Abstract of the dissertation entitled

The Use of a Nurse-led Education Program in Reducing Pediatric Eczema

Submitted by

Lam Hiu Wa

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Atopic eczema is a chronic relapsing inflammatory skin disease commonly associated with atopy. The disease is common in early childhood and is characterized by dryness of skin, itchiness and skin flexures. There has been no cure for the disease. Treatments of atopic eczema focus on relieving symptoms, maintaining skin integrity and preventing secondary infection. With good compliance to the treatment, most patients may obtain optimal control. Education is essential for good compliance to the treatment. In local public acute hospitals, the current service provided restricts the time for comprehensive patient education during follow-up by physicians. Some studies indicated that nurse-led programs
are effective in managing chronic illness because patients have longer consultation time and more information. The effect of nurse-led program in managing common chronic disease like atopic eczema may be promising. However, there was no systematic review on the use of nurse-led education program in reducing pediatric eczema in the local setting.

Against the above background, this dissertation aims to systematically evaluate the current evidences on the effectiveness of nurse-led education program for pediatric eczematous patients in reducing the severity of eczema, to develop an evidence-based guideline of the program, to assess the implementation potential and to develop implementation strategies and evaluation plan.

A systemic review of the literature from Medline (Ovid SP), PubMed and CINAHL (EBSCOhost) was conducted. A total of 298 citations were retrieved after the database search. Finally, 5 studies were identified and included in the systemic review. Data were extracted and the quality of each included studies was assessed with the help of the appraisal instruments. In which, one study was methodologically strong, two studies were of moderate methodological qualities and two studies were of poor methodological qualities. Among the four studies with severity of eczema as outcome measures, three studies showed significant in reducing severity of eczema. Therefore, we considered sufficient evidence that
supported the use of nurse-led education program in reducing pediatric eczema.

An evidence-based guideline of the program was developed. The characteristics of the patients in the local setting are similar to those of the identified studies. The availability of the resources and the readiness of the staff towards the proposed innovation are supportive in the local setting. Thus the findings of the reviewed studies were transferable and the proposed innovation was feasible. Cost-benefit analysis showed that the proposed program could be able to generate a potential saving of about $550,000 in the local setting annually.

In the implementation plan, a three-month pilot study on ten patients will be conducted before the implementation of the program. Evaluation will be made after the end of the pilot study and the end of the implementation program. Refining of final protocol will be done according to the evaluation and comments from the pilot study. The severity of eczema and the patient’s satisfaction are considered as primary and secondary patient outcomes respectively. The healthcare provider outcomes are the staff morale and the workload. Systematic outcomes are the admission rate of pediatric ward and the attendance rate of pediatric outpatient clinic, and the cost of innovation. Finally, patient outcomes, healthcare provider outcomes and systemic outcomes would be evaluated in order to identify the effectiveness of the program.
The Use of a Nurse-led Education Program in Reducing Pediatric Eczema

by

Lam Hiu Wa

Bachelor of Science (Honors) in Nursing

A dissertation submitted in partial fulfillment of the requirements for the Degree of Master of Nursing at The University of Hong Kong

August 2012
Declaration

I declare that this dissertation thereof represents my own work, except where due acknowledge is made, and that it has not been previously included in a thesis, dissertation or report submitted to this University or to any other institution for a degree, diploma or other qualifications.

Signed ____________________________________________

Lam Hiu Wa
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Chapter 1

Introduction

1.1 Background

Atopic eczema, or also called as atopic dermatitis, is a chronic relapsing inflammatory skin disease commonly associated with atopy (Leung, 1995; Williams et al., 1999). The disease is common in early childhood and is characterized by dryness of skin, itchiness and skin flexures (Williams et al., 1999). Atopic eczema causes significant burdens including the discomfort to the patient, management problems for the parents and the financial cost to the family and the health care system (O'Connell, 2004).

Although atopic eczema is not a life threatening condition, suboptimal skin care may result in skin break down, infection and sleep disturbance to children (Williams et al., 1999). The disease reduces patients’ and their parents’ quality of life, causes psychosocial problems and disruption to family life (Absolon, Cottrell, Eldridge, & Glover, 1997; Lawson, Lewis-Jones, Finlay, Reid, & Owens, 1998; Lewis-Jones & Finlay, 1995; Lewis-Jones, Finlay, & Dykes, 2001).

Management of atopic eczema should adopt a stepped approach with treatment tailoring to the severity (National Collaborating Centre for Women & Children's Health, 2007). The treatment is focused on relieving symptoms,
maintaining skin integrity, preventing secondary infection and enhancing the
quality of life (Ayliffe, 2009). Identification and avoidance of exacerbating factors,
proper skin care and appropriate treatment are essential for desirable outcomes
(Ayliffe, 2009). Unfortunately, little is known about the cause of atopic eczema
and there has been no cure for the disease (Hoare, Li, & Williams, 2000). However, with good compliance to the treatment, most patients may have optimal
control (McHenry, Williams, & Bingham, 1995; Nicol, 2000). Moreover, eczema
patient often develops asthma and allergies at the same time (National
Collaborating Centre for Women & Children's Health, 2007).

The prevalence of atopy was the highest in school children from Hong Kong
among three Chinese cities including Beijing, Guangzhou and Hong Kong (Wong
et al., 2001). A study from the Department of Health in Hong Kong showed that
eczema was the second most common skin problem in school children (Fung &
Lo, 2000). Atopic eczema affects 5.6% of 2-6 years old children and 3.4% of
school children in Hong Kong (Fung & Lo, 2000; Wong et al., 2007). According
to the Department of Health in Hong Kong, considerable resources were used for
the management of eczema because of frequent follow-ups and significant cost to
the public health system is required (Fung & Lo, 2000; Hon, Leung, Wong, Ma, &
Fok, 2004). Eczema was the leading chronic dermatologic disease referred to a
tertiary referral center in Hong Kong. It accounted for 33% at a pediatric
dermatology clinic (Hon et al., 2004).

1.2 Affirming the Need

In a pediatric outpatient clinic in a local hospital in Hong Kong, a significant
proportion of patients attended because of atopic eczema. They require regular
follow up appointments and the waiting time can be up to several months. Each
medical consultation has an average duration of about 10 minutes and mainly
focused on assessment of skin condition and prescription of medication with little
time is spent on education. Consequently, eczematous patients and their parents
learned to manage the skin condition by themselves. About 5% patients were
found to have poor control with suboptimal treatment compliance during follow
ups. As a result, they needed admission to the pediatric ward for managing acute
skin infection and receiving education about the self-management skills. Some
patients may even need emergency hospital admission between the routine
follow-ups which usually last for 7 days. If the suboptimal management of
eczema persists, patients and their family will be suffered. Moreover, with the
increasing numbers of new immigrants and young families, the district population
being served by the local hospital is expected to increase. From 2009 to 2019, the
population in the local district will increase from 355,400 to 430,100 (Hospital
Authority, 2011). The workload of healthcare staff in the Department of Pediatric and Adolescent Medicine would therefore also increase. Thus, new strategies are needed to cater the increasing demand and handle the suboptimal management of pediatric eczema.

Poor compliance to the treatment regime is a major reason of suboptimal control in atopic eczema (Hoare et al., 2000). Providing adequate time for education and explanation of the treatment was stressed in the British Association of Dermatologists’ guideline on the management of eczema (McHenry et al., 1995). The guideline of Atopic Eczema in Children from National Collaborating Centre for Women’s and Children’s Health recommended more time should be spent on educating patient and their parents in order to enhance the compliance (National Collaborating Centre for Women & Children's Health, 2007). However, the current service provided restricts the time for comprehensive patient education during follow ups by pediatrician (Moore, Williams, Manias, & Varigos, 2006). Some studies indicate that nurse led clinics are effective in managing chronic illness (Horrocks, Anderson, & Salisbury, 2002; Kinnersley et al., 2000). Patients may have longer consultation time and more information in nurse led clinics. Therefore, patient’s compliance should be improved and resulted in optimal control. Indeed, the role of nurses has been expanded in recent years. For example,
nurses work independently in warfarin and diabetes clinic. The effect of nurse-led program in managing common chronic disease like atopic eczema is promising. Therefore, the efficacy in reducing the severity of pediatric eczema should be studied.

1.3 Objectives and Significance

Because of the frequent follow-ups and high admission rate of pediatric atopic eczema, a change of current practice should be considered.

In view of this, the objectives of this dissertation are:

1. To systematically evaluate the current evidences on the effectiveness of nurse-led education program for pediatric eczematous patients in reducing the severity of eczema;

2. To develop an evidence-based guideline for implementing a nurse-led education program for pediatric eczematous patients;

3. To assess the implementation potential of a nurse-led education program for pediatric eczematous patients in a local hospital in Hong Kong;

4. To develop implementation strategies and evaluation plan for the use of nurse-led education program guideline in local setting.

Through implementing this nurse-led education program, there could be an enhancement in managing pediatric atopic eczema. With the better control of the
severity of eczema, the frequency of follow up and admission rate should be decreased and the burden of health care system should be lessened.
Chapter 2

Critical Appraisal

2.1 Search and Appraisal Strategies

2.1.1 Selection Criteria

Studies included were

1. randomized controlled trials;

2. those that targeted on 0-16 years old children with eczema and their parents;

3. those considered nursing intervention with or without physician visit; and

4. those that evaluated at least one of the following outcomes:
   i. Severity of eczema
   ii. Quality of life of children
   iii. Family impact

Studies were excluded if

1. they considered multidiscipline education programs;

2. they assessed a web based program; or

3. they compared the effect of specific medications only.

2.1.2 Identification of Studies

Identification of relevant studies was conducted by searching three electronic bibliographical databases including Medline (Ovid SP), PubMed and CINAHL
Details of the search terms and search results are described in Appendix 1. No restriction was set on the publication language and year to avoid missing relevant studies. Titles and abstracts of the resulting citations were first screened against the selection criteria. Potential studies had their full papers retrieved before the eligibility of the study was confirmed. Moreover, manual search of reference lists of those eligible studies were also performed.

### 2.1.3 Data Extraction and Appraisal Strategy

Data extracted were study type, level of evidence, sample size, subject characteristics, intervention, control, outcome measures, effect size and length of follow up.

The methodology checklist by Scottish Intercollegiate Guidelines Network (SIGN, 2009) was used to appraise the methodological quality of each included study. The following areas were addressed:

1. Appropriate and clearly focused question
2. Randomization allocation
3. Concealment method
4. Blinding
5. Similarity of investigation and control group
6. Treatment under investigation
7. Standard, valid and reliable outcome measures

8. Dropout rate

9. Intentional-to-treat analysis

10. Comparability of results between different sites

Each of these areas was rated as well covered, adequately addressed, poorly addressed, not addressed, not reported or not applicable. The overall methodological quality of the study is assessed according to the response in each area. The methodological quality is symbolized by “++”, “+” and “-”. “++”, “+” and “-” represents strong, moderate and poor methodological qualities respectively.

2.2 Results

2.2.1 Search Results

A systemic search was done in the late August 2011. A total of 298 citations were retrieved after the database search. After screening the titles, 30 citations were identified as potentially relevant. Further screening by their abstracts resulted in 17 studies, of which, 1 citation was published in German. As the author was unable to understand German, the paper was not evaluated. The full papers of other 16 citations were retrieved for further study. Finally, five studies were identified and included in the systematic review. There was no additional relevant
study after reading the reference lists of these studies.

2.2.2 Study Characteristics

The five RCTs included were primary studies published in English between 1990 and 2010. Their characteristics are summarized in the table of evidence (Appendix 2). Their study type, sample characteristics, intervention, control, outcome measures, effect size and the length of follow up were summarized.

