. Conclusion

The PASECI, developed and validated by Mitchell and Fraser, is a promising measure of parents' self-efficacy for managing various aspects of their child's atopic dermatitis (Mitchell & Fraser, 2011). In this study, the reliability and validity of the K-PASECI was evaluated using a sample of Korean mothers with children with atopic dermatitis who visited hospital outpatient clinics. The K-PASECI was found to be a reliable and valid instrument for measuring mothers' self-efficacy in Korea, where no standardized tool is avaliable for parents of child with atopic dermatitis. Both the K-PASECI and original PASECI can be further utilized in multicultural centres in English-speaking countries.

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Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

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