Regarding the sample characteristics, all studies target to 0-16 years old children with eczema and their parents. Baseline severity of eczema and quality of life varied across different studies. Regarding the intervention, all studies were conducted with single-centre design. Four studies were carried out in out-patient clinics of hospitals and one study was carried out in general practices. Two studies carried out nursing intervention on top of the routine management for intervention group while three studies carried out only nursing intervention. All studies carried out routine management for control group. Outcome measures include the severity of eczema, quality of life of infant and children, family impact and patient’s satisfaction. The severity of eczema was measured by total eczema score, distribution score and itchiness score in one study (Broberg, Kalimo, Lindblad, & Swanbeck, 1990) and was measured by the Scoring Atopic Dermatitis Index (SCORAD) in three studies (Grillo, Gassner, Marshman, Dunn, & Hudson, 2006;
Moore, Williams, Manias, Varigos, & Donath, 2009; Schutteelaar, Vermeulen, Drukker, & Coenraads, 2010). The quality of life of eczematous patient was assessed by the Infants Dermatitis Quality of Life Index (IDQOL) and the Children’s Dermatology Life Quality Index (CDLQI) in three studies (Chinn, Poyner, & Sibley, 2002; Grillo et al., 2006; Schutteelaar et al., 2010). IDQOL was completed by the parents of children below 4 years old and CDQOL was used for children aged 4 to 16 years old. The quality of life of parent was assessed by the Dermatitis Family Impact in three studies (Chinn et al., 2002; Grillo et al., 2006; Schutteelaar et al., 2010). Client Satisfaction Questionnaire-8 (CSQ-8) was used to measure patient satisfaction in one study (Schutteelaar et al., 2010). SCORAD, IDQOL, CDLQI, DFI and CSQ-8 were validated but no evidence was provided to show that total eczema score, distribution score and itchiness score were validated before. A higher total eczema score, distribution score, itchiness score or SCORAD score represents a higher severity of eczema. The range of SCORAD is 0- 103. It is considered as mild if SCORAD score is less than 15, as moderate if SCORAD score is 15-40 and as severe if SCORAD score is greater than 40. A higher score in IDQOL, CDLQI and DFI represents poorer quality of life. A higher marks in CSQ-8 means better satisfaction. Effect sizes varied across studies. Follow up period varied from 1 month to 12 months.
Among the five studies, two studies were conducted in Australia, one in United Kingdom, one in Sweden and one in Netherland. No local study was identified. Ethical approval for conducting the research was reported in 4 studies. Source of funding was disclosed in 3 studies.

2.2.3 Quality Assessment of Identified Studies

The hypotheses or objectives or aims were adequately addressed or well covered in all studies (Broberg et al., 1990; Chinn et al., 2002; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010).

Four studies adequately addressed or well covered the randomization methods (Chinn et al., 2002; Grillo et al., 2006; Moore et al., 2009; Schuttelaar, et al., 2010). The methods of randomization included random numbers (Chinn et al., 2002; Grillo et al., 2006), numbered sealed envelopes (Moore et al., 2009) and computer program (Schuttelaar et al., 2010). The randomization method was not reported in one study (Broberg et al., 1990).

Two studies well covered the concealment method (Moore et al., 2009; Schuttelaar et al., 2010) while other three studies (Broberg et al., 1990; Chinn et al., 2002; Grillo et al., 2006) did not addressed.

Only one study (Schuttelaar et al., 2010) adequately addressed that the trained outcome assessor was blinded but it is impossible to blind the patients and
health care providers.

Three studies (Broberg et al., 1990; Moore, et al., 2009; Schuttelaar et al., 2010) adequately address or well covered that the treatment and control groups were similar at the beginning while the demographic data of groups were not addressed separately in two studies (Chinn et al., 2002; Grillo et al., 2006).

Patients did not received additional treatment in all selected studies.

Three studies well covered (Chinn et al., 2002; Grillo et al., 2006; Moore et al., 2009) the validity and reliability of the outcome measures while the other two did not addressed (Broberg et al., 1990; Schuttelaar et al., 2010).

All the studies mentioned the dropout rate. The dropout rate in intervention group in two studies was larger than 20% which was relatively high as compared to other studies.

The intentional to treat principle was adopted in the analysis of one study (Grillo et al., 2006). The missing data was not performed in the final analyses in other four studies (Broberg et al., 1990; Chinn et al., 2002; Moore et al., 2009; Schuttelaar et al., 2010).

All studies were carried out in one site only.

As a result of the above assessment, one study (Moore, et al., 2009) was methodologically strong because the study had well covered most areas. Two
studies (Grillo et al., 2006; Schuttelaar et al., 2010) were of moderate methodological qualities. In Grillo et al.’s study (2006), the concealment method was not mentioned and the similarity of the intervention and control group was not mentioned. Thus it may impose bias and affect the study results. In Schuttelaar et al.’s study (2010), bias might be resulted because no evidence showed that the measures used are reliable and validated.

Two studies (Broberg et al., 1990; Chinn et al., 2002) were of poor methodological quality. One study (Broberg et al., 1990) did not report the randomization method. The concealment method was not mentioned. Also, no evidence showed that the measures used were reliable and validated. Moreover, the dropout rate was high. Thus these may impose bias and affect the study results. The other study (Chinn et al., 2002) did not mention the concealment method and the dropout rate was high. The similarity of the intervention and control group was not mentioned. All these may affect the assessment of the intervention effect on the outcomes measures.

2.3 Summary and Synthesis

2.3.1 Summary of Data

The length of follow up varied from 1 month to 12 months. The sample characteristics varied. Age ranged from 0 to 16 years old. The number of boys was
close to that of girls in four studies (Broberg et al., 1990; Grillo et al., 2006; Moore, et al., 2009; Schuttelaar et al., 2010) and one did not report the gender characteristic (Chinn et al., 2002). Baseline IDQOL, CDLQI and DFI were showed in three studies (Chinn et al., 2002; Grillo et al., 2006; Schuttelaar et al., 2010). In which, the baseline readings in Chinn et al.’s study (2002) were lower than the other two studies. The baseline severity of eczema varied (Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010). One study (Broberg et al., 1990) used a different tool for measurement.

For the intervention in the studies, the experimental group of two studies (Broberg et al., 1990; Grillo et al., 2006) attended nursing education program plus conventional treatment from physician while the experimental group of three other studies (Chinn et al., 2002; Moore et al., 2009; Schuttelaar et al., 2010) received a nurse led education program only. The control group in all studies received conventional treatment form physician. Participant may choose individual treatment visit or group session for the first visit and they had a second follow up or telephone consultation in Schuttelaar et al.’s study (2010). Telephone support was also provided in another study (Chinn et al., 2002). In all the studies, the content mainly included presentation about knowledge of eczema and demonstration on treatment application. In two studies (Moore et al., 2009;
Schuttelaar et al., 2010), written information was given for reference at home. Medication was prescribed from physician in three studies (Broberg et al., 1990; Grillo et al., 2006; Moore et al., 2009) and from the nurse practitioner in another study (Schuttelaar et al., 2010). Individual treatment plan was provided in three studies (Chinn et al., 2002; Moore et al., 2009; Schuttelaar et al., 2010).

The effect of the nursing intervention was evaluated by different outcome measures. Severity of eczema was measured in four studies. Two studies showed significant difference between intervention and control group in terms of reducing severity of eczema (Grillo et al., 2006; Moore et al., 2009). In Schuttelaar et al. (2010), the between groups comparison was not significant. In Broberg et al. (1990), the total eczema score showed significant difference but the distribution score and itchiness score were not significant. Regarding the quality of life, three studies carried out the measure (Chinn et al., 2002; Grillo et al., 2006; Schuttelaar et al., 2010). All studies showed no significant difference between groups except the CDLQI in Grillo et al.’s study (2006). Parent’s satisfaction was significantly higher in intervention group than in control group in Schuttelaar et al.’s study (2010).

2.3.2 Synthesis of Data

Among the four studies with severity of eczema as outcome measures, three
studies showed significant difference between intervention and control group in terms of reducing severity of eczema (Grillo et al., 2006; Moore et al., 2009) while one study did not (Schuttelaar et al., 2010). The three studies were of moderate to strong methodological quality. In Schuttelaar et al. (2010), the data from dropout participants were not used for final analysis. The length of follow up was the longest among the studies. A possible explanation for the different result could be the intervention did not have enough long term effect. It may imply that follow up is needed to maintain the effect of nurse-led education program. Therefore, follow up with 3 month interval may be considered. The length of follow up should last for 6 months for maintaining a long term effect.

Among the three studies (Chinn et al., 2002; Grillo et al., 2006; Schuttelaar et al., 2010) with quality of life as outcome measures, all studies showed no significant difference between groups except the CDLQI in one study (Grillo et al., 2006). The follow up period varied from 3 months to 12 months. The participants in two studies were with similar demographic data and the studies are with moderate methodological qualities (Grillo et al., 2006; Schuttelaar et al., 2010). The participants in Chinn et al. (2002) were with better quality of life at baseline and the study was with poor methodological qualities. The quality of life showed no direct relationship with the reduction of severity of eczema. A possible
explanation for this could be due to more time, effort and financial burden in maintaining good treatment compliance. Also, external factors rather than the disease may affect the quality of life. It may be influenced by the coexisting diseases as eczema patients often develop asthma and allergies together. There is a minimal value to set up a new education program for the purpose only if the convention treatment provides similar effect.

Patient satisfaction was evaluated in only one study (Schuttelaar et al., 2010). The intervention group was with higher patient satisfaction. The treatment visit took 20 to 30 minutes in intervention group and it took 10 to 20 minutes in control group. Time is allowed for counseling and for patients and their parents to raise their concern. Written information was provided as reference at home. The confidence of self management would then be enhanced. The other reason may due to the choice of service provided. Enough time for raising concerns and offering choices may result in higher patient satisfaction. This should be considered in my innovation.

Regarding to the intervention, one study (Grillo et al., 2006) provided nurse-led education program in addition to convention treatment while the other two studies (Moore et al., 2009; Schuttelaar et al., 2010) provide nurse-led education program alone. In the studies carried out nurse-led education program
only, the nurse will prescribe independently or refer to dermatologist if needed.

The nurses in the local setting are not allowed for prescription of medication. Also, cultural acceptance should be considered. In Hong Kong, people may not accept managing the disease without physician consultation even nurse is competent to do so. Based on the above reasons, nurse-led education program in addition to the conventional treatment is preferred in the innovation.

In conclusion, there is sufficient evidence that nurse-led education program is effective in reducing the severity of pediatric eczema. The nurse-led education program is proposed in the Department of Pediatric and Adolescent Medicine. The length of follow up will be 6 months. A two hours group workshop will be introduced and follow ups with 3 months interval will be scheduled according to the need. The follow up frequency may be adjusted according to the need of patients and parents. Patient may choose to have individual follow up visits or telephone consultations. The contents include an individual consultation, a presentation about eczema knowledge, demonstration on treatment application and wet wrapping skills, and treatment return demonstration by patients or their parents. Written information will be provided for reference at home. Also, individual management plan will be established with patients and their parents collaboratively. Patient will receive conventional treatment and medication
prescription from physician as usual.
Chapter 3
Translation and Application

3.1 Implementation Potential

The integrated review conducted in Chapter Two clearly showed sufficient evidence to support that nurse-led education program for pediatric eczematous patients could reduce the severity of eczema. The nurse-led education program can potentially be transferred to the Department of Pediatric and Adolescent Medicine of a local hospital in Hong Kong. Assessment of the implementation potential of the innovation in the local setting is essential. It includes assessment of transferability of findings, feasibility and the cost-benefit ratio.

3.1.1 Target audience and setting

The target audience of the nurse-led education program includes eczematous patients who are between 0-16 years old and under the care of Department of Pediatric and Adolescent Medicine of a local acute hospital in Hong Kong. One of the parents of the patient should accompany the patient to join the program. Non-Cantonese speaking families or patients who are participating similar program in other settings are excluded from the study. The nurse-led education program will be held at the Pediatric and Adolescent Medicine Outpatient Clinic of an acute hospital in Hong Kong.
3.1.2 Transferability of the Findings

To assess whether a nurse-led education program for pediatric eczematous patients is transferrable to the target hospital, the basic patient demographic characteristics, severity of the disease and cultural differences were compared between the target hospital and those considered in the identified studies. In addition, the philosophy of care of the proposed nurse-led education program should match with that of the local setting. Moreover, the number of patients who can be benefited as well as the implementation and evaluation time should also be considered.

The age of individuals considered in the identified studies (Chinn et al., 2002; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010) ranged between 0-16 years except in one study which had the age of subjects ranged between 0-6 years (Broberg et al., 1990). The Department of Pediatric and Adolescent Medicine provides service to patients aged 16 years or below. Thus, the age of patients in target setting is similar to that of patients considered in the identified studies.

Regarding the gender ratio, the number of boys was close to that of girls in four studies (Broberg et al., 1990; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010) and one study did not report the gender characteristic
(Chinn et al., 2002). The gender disparity of the pediatric eczema patients in target hospital was indeed also not substantial.

In the identified studies, the severity of eczema of the patients varied from moderate to severe. In the outpatient clinics of the target hospital, it is estimated that most patients are also with moderate to severe eczema. The severity of eczema of the patients in target setting is similar to those in the identified studies.

The cultural background of the patients in the target setting and those considered in the identified studies are however different. All identified studies were carried out in western countries. However, the nurse-led education program will be promoted in Hong Kong Chinese society. The belief of taking care of children with eczema may be different between western parents and Chinese parents. However, there is an individual consultation time in the program which helps nurses to understand the local needs of Chinese parents. Thus, the proposed nurse-led education program may fit in the local setting culturally.

The philosophy of care is another determinant of successful transferring of an innovation. The aim of the nurse-led education program is to enhance the management of pediatric atopic eczema and reduce the severity of the pediatric atopic eczema. It facilitates patients and their family members to cope with the disease. The nurse-led education program should fit in well with the philosophy of
care in the Hospital Authority (HA) and the target hospital. The mission of HA is to help people stay healthy and one of the values of HA is patient centered care. Individual treatment plan, individual consultation and choices of follow up method provide chances to understand the patients' and their parents' needs in addition to provide timely and appropriate response. The program meets with the emphasis of people centered care.

The nursing mission of the target hospital is to build a healthy community through innovative, caring and quality nursing services. The mission of target department is to provide a quality holistic healthcare service to our children. The innovation is an evidence based practice. It provides a quality nursing service which enhances the management of pediatric eczema. Parent’s contribution is essential to provide holistic healthcare to children. The parents of eczematous children will be invited to join the program. It gives support to the families in the care of children. Thus, the nurse-led education program should fit in well with the philosophy of care in the HA and the target hospital.

Substantial amount of patients in the target settings will be benefited from the nurse-led education program. In the target hospital, there were 12,691 attendances in the Pediatric and Adolescent Outpatient Clinic in year 2009/10 (Hospital Authority, 2010). Of which, about 1000 visits were about atopic eczema.
The program will target on the patients with suboptimal treatment compliance. It is estimated that around 100 patients were with poor self eczema management and around 50 patients required admission each year. A group workshop will be held once a month. Each group will have about eight to ten patients. Around 100 patients will be benefited by the program annually.

It is estimated that the implementation of the nurse-led education program should take two years. This includes six months of preparation, which covers proposal preparation and approval of the program; and six months for piloting the program. Modification will be made during this period if necessary. The actual implementation will be carried out in the next nine months before the evaluation and complication of report will be made which will take approximately another three months.

3.1.3 Feasibility

Concerning the feasibility of the nurse-led education program in the target hospital, administration support, staff support and availability of resources are essential for carrying out the program.

Administrative support for an innovation is paramount. The General Manager of Nursing (GMN), Department Operation Manager (DOM), Pediatric and Adolescent Medicine Ward Manager (WM) and Outpatient Clinic Manager
are eligible to carry out or terminate the innovation upon the approval of the program from Chief of Service (COS) is sought. Indeed, the Nursing Training and Development Committee of the target hospital always stress the importance of staff development and always release nurses to participate in different seminars and courses. It also encourages nurses to bring back the ideas for innovations and improvement of the services.

Staff support is also important for the innovation. The implementation of the program would not interfere much with the current staff function. The program will be run by four main nursing staff only. Pediatricians will continue to offer their expert care to patients.

During the set up stage, the program team will spend two hours in the morning of Monday and Thursday on the nurse-led education program. As all the pediatricians have the grand round for in-patients at that timeslot, the workload in the outpatient clinic is lessened. In the long run, the nurse-led education program will also be carried out in this timeslot. Only one program coordinator will be allocated to the program for each session. The remaining team members will carry on their usual duties in the outpatient clinic. One extra nurse is recommended to be on duty at that time to compensate the increased workload. The extra workload for the outpatient clinic nurses and clerical staff is to arrange appointments of the
program for the participants. It usually takes several minutes for booking an appointment. However, outpatient clinic nurses will save up the time for educating patients about the management of eczema. Indeed, the workload of pediatrician, clerical staff and supporting staff should also be reduced by the positive effect of the program.

The knowledge and skills to carry out the nurse-led education program are available in the nursing staff. All nurses in the Department of Pediatric and Adolescent Medicine should already have the basic knowledge about pediatric eczema and skills to implement the education program as there were eczema workshops and lectures organized periodically by the Department for nurses. Moreover, pediatric nurses have already been providing eczema education in the target setting but only without formal protocol or guideline. In addition, the program will be run by a program team. One advanced practice nurse in pediatrics will be the program supervisor and three registered nurses who have more than five years of working experience in pediatrics will be program coordinators. They are all experienced enough to carry out the program.

The department in the target setting has been very supportive in terms of time release for staff training. Most of the time taken for participating courses can be counted as working hours. The introductory session of the nurse-led education
program to the staff in the Department of Pediatric and Adolescent Medicine will last about one hour only. The staff will be released to attend the session.

Little equipment and not many facilities are necessary for conducting the nurse-led education program. Only information booklets, topical medication samples and wet wrapping materials for demonstration are needed. Two consultation rooms in the outpatient clinic are with low utility. Nurses will only share these two consultation rooms for individual consultations. Classroom in target hospital will be booked for the group workshop.

3.1.4 Cost-benefit Ratio

In order to maximize the healthcare benefit at a low healthcare risk and cost, a cost-benefit analysis was conducted before setting up the guideline of the nurse-led education program. Both material cost and non material cost were considered to assess the impact of the innovation.

The pediatric eczematous patients will not experience any risk in the nurse-led education program. The program is not aimed at changing the prescription but increasing their compliance. Patients will continue to have the expert care from pediatricians. None of the identified studies showed a negative influence on the severity of eczema and, patients’ and their parents’ knowledge and skills of eczema management.
There are several potential benefits from the implementation of the nurse-led education program. The pediatric eczematous patients and their parents will gain more knowledge and skills about eczema management (Broberg et al., 1990; Chinn et al., 2002; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010). The program will provide a channel for patients and parents to clarify the misconception and raise their concern. It is hoped that the compliance of treatment among pediatric eczematous patients will be increased and thus reduce the severity of eczema. The frequency of follow up and admission due to poor eczema control will then be lowered, and thus, patients will receive better quality of nursing care in both outpatient clinic and ward setting.

Another potential non-material benefit of implementing the innovation is the improvement of staff morale as patient education is an important part of our holistic nursing care. There is no formal guideline and protocol in the current setting, patient education was not systemic. Different nurses may use different teaching strategies which may not be evidence-based. Patients may easily be confused by the different teaching strategies, thus the effectiveness of the education are affected. The nurse-led education program offers a channel for nursing staff to provide evidence-based education effectively.

The contents of the nurse-led education program have been taught by nurses
every day but now it is systemized as an evidenced-based program. The program will be allocated in a timeslot with less workload in outpatient clinic and one extra nurse is recommended to be on duty during the program. The workload of nursing staff will eventually be lowered as the education program is delivered in a more systemic and effective way. It should not affect neither the staff morale nor increase the turnover rate or absenteeism.

There should be set up cost and running cost of the innovation. The set up cost includes the expense in the first two years and the running cost is the expense of the third years onwards.

For the set up cost, it includes personnel cost and direct program cost. Personnel cost includes the expenses for staff involved in the innovation. In this program, one advanced practice nurse and three registered nurses are the main staff involved. The estimated number of man hours is listed in Appendix 5. They will spend time on work meeting, training staff, interviewing patients, running the program and evaluating the program. Forty nursing staff, fifteen medical staff and five clerical or supporting staff will be relieved in groups to attend the one hour introductory session about the nurse led education program. It is estimated that the number of man-hours for setting up the program is about 756 hours. According to the mean salary of advanced practice nurse, registered nurse, medical staff and
supporting staff, the total personnel cost in running the program is about HK$122,212 (Hospital Authority, 2007; Hospital Authority, 2011).

The direct cost includes printing information booklets, photocopying handout and forms, buying stationery, preparing refreshment and promotion. The direct cost is estimated HK$7,000. No cost is needed for venue, computer and audio-visual equipment as they are provided by the hospital and the department. The estimated set up cost of nurse-led education program for pediatric eczema patients is showed in Appendix 4. It would be about HK$129,212.

For the running cost, the majority cost would be personnel expense which cost HK$85,184 (Hospital Authority, 2007; Hospital Authority, 2011). The total annual running cost would be HK$89,184. The estimated annual running cost and the number of man-hours are summarized in Appendices 6 and 7.

It is hoped that the implementation of the nurse-led education program may lower the frequency of follow up and admission rate due to poor control of pediatric eczema and thus probably lower the cost of providing the service. There are about 50 clinical admissions and 1000 outpatient clinic visits were due to atopic eczema. Patients usually stay for five days in each of the admission. The average inpatient cost per patient per day is $3398 (Hospital Authority, 2010). If the admission rate due to poor control of pediatric eczema decreased by 50%,
$424,750 would be saved. The average outpatient cost per attendance is $842 (Hospital Authority, 2010). If the number of visits is decreased by 30%, $252,600 would be saved. It is estimated that $677,350 would be saved annually. The cost saved annually is summarized in Appendix 8. Therefore, the material costs of not implementing the innovation are repeated follow ups and admissions, the workload of staff and healthcare expenses would be increased.

3.2 Evidence-based Practice Guideline

An evidence based practice guideline was developed after affirming the implementation potentials of the nurse-led education program. The evidence level of the guideline was based on the Scottish Intercollegiate Guideline Network (SIGN) grading system (Scottish Intercollegiate Guideline Network, 2011). The level of evidence developed by SIGN is attached in Appendix 9. Among the five identified studies, one study was graded as 1++ (Moore et al., 2009), two were graded as 1+ (Grillo et al., 2006; Schuttelaar et al., 2010) and the other two were graded as 1- (Broberg et al., 1990; Chinn et al., 2002). The grading of the proposed recommendations was determined by the evidence level of each identified studies. The grading did not reflect the importance or effect of the recommendations but it helped to differentiate the recommendations based on stronger or weaker evidence. The grading of recommendations developed by the
SIGN is attached in Appendix 10.

The nurse-led education program in reducing pediatric eczema guideline was established and is attached in Appendix 11. The guideline is user-friendly and aims at providing support to the nurses who organize the program. The background information of eczema, the aims and objectives of the program, the contents of the program and the recommendations have been included in the guideline.
Chapter 4

Implementation Plan

4.1 Communication Plan

To implement the nurse-led education program for pediatric eczematous patients into clinical practice, effective communication between healthcare professionals is required. To disseminate the newly proposed protocol, a comprehensive communication plan is essential.

4.1.1 Stakeholders

Stakeholders refer to people who are affected by the proposed changes or anticipated results of the innovation. It is essential to identify the stakeholders first for effective communication. In our setting, the key stakeholders are the Chief of Service (COS), General Manager of Nursing (GMN), Department Operation Manager (DOM), Pediatric and Adolescent Medicine Ward Manager (WM), and Out-patient Clinic Manager. These five administrators have the autonomy to allocate the human and capital resources to the proposed innovation. The other key stakeholders are the program team members because they are the users of the proposed guideline and are responsible for organizing the program to the pediatric eczematous patients. Other stakeholders are pediatricians, nurses in outpatient clinic and ward. The number of pediatricians and nurses are about 60. They are
involved in referring clients to the program.

4.1.2 Initiation Stage

To initiate the innovation, the proposer will discuss the personal experience and the observations of the current situation to Outpatient Clinic Manager, WM and APNs. The need for enhancing current practice, the evidence supporting the innovation and the proposed guideline will be presented to them in order to get the recognition of the existing problem and realize the need of change. If the APNs and two managers show interest to the innovation, the idea of launching the new guideline will be disseminated among nursing staff of the Department of Pediatric and Adolescent Medicine to solicit their support and gather their comments.

With the agreement of the WM and the Outpatient Clinic Manager, a presentation by the innovation proposer to the DOM will be arranged in a monthly DOM meeting. Managers and DOM will be in the meeting. The clinical issue about frequent follow-ups and high admission rate of patients with pediatric atopic eczema will be raised. The need of nurse-led education program to pediatric eczematous patients will be discussed. The supporting evidence, cost and benefits of the innovation, the transferability and feasibility will be written in a formal proposal. The proposal and the innovation guideline will help the administrators to understand the significance of the innovation. With the support
from DOM, he will help to get the approval from GMN and COS. A presentation and a proposal will be prepared to GMN and COS by the innovation proposer.

After approval from the administrators is sought, the next concern is the development of a program team to facilitate the communication process. One advanced practice nurse in pediatrics will be invited as the program supervisor and three registered nurses who have more than five years working experience in pediatrics will be the program coordinators. The innovation proposer is a preferred member of the program team. The program team is responsible to refine the guideline, formulate the communication plan, conduct a pilot study, organize the program and evaluate the effectiveness of the program. The program supervisor will be responsible to report the progress to the DOM, GMN and COS.

The initiation stage will last for about 6 months.

4.1.3 Facilitation Stage

During the facilitation stage, the program team will follow a Gantt chart to guide the facilitation of translation. Gantt chart is used to illustrate the time frame of preparation, implementation and evaluation plan. It is attached in Appendix 12. Bi-weekly work meetings will be scheduled to organize the program.

4.2 Pilot Study Plan

Prior to the full-scale program evaluation, a pilot study will be conducted.
Pilot study is a small scale preliminary study and it is designed to evaluate the feasibility, efficiency and cost of study methods, the reproducibility and accuracy of measurements (Hulley, 2007). It also helps to identify and correct the potential problems of the program. It will be carried out by the program team and it will last for six months covering preparations and evaluation. Preparation of the pilot study will last for 2 months. Training workshops to program team and introductory sessions to staff will be carried out. The actual period for pilot study will be three months. After that, one month will be spent on evaluation of the pilot study and modification of the program before the actual implementation of the program.

4.2.1 Preparation of the Pilot Study

Preparation of the pilot study will last for 2 months. Prior to the pilot study, bi weekly work meetings will be scheduled among program team to follow the progress of the program. The program supervisor will call for the meetings and send out the agenda through e mails.

Meanwhile, two sessions of the training workshops will be provided to program coordinators by the program supervisor. There will be one session per week and each session will last for one hour. The first training session will focus on the management of eczema. Although the program coordinators should already
have the knowledge and skills about managing eczema, the evidence-based guideline will be introduced in the training session to standardize their education in the program. The use of Scoring Atopic Dermatitis (SCORAD) Index (Appendix 13) will also be discussed to standardize the scoring of each program team member. The second training session will focus on consultation skills and presentation skills. Providing a relaxing and pleasant atmosphere during consultation is important to build an intimate therapeutic relationship. Obtaining relevant information is essential to develop a comprehensive individual management plan. Such training would give an insight to the program coordinators. After the training, the program coordinators should be able to conduct effective consultations and provide evidence-based education to the patients.

It is essential to get support from other health professionals. Introductory sessions to nursing and medical staff will be organized for briefing the proposed innovation. It will last for one hour and will be held by program team members. The purpose and the contents of the program, as well as their role to refer cases for the program will be introduced. Questions and answers sessions will be provided to handle staff enquiries.

4.2.2 Subjects Recruitment Strategies
The pilot study will be held in the Pediatric and Adolescent Medicine Outpatient clinic. The recruitment will be held in the same place. Ten pediatric eczematous patients will be recruited in the pilot study because it will be the number of patients to be included in the one session of the proposed program. The inclusion criteria in the pilot study will be the same as that proposed in the guideline. The outpatient clinic nurses or pediatrician will identify the potential subjects who meet the inclusion criteria and also will assess the readiness of the patients and their parents to participate in the pilot study. The potential subjects will then be referred to the program team. The planned time frame for the recruitment will be around two weeks.

After recruiting the subjects, the pilot study will be held within 2 weeks.

**4.2.3 Data Collection**

Demographic data, severity of eczema and treatment received from pediatrician will be recorded in the assessment form (Appendix 13) as baseline. By the end of the pilot study, the severity of eczema will be assessed again for comparison.

**4.2.4 Data Evaluation**

After the data collection, the data will be evaluated by the program team. The evaluation will last for one month. The difficulties encountered in the pilot study,
the confidence level of applying the guideline and carrying out the program will be discussed among the program team. Modification of the guideline and the program will be made accordingly.

4.3 Evaluation Plan

Evaluation plan is used to determine whether the innovation is effective and achieving the desired outcomes. It is also used to receive comments to refine the guideline. A comprehensive evaluation may help to analyze the innovation. The findings will facilitate the development of similar programs in other areas.

4.3.1 Outcomes

4.3.1.1 Patient Outcomes

The clinical benefits of the nurse-led education program on pediatric eczematous patients will be focused on reducing their severity of eczema. The primary outcome will be assessed by program team coordinators using SCORAD Index (European Task Force on Atopic Dermatitis). The SCORAD index considered both objective and subjective signs. It consists of three main components which are the extent, intensity and subjective symptoms. To measure the extent of eczema, the rule of nines is applied for estimating the affected area. The extent can be graded 0-100. The intensity part includes six items: erythema, edema or papulation, excoriations, lichenification, oozing or crusts and dryness.
Each item is graded 0-3. Subjective items included daily pruritus and sleeplessness. Both subjective items can be graded on a 10 cm visual analogue scale. The maximum subjective score is 20. The SCORAD index formula is: $A/5 + 7B/2 + C$. In this formula, $A$ is defined as the extent (0-100), $B$ is defined as the intensity (0-18) and $C$ is defined as the subjective symptoms (0–20). The overall score ranged from 0 to 103. A higher score represents more severe eczema. A score less than 25 is considered as mild, score between 25 and 50 is considered as moderate and score higher than 50 is considered as severe.

The secondary outcome is patient’s satisfaction. A structured questionnaire (Appendix 14) will be used to evaluate the patient’s satisfaction towards the program. It will be filled in by patient’s parent if the child is too young to understand the program. The questionnaire will be filled in immediately after the program and at 6 months. The questionnaire composes of five questions which focus on the skin condition, follow up and admission frequency, and knowledge. A five point scale is used to measure the comment towards the program from ‘extremely agree’ to ‘extremely disagree’. For the last question, there will be an open ended question for any comment.

4.3.1.2 Healthcare Provider Outcomes

Evaluating healthcare provider outcomes facilitates a more comprehensive
evaluation. The workload of nurses and pediatrician in the Department of Pediatric and Adolescent Medicine is expected to be lower after the innovation. It is hoped that the morale is improved by the reduced workload. Providing education to eczematous patients is time consuming. With the nurse-led education program, less time will be spent on education and they may enhance other service. A questionnaire (Appendix 15) will be used to gather comments from around 70 nurses and pediatrician in the Department of Pediatric and Adolescent Medicine. The questionnaire composes of three yes/no questions. It mainly focuses on the workload. For the fourth question, a five point scale is used to measure the overall comment towards the program from ‘extremely not satisfied’ to ‘excellent’. The last question is an open ended for any comment.

4.3.1.3 System Outcomes

Systematic outcomes are the admission rate of pediatric ward and the attendance rate of pediatric outpatient clinic, and the cost of innovation.

Patients will have a comprehensive education in the program. Therefore, patient’s compliance to the treatment should be improved and results in optimal control. With better control, the follow up frequency and chance of admission should be lowered. The number of follow ups and admissions in previous 6 months of each patient will be recorded at baseline and 6 months.
The cost of the innovation is expected to be compensated by the reduced admission rate and attendance rate. The burden of health care system should be lessened. The cost of the innovation will be calculated. It will be compared to the cost of admission and the number of follow-up reduced at 6 months.

**4.3.2 Nature and Number of Clients to be Involved**

Eligible patients will be recruited at the target hospital will be recruited. The inclusion and exclusion criteria are based on the identified studies. The participants in the program should meet the following inclusion criteria:

1. they should be aged between 0 to 16 years old;
2. they are under the care of the Department of Pediatric and Adolescent Medicine of the target hospital;
3. one of the parents of the patient can accompany the patient to join the program.

The exclusion criteria are:

1. they are participating similar program in other settings;
2. they are not able to understand Cantonese.

Recruitment will adopt a convenience sampling method. Sample size is calculated by using JAVA Applets for Power and Sample Size (Lenth, 2006-9). For paired t-test, a total sample of at least 128 patients needed to detect a
clinically significant effect size of 5 with power as 80%, alpha as 0.05, and standard deviation as 20. More patients need to recruit for baseline assessment when taking the dropout rate into account. The dropout rate is about 10%. The estimated percentage was based on the reviewed studies. Therefore, at least 140 patients will actually be recruited.

4.3.3 Timing and Frequency of Data Collection

Approval will be obtained from the ethics committee of the hospital before recruitment and data collection. The eligible participants will be referred by nurses and pediatrician to the program team. The program coordinators will explain the purpose and will give a brief introduction of the program to patients and their parents before the program start. A written consent will be obtained before data collection for those agree to join. Baseline information will be collected before individual consultation. After that, a two hours group workshop will be introduced. Ten patients will be in a group. Follow up will be arranged according to patient’s need. Patient may choose to have individual follow up visit or telephone follow up consultation. The follow up frequency depends on the need of the patient. The program will run for 9 months. The patient outcomes will be assessed by SCORAD index (Appendix 13) at baseline, 3 months and 6 months. The patient’s satisfaction to the program will also be assessed immediately after
the program and at 6 months.

Apart from collecting data of the patient outcomes, evaluation of the workload and comments of nurses and pediatrician in the Department will be done at 6 months.

For the system outcomes, the number of follow-ups and admissions in previous 6 months of each patient will be recorded at baseline and 6 months for comparison. The cost of innovation will be calculated in 6 months.

4.3.4 Data Analysis

Descriptive statistics will be used to describe the participant characteristics in terms of demographic data and the severity of eczema.

The primary patient outcome is reducing the severity of eczema. The severity of eczema will be assessed by the SCORAD Index (Appendix 13). The score ranged from 0 to 103. The patient outcomes will be assessed by SCORAD Index at baseline, 3 months and 6 months. Paired t-test will be preformed to assess the reduction of severity of eczema at each follow-up time.

For the secondary outcome, the patient’s satisfaction will be assessed by questionnaire (Appendix 16). To analyze the patient’s satisfaction, average score of each question will be calculated. A 95 % confident interval will be used to understand the patient’s satisfaction level. The open ended question for any
comment will be analyzed.

Regarding to the evaluation of healthcare provider outcomes, the objective is to examine whether there is a reduction of workload among nurses and pediatrician. As stated earlier, a questionnaire will be used for the assessment (Appendix 15). The score of the questionnaire will be calculated. A 95% confidence interval will be used to estimate for the proportion of healthcare providers reporting a reduction in workload. The open ended question for any comment will be analyzed.

For evaluating the system outcomes, the objectives are to examine the admission rate of pediatric ward and attendance rate of pediatric out-patient clinic and the cost of innovation. The admission rate of pediatric ward and attendance rate of pediatric out-patient clinic due to eczema after implementation of the program is estimated by recording the number of follow-ups and admissions in previous 6 months of each participant. The difference at baseline and at 6 months will be compared. Paired t-test will be used for analysis. The change of admission rate and attendance rate of all the participants will be calculated based on the findings. Furthermore, the cost of the innovation will be calculated. It will be compared to the cost of admission and follow up reduced at 6 months.

4.3.5 Basis for Recommendation of Nurse-led Education Program to
Pediatric Eczema Patients

The chief indication of an effective change of practice is the achievement of the defined patient outcome on reducing severity of eczema. The education program will be considered as effective if the SCORAD index reduced 5 scores at 6 months after the program. The improvement is estimated and based on the revised studies and the experience of the innovation proposer. With enriching the knowledge and skills, patients are expected to be better control their eczema. Thus, the quality of life will be improved.

The healthcare provider outcome is aim at reducing the workload in eczema education. The program is considered as effective if 60% staff feels the workload is reduced.

For the systemic outcomes, it is aim at reduce the expenditure and burden of the target hospital. The program is considered as effective if the admission rate of pediatric ward and attendance rate of pediatric out-patient clinic due to poor control of pediatric eczema after implementation of the program is reduced 50% and 30% accordingly. There are about 50 clinical admissions and 1000 outpatient clinic visits were due to atopic eczema annually. Patients usually stay for five days in each of the admission. The average inpatient cost per patient per day is $3398 (Hospital Authority, 2010). If the admission rate decreases 50%, $424,750 will be
saved. The average outpatient cost per attendance is $842 (Hospital Authority, 2010). If the number of visit decreases 30%, $252,600 will be saved. It is estimated that $677,350 will be saved annually. The total annual running cost would be HK$89,184. The estimated set up cost of nurse led education program is about HK$129,212. Therefore, around $550,000 will be saved annually in the long run. The program is considered as effective if the expenditure is reduced.
## Appendices

### Appendix 1- Systemic Search

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<td>#3 education OR intervention OR program OR programme OR clinic OR consultation OR workshop OR class OR classes OR lesson OR lessons</td>
<td>2006059</td>
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<td>#4 random OR randomized OR randomised</td>
<td>639174</td>
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<td>#5 #1 AND #2 AND #3 AND #4</td>
<td>165</td>
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<tr>
<td>#6 By title screening</td>
<td>10</td>
</tr>
<tr>
<td>#7 By abstract screening</td>
<td>7</td>
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<tr>
<td>#8 After reading full text</td>
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<tr>
<th>Keywords</th>
<th>CINAHL (EBSCOhost)</th>
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<td>#1 ( (MH &quot;Eczema&quot;) OR &quot;eczema&quot; ) OR atopic dermatitis</td>
<td>2289</td>
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<td>#2 Education OR Intervention OR Program OR Programme OR Clinic OR Consultation OR Workshop OR class OR Classes OR lesson OR lessons</td>
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<td>#3 child OR Children OR Pediatric OR Pediatrics OR Paediatric OR paediatrics OR schoolchildren OR Preschool OR toddler OR kid OR kids</td>
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<tr>
<td>#4 random OR randomized OR randomised</td>
<td>117472</td>
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<tr>
<td>#5 S1 and S2 and S3 and S4</td>
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<td>#6 By title screening</td>
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<tr>
<td>#7 By abstract screening</td>
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## Appendix 2 - Table of Evidence

<table>
<thead>
<tr>
<th>Bibliographic Citation</th>
<th>Sample Characteristics</th>
<th>Intervention</th>
<th>Control</th>
<th>Outcome Measures</th>
<th>Effect size (Intervention vs. Control)</th>
<th>Length of follow up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broberg et al. 1990</td>
<td>1. Median age = 2.75 years (intervention group) 2.1 years (control group)  (Range: 0.3 to 6.2) 2. 26 boys and 24 girls 3. Mean total eczema score = 21.3 (intervention) 26.4 (control)</td>
<td>1. Routine medical visit 2. One 2 hours Nurse's lesson within 2 weeks after the initial visit. Discussion or training in practice about: - general information about eczema - environmental control - topical treatment - expected achievement (n= 23)</td>
<td>Routine medical visit (n= 19)</td>
<td>(1) Total eczema score  (Range: 0-96)  (2) Distribution score  (Range: 0-4)  (3) Itchiness score  (Range: 0-4)</td>
<td>The Change of mean score from baseline (1) -20.5 vs. -13.2 (p&lt;0.05)  (2) -2.0 vs. -1.0 (not significant)  (3) -1.3 vs. -1.2 (not significant)</td>
<td>3 months</td>
</tr>
<tr>
<td>Chinn et al. 2002</td>
<td>1. Mean age= 5.57 years Mean age of younger children= 2.14 years Mean age of older children= 8.86 years (Range: 0.5-15.5 years) 2. Baseline mean of QOL or family impact=</td>
<td>One 30 minutes nurse consultation +/- telephone support or further appointment: - Discussion on knowledge of eczema - Practical demonstration with  (n=105)</td>
<td>Normal management regimen</td>
<td>(1) 0.5-4 years IDQOL (Range: 0-30) 4-16 years CDLQI (Range: 0-30)</td>
<td>Effect size (Intervention – control)  (1) 0.5-4 years 1.2; p=0.24 4-16 years 0.24; p=0.7</td>
<td>3 months</td>
</tr>
<tr>
<td>Bibliographic Citation</td>
<td>Sample Characteristics</td>
<td>Intervention</td>
<td>Control</td>
<td>Outcome Measures</td>
<td>Effect size</td>
<td>Length of follow up</td>
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<tr>
<td>Grillo et al. 2006</td>
<td>1. Mean age= 4.3 years (Range: 0.3 to 13 )&lt;br&gt;2. 35 boys &amp; 26 girls&lt;br&gt;3. Mean SCORAD= 50.97 (Intervention group)&lt;br&gt;47.7 (Control group)&lt;br&gt;4. Baseline mean DFI= 11.09 (Intervention group)&lt;br&gt;10.86 (Control group)&lt;br&gt;5. Mean CDLQI= 8.1 (Intervention group)&lt;br&gt;9.69 (Control group)&lt;br&gt;6. Mean IDQOL= 11 (Intervention group)&lt;br&gt;8.63 (Control group)</td>
<td>1. Normal management regimen&lt;br&gt;2. One 2 hours nurse education workshop:&lt;br&gt; - Presentation about knowledge of eczema&lt;br&gt; - Practical session on wet wrapping and cream application&lt;br&gt; - Questions and sharing session (n= 32)</td>
<td>Normal management regimen&lt;br&gt; (n= 32)</td>
<td>(1) &lt;5 years IDQL (Range: 0-30)&lt;br&gt; (2) &lt;5 years FDI (Range: 0-30)&lt;br&gt; (3) SCORAD (Range: 0-103)</td>
<td>(1) &lt;5 years&lt;br&gt;6.91(5) vs. 5.33(3.02)&lt;br&gt;No significant difference&lt;br&gt;5-16 years&lt;br&gt;1.75 (1.16) vs. 7.08 (4.52); p=0.004&lt;br&gt;7.47 (5.79) vs. 7.89 (5.85)&lt;br&gt;No significant difference&lt;br&gt;Severe: &gt;40&lt;br&gt;23.52 (16.53) vs. 40.21 (22.9); P&lt;0.005</td>
<td>3 months</td>
</tr>
</tbody>
</table>

- CDLQI: 7.9<br>IDQOL: 5.9<br>FDI: 4.6 (younger children)<br>4.8 (older children)<br>an individual treatment plan<br> - Advice for children on self management at school<br> - Written drug leaflet (n= 92)<br>Note: CDLQI: Children's Dermatology Life Quality Index<br>IDQOL: Inventory of Dermatological Quality of Life<br>FDI: Freiburg Disability Index
<table>
<thead>
<tr>
<th>Bibliographic Citation</th>
<th>Sample Characteristics</th>
<th>Intervention</th>
<th>Control</th>
<th>Outcome Measures</th>
<th>Effect size Intervention – control a</th>
<th>Length of follow up</th>
</tr>
</thead>
</table>
| Moore et al. 2009 RCT++ | 1. Mean age = 3.3 years  
2. 2.8 years (Intervention group)  
3.75 years (Control group)  
(Range: 0-16)  
2. 30 boys & 19 girls (Intervention group)  
24 boys & 26 girls (Control group)  
3. Baseline mean SCORAD =  
38 (Intervention group)  
42 (Control group) | One 2 hours Nurse-led eczema workshop:  
- Refer to dermatology registrar for prescription if necessary  
- Eczema booklets & equipment cards to parents  
- Educational video and nurse presentation in a group  
- Application of treatments was demonstrated and parents participated with supervision from the nurse  
- Written management plan (n=49) | Dermatologist-led clinic  
- Prescriptions  
- Eczema booklets & equipment cards available at clinic  
- Educational video  
- Management plan (n=50) | (1) SCORAD  
(Range: 0-103) | (1) -9.93; p< 0.001  
[ 95% CI -14.57 to -5.29] | 1 month |
| Schuttelaar et al. 2010 RCT+ | 1. Mean age: 5.37 years  
5.3 years (Intervention group)  
5.4 years (Control group)  
(Range: 0-16 years)  
2. 50 boys & 31 girls (Intervention group) | Nurse practitioner disease management program:  
Schedule  
- 1st treatment visit about 30 | Conventional care and treatment visits by dermatologist about 10-20 | Primary:  
(1) <4 years  
IDQL  
(Range: 0-30)  
4-16 years | (1) <4 years  
1.7; p= 0.26  
[95% CI -4.6 to 1.2]  
4-16 years  
0.7; p= 0.55 | 12 months |
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</table>
| 3. | Baseline SCORAD= | minutes or a 2 hours group session with maximum 8 parents  
- 2nd visit/ telephone consultation- 2 weeks after 1st visit  
- +/- Mail or telephone support from nurse  |
|   |   |   |
|   |   |   |
| 4. | Baseline mean DFI= |   |
|   |   |   |
|   |   |   |
| 5. | Baseline mean CDLQI= |   |
|   |   |   |
|   |   |   |
| 6. | Baseline mean IDQOL= |   |
|   |   |   |
|   |   |   |

**Content**

- Treatment of eczema  
- Presentation about knowledge of eczema  
- Practical demonstration on wet wrapping and cream application  
- Written action plan  
- Written information about the knowledge of eczema, cream application and wet wrapping skills  

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<table>
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<tbody>
<tr>
<td>48 boys &amp; 31 girls (Control group)</td>
<td>minutes; No education from nurse</td>
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</tbody>
</table>
| 33.4 (Intervention group, <4yrs) | 0.5; p= 0.65  
[95% CI -3.3 to 1.7]  |
| 33.4 (Control group, <4yrs) |   |
| 35.4 (Control group, 4-16yrs) |   |
| 32.9 (Intervention group, 4-16yrs) |   |
| 35.4 (Control group, 4-16yrs) |   |
| 3.4 (Intervention group) |   |
| 9.2 (Control group) |   |
| 10.0 (Intervention group) |   |
| 12.1 (Control group) |   |
| 10.7 (Intervention group) |   |
| 11.6 (Control group) |   |
| 33.4 (Intervention group, <4yrs) |   |
| 29.9 (Intervention group, 4-16yrs) |   |
| 33.4 (Control group, <4yrs) |   |
| 35.4 (Control group, 4-16yrs) |   |
| 3.4 (Intervention group) |   |
| 9.2 (Control group) |   |
| 10.0 (Intervention group) |   |
| 12.1 (Control group) |   |
| 10.7 (Intervention group) |   |
| 11.6 (Control group) |   |

**IDQL & IDQOL: Infants’ Dermatology Quality of Life Index; CDLQI: Children’s Dermatology Life Quality Index; DFI: Dermatitis Family Impact; FDI: Family Dermatitis Index; SCORAD: Scoring Atopic Dermatitis; CSQ-8: Client Satisfaction Questionnaire-8. a mean; p value [95% CI difference]. b mean (SD). c mean (SD); p value.**

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Appendix 3- Quality Assessment of Selected Studies


**Study Type:** Randomized controlled trial

| INTERNAL VALIDITY |
|-------------------|-------------------|
| 1.1 The study addresses an appropriate and clearly focused question. | Adequately addressed. The objective was stated at the end of introduction. |
| 1.2 The assignment of subjects to treatment groups is randomised | Not reported. The patients were divided into two random groups but the randomized method was not stated. |
| 1.3 An adequate concealment method is used | Not addressed. The concealment method was not mentioned. |
| 1.4 Subjects and investigators are kept ‘blind’ about treatment allocation | Not applicable. Impossible to blind. |
| 1.5 The treatment and control groups are similar at the start of the trial | Adequately addressed. Demographic data of groups was similar. The baseline of mean total eczema score was 21.3 and 26.4 in two groups. |
| 1.6 The only difference between groups is the treatment under investigation | Well covered. No additional treatment was given. |
| 1.7 All relevant outcomes are measured in a standard, valid and reliable way | Not addressed. No evidence provided that the measures used are reliable and have been validated prior. |
| 1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Control group: (26-23)/26x100% = 11.54%  
Intervention group: (24-19)/24x100% = 20.83%  
Total: [(26+24)- (23+19)]/ (26+24) = 16%  
Reasons: Three children became asymptomatic and parents were not motivated to come. Two were negative towards topical treatment. One was involved in car accident. Two suffered other diseases. |
## OVERALL ASSESSMENT OF THE STUDY

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><strong>2.1</strong></td>
<td>How well was the study done to minimise bias? Code ++, +, or –</td>
</tr>
<tr>
<td></td>
<td>-</td>
</tr>
<tr>
<td><strong>2.2</strong></td>
<td>If coded as +, or – what is the likely direction in which bias might affect the study results?</td>
</tr>
<tr>
<td></td>
<td>The randomization was poorly addressed. The concealment method was not mentioned. No evidence provided that the measures used are reliable and have been validated prior. The drop out rate was high. Thus these may impose bias and affect the study results.</td>
</tr>
<tr>
<td><strong>2.3</strong></td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
</tr>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td><strong>2.4</strong></td>
<td>Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
</tr>
<tr>
<td></td>
<td>No.</td>
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</tbody>
</table>


**Study Type:** Randomized controlled trial

### INTERNAL VALIDITY

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<thead>
<tr>
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<tbody>
<tr>
<td><strong>1.1</strong></td>
<td>The study addresses an appropriate and clearly focused</td>
</tr>
<tr>
<td></td>
<td>Adequately addressed. The objective was stated in the introduction.</td>
</tr>
<tr>
<td>Question</td>
<td>Assessment</td>
</tr>
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<td>------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.2 The assignment of subjects to treatment groups is randomised</td>
<td>Well covered. The randomization was done by a list of random numbers in blocks of 20.</td>
</tr>
<tr>
<td>1.3 An adequate concealment method is used</td>
<td>Not addressed. The concealment method was not mentioned.</td>
</tr>
<tr>
<td>1.4 Subjects and investigators are kept ‘blind’ about treatment allocation</td>
<td>Not applicable. Impossible to blind.</td>
</tr>
<tr>
<td>1.5 The treatment and control groups are similar at the start of the trial</td>
<td>Not addressed. Demographic data of groups were not addressed separately. The baseline measures of QOL were skewed. Median scores did not differ significantly.</td>
</tr>
<tr>
<td>1.6 The only difference between groups is the treatment under investigation</td>
<td>Well covered. No additional treatment was given.</td>
</tr>
<tr>
<td>1.7 All relevant outcomes are measured in a standard, valid and reliable way</td>
<td>Well covered. The outcome measure was measured in a valid and reliable way.</td>
</tr>
</tbody>
</table>
| 1.8 What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Control group: (116-105)/116x100% = 9.48%  
Intervention group: (119-92)/119x100% = 22.69%  
Total: (105+92)/(116+119)x100% = 16.17%  
Reason: 5 children in intervention group declined the appointment or did not attend the appointment. |
| 1.9 All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis) | Not addressed. The data from drop out participants were not used for analysis. The characteristic of drop out participants was discussed under results. |
| 1.10 Where the study is carried out at more than one site, results are comparable for all sites | Not applicable. The study was carried out in one site only. |

**OVERALL ASSESSMENT OF THE STUDY**

| 2.1 How well was the study done to minimise bias? | - |
Code ++, +, or –

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<tbody>
<tr>
<td>2.2</td>
<td>If coded as +, or – what is the likely direction in which bias might affect the study results?</td>
</tr>
<tr>
<td>2.3</td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
</tr>
<tr>
<td>2.4</td>
<td>Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
</tr>
</tbody>
</table>


**Study Type:** Randomized controlled trial

**INTERNAL VALIDITY**

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.1</td>
<td>The study addresses an appropriate and clearly focused question.</td>
</tr>
<tr>
<td>1.2</td>
<td>The assignment of subjects to treatment groups is randomised</td>
</tr>
<tr>
<td>1.3</td>
<td>An adequate concealment method is used</td>
</tr>
<tr>
<td>1.4</td>
<td>Subjects and investigators are kept ‘blind’ about treatment allocation</td>
</tr>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between</td>
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<td>groups is the treatment under investigation was given.</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way</td>
</tr>
<tr>
<td>1.8</td>
<td>What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?</td>
</tr>
<tr>
<td>1.9</td>
<td>All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis)</td>
</tr>
<tr>
<td>1.10</td>
<td>Where the study is carried out at more than one site, results are comparable for all sites</td>
</tr>
<tr>
<td><strong>OVERALL ASSESSMENT OF THE STUDY</strong></td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>How well was the study done to minimise bias? Code ++, +, or –</td>
</tr>
<tr>
<td>2.2</td>
<td>If coded as +, or – what is the likely direction in which bias might affect the study results?</td>
</tr>
<tr>
<td>2.3</td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention?</td>
</tr>
<tr>
<td>2.4</td>
<td>Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
</tr>
</tbody>
</table>

**Study Type:** Randomized controlled trial

<table>
<thead>
<tr>
<th>INTERNAL VALIDITY</th>
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<tbody>
<tr>
<td><strong>1.1</strong> The study addresses an appropriate and clearly focused question.</td>
<td><strong>Well covered.</strong> The hypothesis was clearly stated in the introduction.</td>
</tr>
<tr>
<td><strong>1.2</strong> The assignment of subjects to treatment groups is randomised</td>
<td><strong>Well covered.</strong> The randomization was done by sequentially numbered sealed, opaque envelopes in blocks of 10.</td>
</tr>
<tr>
<td><strong>1.3</strong> An adequate concealment method is used</td>
<td><strong>Well covered.</strong> Adequate concealment method was used.</td>
</tr>
<tr>
<td><strong>1.4</strong> Subjects and investigators are kept ‘blind’ about treatment allocation</td>
<td><strong>Not applicable.</strong> Impossible to blind.</td>
</tr>
<tr>
<td><strong>1.5</strong> The treatment and control groups are similar at the start of the trial</td>
<td><strong>Well covered.</strong> Groups were demographically similar.</td>
</tr>
<tr>
<td><strong>1.6</strong> The only difference between groups is the treatment under investigation</td>
<td><strong>Well covered.</strong> No additional treatment was given.</td>
</tr>
<tr>
<td><strong>1.7</strong> All relevant outcomes are measured in a standard, valid and reliable way</td>
<td><strong>Well covered.</strong> The outcome measure was measured in a valid and reliable way.</td>
</tr>
</tbody>
</table>
| **1.8** What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed?                                                             | Control group: \( \frac{58-50}{58} \times 100\% = 13.79\% \)  
Intervention group: \( \frac{54-49}{54} \times 100\% = 9.26\% \)  
Reason: They did not attend the review appointment. |
| **1.9** All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis)                                                                          | **Not addressed.** Intention to treat analysis was not performed. The data from drop out participants were not used for final analysis. |
| **1.10** Where the study is carried out at more than one site, results are                                                                                                                                          | **Not applicable.** The study was carried out in one site only. |
**OVERALL ASSESSMENT OF THE STUDY**

| 2.1 | How well was the study done to minimise bias? Code ++, +, or – | ++. The study had well-covered in most of the areas. |
| 2.2 | If coded as +, or – what is the likely direction in which bias might affect the study results? | Not applicable. |
| 2.3 | Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study intervention? | Yes, the study is of strong methodology quality. |
| 2.4 | Are the results of this study directly applicable to the patient group targeted by this guideline? | Yes, the patient population of my proposed guideline was similar to those in the study. |


**Study Type:** Randomized controlled trial

**INTERNAL VALIDITY**

<p>| 1.1 | The study addresses an appropriate and clearly focused question. | Well covered. The hypothesis was clearly stated in the introduction. |
| 1.2 | The assignment of subjects to treatment groups is randomised | Adequately addressed. Randomization was stratified by age, using a computer generated scheme. |
| 1.3 | An adequate concealment method is used | Well covered. Consecutive closed envelopes labeled only with a number were used. |
| 1.4 | Subjects and investigators are kept ‘blind’ about treatment allocation | Adequately addressed. Impossible to blind to patient and health care providers. The trained outcome assessor scoring eczema |</p>
<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
<th>Assessment</th>
</tr>
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<tbody>
<tr>
<td>1.5</td>
<td>The treatment and control groups are similar at the start of the trial</td>
<td>Well covered. Groups were demographically similar and the SCORAD was no significant difference.</td>
</tr>
<tr>
<td>1.6</td>
<td>The only difference between groups is the treatment under investigation</td>
<td>Well covered. No additional treatment was given.</td>
</tr>
<tr>
<td>1.7</td>
<td>All relevant outcomes are measured in a standard, valid and reliable way</td>
<td>Not addressed. No evidence provided that the measures used are reliable and have been validated prior.</td>
</tr>
</tbody>
</table>
| 1.8     | What percentage of the individuals or clusters recruited into each treatment arm of the study dropped out before the study was completed? | Control group: (79-73)/79x100% = 7.59%  
Intervention group: (81-79)/81x100% = 2.47%  
Reasons: One child was emigrated. Three children dropped out due to too much effort. Four dropped out without reason given. |
| 1.9     | All the subjects are analysed in the groups to which they were randomly allocated (often referred to as intention to treat analysis) | Not addressed. Intention to treat analysis was not performed. The data from drop out participants were not used for final analysis. |
| 1.10    | Where the study is carried out at more than one site, results are comparable for all sites | Not applicable. The study was carried out in one site only. |

**OVERALL ASSESSMENT OF THE STUDY**

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<td>2.1</td>
<td>How well was the study done to minimise bias? Code ++, +, or –</td>
<td>+. The study had well-covered in most of the areas.</td>
</tr>
<tr>
<td>2.2</td>
<td>If coded as +, or – what is the likely direction in which bias might affect the study results?</td>
<td>Bias might be resulted because no evidence provided that the measures used are reliable and have been validated prior.</td>
</tr>
<tr>
<td>2.3</td>
<td>Taking into account clinical considerations, your evaluation of the methodology used, and the statistical power of the study, are you certain that the overall effect is due to the study</td>
<td>Yes, the study is of moderate methodology quality.</td>
</tr>
<tr>
<td>intervention?</td>
<td>2.4 Are the results of this study directly applicable to the patient group targeted by this guideline?</td>
<td>Yes, the patient population of my proposed guideline was similar to those in the study.</td>
</tr>
</tbody>
</table>
# Appendix 4- Estimated Set up Cost of the Nurse-led Education Program in Reducing Pediatric Eczema in the First Two Year

<table>
<thead>
<tr>
<th>Items</th>
<th>Time Spent</th>
<th>Cost (HK Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal Cost</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program supervisor</td>
<td>74 hours</td>
<td>17,538</td>
</tr>
<tr>
<td></td>
<td>$ 237 per hour</td>
<td></td>
</tr>
<tr>
<td>Program coordinators</td>
<td>310 hours</td>
<td>47,120</td>
</tr>
<tr>
<td></td>
<td>$ 152 per hour</td>
<td></td>
</tr>
<tr>
<td>Nursing staff training</td>
<td>40 hours</td>
<td>6,080</td>
</tr>
<tr>
<td></td>
<td>$ 152 per hour</td>
<td></td>
</tr>
<tr>
<td>Medical staff training</td>
<td>15 hours</td>
<td>3,750</td>
</tr>
<tr>
<td></td>
<td>$ 250 per hour</td>
<td></td>
</tr>
<tr>
<td>Clerical and supporting staff training</td>
<td>5 hours</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>$60 per hour</td>
<td></td>
</tr>
<tr>
<td>Nursing staff for compensating the increased workload</td>
<td>312 hours</td>
<td>47,424</td>
</tr>
<tr>
<td></td>
<td>$ 152 per hour</td>
<td></td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td></td>
<td><strong>122,212</strong></td>
</tr>
<tr>
<td><strong>Direct program cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printing &amp; photocopying</td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td>Stationery</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Refreshment</td>
<td></td>
<td>1500</td>
</tr>
<tr>
<td>Promotion</td>
<td></td>
<td>1000</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td></td>
<td><strong>7000</strong></td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venue</td>
<td></td>
<td>Hospital permission</td>
</tr>
<tr>
<td>Computer &amp; audio visual equipment</td>
<td></td>
<td>Department provision</td>
</tr>
<tr>
<td><strong>Total Set up Cost</strong></td>
<td></td>
<td><strong>129,212</strong></td>
</tr>
</tbody>
</table>

*Calculation is based on the mean of hourly salary of staff according to the Human Resources Circular No. 20/11
## Appendix 5- Estimated Man-hours for Setting up the Nurse-led Education Program in Reducing Pediatric Eczema in the First Two Year

<table>
<thead>
<tr>
<th>Items</th>
<th>Item description</th>
<th>Time spent per item (Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Program Supervisor (n=1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work meetings</td>
<td>2 hours / meeting 10 meetings in total</td>
<td>20</td>
</tr>
<tr>
<td>Skill training</td>
<td>2 hours</td>
<td>2</td>
</tr>
<tr>
<td>Introductory sessions to nursing staff in ward and outpatient clinic</td>
<td>1 hour/session 30 staff per session 2 sessions in total</td>
<td>2</td>
</tr>
<tr>
<td>Data analysis and report</td>
<td>6 bimonthly reports and 1 final report</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td>subtotal</td>
<td>74</td>
</tr>
<tr>
<td>Program Coordinator (n=3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work meetings</td>
<td>2 hours / meeting 10 meetings in total</td>
<td>60</td>
</tr>
<tr>
<td>Skill training</td>
<td>2 hours</td>
<td>6</td>
</tr>
<tr>
<td>Introductory sessions to nursing staff in ward and outpatient clinic</td>
<td>1 hour/session 30 staff per session 2 sessions in total</td>
<td>2</td>
</tr>
<tr>
<td>Interview patient and establish individual care plan (at the beginning of the program)</td>
<td>0.5 hours/ case 1 nurse/ case 140 cases in total</td>
<td>70</td>
</tr>
<tr>
<td>Running the group program</td>
<td>2 hours/ session 1 nurse / session 16 session in total</td>
<td>32</td>
</tr>
<tr>
<td>Follow up visits or telephone consultation</td>
<td>20 minutes/ session 3 sessions / case 1 nurse / session 140 cases in total</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>subtotal</td>
<td>310</td>
</tr>
<tr>
<td>Nursing staff of the Department of Pediatric and Adolescent Medicine (n=40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff relief for introductory sessions</td>
<td>1 hour/ nurse</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>subtotal</td>
<td>40</td>
</tr>
<tr>
<td>Medical staff of the Department of Pediatric and Adolescent Medicine (n=15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Staff relief for introductory sessions</td>
<td>1 hour/ physician</td>
<td>15</td>
</tr>
<tr>
<td>subtotal</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Clerical and supporting staff of the Department of Pediatric and Adolescent Medicine (n=5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff relief for introductory sessions</td>
<td>1 hour/ staff</td>
<td>5</td>
</tr>
<tr>
<td>subtotal</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Nursing staff in the Pediatric and Adolescent Medicine Outpatient Clinic (n=1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One extra staff for compensating the increased workload during the program</td>
<td>6 hour/ week 52 weeks</td>
<td>312</td>
</tr>
<tr>
<td>subtotal</td>
<td>312</td>
<td></td>
</tr>
<tr>
<td>Total Set Up Man Hours</td>
<td>756</td>
<td></td>
</tr>
</tbody>
</table>
Appendix 6- Estimated Annual Running Cost of the Nurse-led Education Program in Reducing Pediatric Eczema (Third Year Onwards)

<table>
<thead>
<tr>
<th>Items</th>
<th>Time Spent</th>
<th>Cost (HK Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Personal Cost</strong>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Program supervisor</td>
<td>24 hours $ 237 per hour</td>
<td>5,688</td>
</tr>
<tr>
<td>Program coordinators</td>
<td>201 hours $ 152 per hour</td>
<td>30,552</td>
</tr>
<tr>
<td>Nursing staff training</td>
<td>10 hours $ 152 per hour</td>
<td>1520</td>
</tr>
<tr>
<td>Nursing staff for compensating the increased workload</td>
<td>312 hours $ 152 per hour</td>
<td>47,424</td>
</tr>
<tr>
<td></td>
<td><strong>subtotal</strong></td>
<td><strong>85,184</strong></td>
</tr>
<tr>
<td><strong>Direct program cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printing &amp; photocopying</td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td>Stationery</td>
<td></td>
<td>500</td>
</tr>
<tr>
<td>Refreshment</td>
<td></td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td><strong>subtotal</strong></td>
<td><strong>4000</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Total Running Cost</strong></td>
<td><strong>89,184</strong></td>
</tr>
</tbody>
</table>

*Calculation is based on the mean of hourly salary of staff according to the Human Resources Circular No. 20/11
### Appendix 7- Estimated Annual Man-hours for Running the Nurse-led Education Program in Reducing Pediatric Eczema (Third Year Onwards)

<table>
<thead>
<tr>
<th>Items</th>
<th>Item description</th>
<th>Time spent per item (Hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Program Supervisor (n=1)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work meetings</td>
<td>2 hours / meeting 4 meetings in total</td>
<td>8</td>
</tr>
<tr>
<td>Introductory sessions to nursing staff in ward and outpatient clinic</td>
<td>1 hour/session 25 staff per session 1 session in total</td>
<td>1</td>
</tr>
<tr>
<td>Data analysis and report</td>
<td>2 reports</td>
<td>15</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td><strong>Program Coordinator (n=3)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work meetings</td>
<td>2 hours / meeting 4 meetings in total</td>
<td>24</td>
</tr>
<tr>
<td>Introductory sessions to new nursing staff</td>
<td>1 hour/session 30 staff per session 1 sessions in total</td>
<td>3</td>
</tr>
<tr>
<td>Interview patient and establish individual care plan (before the program)</td>
<td>0.5 hours/ case 1 nurse/ case Total 100 cases</td>
<td>50</td>
</tr>
<tr>
<td>Running the group program</td>
<td>2 hours/ session 1 nurse / session Total 12 session</td>
<td>24</td>
</tr>
<tr>
<td>Follow up visits or telephone consultation</td>
<td>20 minutes/ session 3 sessions / case 1 nurse / session Total 100 cases</td>
<td>100</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td></td>
<td>201</td>
</tr>
<tr>
<td><strong>Nursing staff in the Pediatric and Adolescent Medicine Outpatient Clinic (n=1)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One extra staff for compensating the increased workload during the program</td>
<td>6 hour/ week 52 weeks</td>
<td>312</td>
</tr>
<tr>
<td><strong>subtotal</strong></td>
<td></td>
<td>312</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>537</td>
</tr>
</tbody>
</table>
### Appendix 8- Cost Saved Annually with the Implementation of the Program

<table>
<thead>
<tr>
<th>Original Number of cases</th>
<th>Cost per attendance</th>
<th>Estimated reduction of use</th>
<th>Cost saved after implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Outpatient clinic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000</td>
<td>$842</td>
<td>30%</td>
<td>$252,600</td>
</tr>
<tr>
<td><strong>Admission</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50</td>
<td>$3390 x 5 days</td>
<td>50%</td>
<td>$ 424,750</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>$ 677,350</strong></td>
</tr>
</tbody>
</table>
## Appendix 9- Level of Evidence Developed by the SIGN

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1++</td>
<td>High-quality meta-analyses, systematic reviews of RCTs*, or RCTs with very low risk of bias.</td>
</tr>
<tr>
<td>1+</td>
<td>Well-conducted meta-analyses, systemic reviews of RCTs, or RCTs with low risk of bias.</td>
</tr>
<tr>
<td>1−</td>
<td>Meta analyses, systematic reviews of RCTs, or RCTs with a high risk of bias.</td>
</tr>
<tr>
<td>2++</td>
<td>High quality systematic reviews of case-control or cohort studies. High quality case-control or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal.</td>
</tr>
<tr>
<td>2+</td>
<td>Well-conducted case control or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal.</td>
</tr>
<tr>
<td>2−</td>
<td>Case control or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal.</td>
</tr>
<tr>
<td>3</td>
<td>Non-analytic studies, e.g. case reports, case series</td>
</tr>
<tr>
<td>4</td>
<td>Expert opinion</td>
</tr>
</tbody>
</table>

* RCT: randomized, controlled trial.
## Appendix 10- Grading of Recommendations Developed by the SIGN

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>At least one meta analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or a systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results.</td>
</tr>
<tr>
<td>B</td>
<td>A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 1++ or 1+.</td>
</tr>
<tr>
<td>C</td>
<td>A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or extrapolated evidence from studies rated as 2++.</td>
</tr>
<tr>
<td>D</td>
<td>Evidence level 3 or 4; or extrapolated evidence from studies rated as 2+.</td>
</tr>
<tr>
<td>Good Practice Points</td>
<td>Recommended best practice based on the clinical experience of the guideline development group.</td>
</tr>
</tbody>
</table>
Appendix 11- Nurse-led Education Program in Reducing Pediatric Eczema

Guideline

Nurse-led Education Program in Reducing Pediatric Eczema Guideline

Department of Pediatrics and Adolescent Medicine

Jan 2012
1. **Background**

Atopic eczema is a chronic relapsing inflammatory skin disease commonly associated with atopy (Leung, 1995; Williams et al., 1999). The disease typically presents in early childhood and is characterized by dryness of skin, pruritus and skin flexures (Williams, et al., 1999). Atopic eczema causes significant burdens include the discomfort to the patient, management problems for the parents and the financial cost to the family and the health care system (O'Connell, 2004). Unfortunately, there has been no cure for the disease (Hoare, Li, & Williams, 2000) but most patients will obtain optimal control with good compliance to the treatment (McHenry, Williams, & Bingham, 1995; Nicol, 2000).

2. **Aims of the Nurse-led Education Program**

1) Enhance the management of pediatric atopic eczema;

2) Decrease the severity of pediatric eczema;

3) Decrease the follow up and admission rate due to pediatric atopic eczema.

3. **Objectives of the Nurse-led Education Program**

1) To provide patients and their parents with the information about pediatric eczema;

2) To teach and strengthen patients’ and their parents’ self management skills;

3) To increase the compliance of the treatment regime.
4. The Contents of the Nurse-led Education Program

The nurse-led education program should be organized by one pediatric nurse specialist and three registered nurses who have more than 5 years experience in pediatric.

Pediatric atopic eczematous patients and their parents will be referred to the nurse-led education program by pediatrician or nurses in the Department of Pediatric and Adolescent Medicine.

A two hours group workshop will be introduced. Ten patients will be in a group. Follow ups will be scheduled according to patient’s need. Patient may choose to have individual follow up visit or telephone follow up consultation. Written information will be provided for reference at home. Four major components are included in the workshop. These are individual consultation, presentation, demonstration on treatment application and wet wrapping skills, and treatment return demonstration.

Content of the workshop

<table>
<thead>
<tr>
<th>Time</th>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>Individual consultation</td>
</tr>
<tr>
<td>30 minutes</td>
<td>Presentation</td>
</tr>
<tr>
<td>30 minutes</td>
<td>Demonstration on treatment application and wet wrapping skills</td>
</tr>
<tr>
<td>30 minutes</td>
<td>Treatment return demonstration</td>
</tr>
</tbody>
</table>
**Individual consultation**

Aims:

- To identify individual needs of patients;

- To clarify misunderstandings.

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>1. History taking from patient and parents: medical history, family history of atopic disease, length of disease and current treatment</td>
</tr>
<tr>
<td></td>
<td>2. Baseline severity of eczema is measured using the Scoring of Atopic Dermatitis (SCORAD) Index</td>
</tr>
<tr>
<td></td>
<td>3. Develop an individual management plan with patient and parents</td>
</tr>
<tr>
<td></td>
<td>4. Information booklet is given</td>
</tr>
</tbody>
</table>

**Presentation**

Aims:

- To understand the basic knowledge of atopic eczema;

- To provide a supportive and relax group atmosphere.

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>1. Introduce the nurse-led education program</td>
</tr>
</tbody>
</table>
Demonstration on treatment application and wet wrapping skills

Aim:

- To develop patients and their parents treatment application and wet wrapping skills.

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>1. Teach about where, when, how to use the topical treatment and wet wrapping</td>
</tr>
</tbody>
</table>

Treatment return demonstration

Aims:

- To strengthen patients and their parents treatment application and wet wrapping skills;

- To identify the individual difficulties for treatment application and wet wrapping.

<table>
<thead>
<tr>
<th>Time</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 minutes</td>
<td>1. Involve patient and their parents’ participation with</td>
</tr>
</tbody>
</table>
supervision. Parents’ return demonstration is expected for patients who are too young to manage eczema by themselves.

Information Booklet

Aim:

- To provide written information for reference at home;
- To increase the compliance to the treatment regime.

Content

| 1. Basic knowledge of atopic eczema: sign and symptoms; triggering factors, the use of topical treatment and wet wrapping, basic skin care, infections |
| 2. Where, when, how to use the topical treatment and wet wrapping |
| 3. Contact method for arranging follow up or telephone consultation |

5. Recommendations

Recommendation 1: The nurse-led education program for pediatric atopic eczema should be conducted. (Grade: A)

Nurse-led education program is proved to be an effective measure for pediatric atopic eczema management in terms of decreased eczema severity regardless of the
prescribed treatment (Broberg, Kalimo, Lindblad, & Swanbeck, 1990; Grillo, Gassner, Marshman, Dunn, & Hudson, 2006; Moore, Williams, Manias, Varigos, & Donath, 2009). (1-; 1+; 1++)

**Recommendation 2: Experienced nurse should responsible to provide the education program. (Grade: A)**

The education program should be provided by experienced nurses. The nurse should have worked for 3 years in the related area. (Schuttelaar, Vermeulen, Drukker, & Coenraads, 2010). (1+)

Nurses in eczema education program allows more time for education and demonstration of treatment (Moore et al., 2009; Schuttelaar et al., 2010). (1+, 1++)

The program is patient centered approach that addresses the individual needs. The therapeutic relationship between the nurses and patients and their parents was the key to improve the compliance of treatment (Moore et al., 2009; Schuttelaar et al., 2010). (1+, 1++)

**Recommendation 3: The target population should be pediatric atopic eczematous patients and their parents. The patient should aged 0-16 years old who under the care of target department. It includes both in-patients and out-patients. (Grade: A)**

The samples in all the identified studies were ranged from 0 to 16 years old. Both
patients and their parents took part in the programs (Broberg et al., 1990; Chinn, Poyner, & Sibley, 2002; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010). (1-, 1-, 1+, 1++, 1+)

Teenage patients are advised to take up their role in self management of eczema. Parents of eczema patients with younger age are advised to take part in the program and assist in management of eczema according to the patient’s individual needs.

**Recommendation 4: The education program should be conducted in the out-patient clinic of the target department. (Grade: A)**

The program should held in the place where patient are receiving treatment in order to enhance the interdisciplinary communication (Broberg et al., 1990; Grillo et al., 2006; Moore et al., 2009; Schuttelaar et al., 2010). (1-, 1+, 1++, 1+)

**Recommendation 5: Individual management plan should be developed. (Grade: A)**

Individual management plan should be developed (Chinn et al., 2002; Moore et al., 2009; Schuttelaar et al., 2010). (1-, 1++, 1+) During the individual consultation and development of individual management plan, nurses were based on a patient centered approach which addressed the needs of patients and parents at a level they could comprehend. Therapeutic relationship between the nurse and patients and their parents built during the consultation. The therapeutic relationship was important to
achieve sustainable compliance (Schuttelaar et al., 2010). (1+)

**Recommendation 6: Demonstration of treatment application and wet wrapping skills should be included. (Grade: A)**

Demonstration of treatment application and wet wrapping is essential to the successful management of atopic eczema. It improves the adherence and the outcome of the treatment (Moore et al., 2009). (1++)
References


## Appendix 12- Gantt Chart for Implementation of the Nurse-led Education Program for Pediatric Eczematous Patients

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Months</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Preparing the Proposal and Guideline</td>
<td>✓</td>
</tr>
<tr>
<td>Seeking Approval</td>
<td></td>
</tr>
<tr>
<td>Training to the Program Team</td>
<td></td>
</tr>
<tr>
<td>Introductory Sessions to staff</td>
<td></td>
</tr>
<tr>
<td>Pilot Study</td>
<td></td>
</tr>
<tr>
<td>Evaluation of Pilot Study and Modification of the Program &amp; Recruitment</td>
<td></td>
</tr>
<tr>
<td>Actual Implementation</td>
<td></td>
</tr>
<tr>
<td>Evaluation</td>
<td></td>
</tr>
</tbody>
</table>

---

83
Appendix 13- The Scoring Atopic Dermatitis (SCORAD) Index (Derived from the Report of the European Task Force on Atopic Dermatitis).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erythema</td>
<td></td>
</tr>
<tr>
<td>Oedema/Pustulation</td>
<td></td>
</tr>
<tr>
<td>Oozing/crust</td>
<td></td>
</tr>
<tr>
<td>Excoriation</td>
<td></td>
</tr>
<tr>
<td>Lichenification</td>
<td></td>
</tr>
<tr>
<td>Dryness*</td>
<td></td>
</tr>
</tbody>
</table>

PRURITUS (0 to 10) | SLEEP LOSS (0 to 10)

Current treatment use: 1._________ 2.___________ 3.__________ 4._________

Number of flares/ month: ________

Number of admission/ previous 6 months: ________

Number of follow up/ previous 6 months:__________
Reference

Appendix 14- Evaluation Questionnaire for Patients and their Parents

Nurse-led Education Program for Pediatric Eczema Patients
Evaluation Questionnaire for Patients and their Parents

兒童濕疹護理課程-病人與家長問卷調查

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 此課程可改善兒童濕疹</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. 此課程可增加你對兒童濕疹的護理</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>3. 此課程可減少因兒童濕疹而覆診或住院</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>4. 此課程達到你預期效果</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. 你對此課程滿意</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. 其他意見:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*請在適當位置打圈
1=非常同意
2=同意
3=無意見
4=不同意
5=非常不同意

~多謝~
### Evaluation Questionnaire for Nursing and Medical Staff in the Department of Pediatric and Adolescent Medicine

**Nurse-led Education Program for Pediatric Eczema Patients**

**Date:** __________  
**Position:** __________

1. Do you think the referral made by nurses or physician is appropriate?  
   - Yes  
   - No

2. Do you think the workload on eczema education in your workplace reduced?  
   - Yes  
   - No

3. Do you think the education program is worth to carry on?  
   - Yes  
   - No

4. What is your overall comment to the program?
   - Extremely Not Satisfied  
   - Not Satisfied  
   - Neutral  
   - Good  
   - Excellent

5. Other Comments:

*Please circle the appropriate.*

~Thank You~


Hospital Authority (2011). *Hospital Authority Pay Adjustment 2011/12*. Hospital Authority Human Resources Circular No. 20/11.


Lippincott Williams & Wilkins.


http://www.sign.ac.uk/methodology/checklists.html


http://www.sign.ac.uk/guidelines/fulltext/50/index.html


and risk factors. *Clinical & Experimental Allergy, 37*(2), 174-179.