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PATTERN OF USE OF SKIN CARE PRODUCTS IN CHILDREN WITH AND WITHOUT ECZEMATOUS SKIN LESIONS

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ABSTRACT

Objective: To compare the pattern of use of skin care products between children with eczematous skin lesions and those without.

Design: Case control study.

Setting: Two well baby clinics at the Kenyatta National Hospital and the Mbagathi District Hospital in Nairobi.

Subjects: Eighty nine infants with eczematous skin lesions and 89 age and sex matched controls without skin lesions.

Main outcome measures: Presence and severity of skin lesions related to the type of skin care products used by the child.

Results: Exposure to various products was not significantly different between infants with skin lesions and those without. However, more mothers whose children had a skin rash had made a change in the type of soap and or skin cream used for their child ($p < 0.0001$). The principal reason for changing products was skin rash in the baby and most mothers made changes away from scented baby soap products.

Conclusion: The study found no significant difference between the cases and controls regarding the type of skin care products used.

INTRODUCTION

Skin care products including soaps, powders and skin creams are commonly used on children in an effort to cleanse the skin or keep it moist. A study in the United States has indicated that a child may be exposed to an average of five different products with resultant exposure to a large number of environmental chemicals(1). Although the situation may be somewhat different on the local scene with fewer products used per child, a single product may contain a considerable number of chemicals. For instance, most baby soaps contain perfumes whose chemical composition is often not publicly known but may consist of between 10 and 300 separate components(2,3). The popularity of these products, which is promoted by aggressive advertisement and popular belief, is illustrated by their widespread use, but verification of their safety prior to marketing remains an important question.

Infant skin and particularly neonatal skin is especially prone to dermatitis provoked by irritants. This may be related to the fact that children receive the largest exposure to certain groups of chemicals contained in these products. The other factors that play a role include a large surface area to weight ratio as well as an immature stage of organ development. This is especially important in young infants who have been shown to have enhanced trans-cutaneous absorption.

This often manifests as an increased incidence of eczematous eruptions in this age group(4-6).

A certain group of children may also be inherently more susceptible to the irritant action of soap and other skin care products. In experimental models using the soap chamber, the skin of subjects with atopic dermatitis has been shown to be more susceptible to the irritant action of soap and to react more severely to synthetic detergents when compared to normal controls(7,8).

Clinical experience and limited research data has shown that many parents will often make a change in the type of skin care products used when their child develops a skin rash. This is usually a spontaneous response since the skin products are perceived to cause or at least to worsen the skin condition. In many cases however, the change in type of skin products reflects the advice given to parents by the health care givers. In one series among children of low economic status mothers preferred to use unscented soap products in those children with atopic dermatitis. They reported worsening of skin lesions when scented products were used(9).

The relationship between eczema and various types of soaps and detergents has been studied using the soap chamber and in comparative studies. It is acknowledged that some soaps are more likely to irritate the skin than others, but the reasons for this are not entirely clear. Differing alkalinity, power to

penetrate the epidermal barrier and fatty acid content are some of the postulated factors. Additionally, soaps with a high concentration of fragrances as well as those to which abrasives have been added to facilitate cleansing are considered the most irritating to the skin(10-13). The irritant action of soap occurs by a defating effect thus extracting lipid from outer layers of the stratum corneum, and is most significant in eczematous skin. The results of the few comparative clinical studies performed to compare mildness of different brands of soap are conflicting. Some investigators have found most brands tested to relatively safe while others have found specific brands especially perfumed products to be more irritant(14,15). A local study found no association between the use of toilet soaps or laundry detergents in early infancy and development of atopic dermatitis(16).

On the local scene, skin rash accounts for a large proportion of paediatric consultations. The paediatrician is often asked to recommend the mildest and least irritating soap or skin care product to preserve the normal condition of the child's skin. Even though most of the skin rashes constitute mild eczema they do cause concern to parents. Additionally, in a few instances babies present to the paediatrician with severe eczematous eruption often with secondary bacterial infections presumably following the use of a specific soap or skin care product. Anecdotal evidence suggests that withholding of certain products results in the healing of skin lesions in some infants but this has not been subjected to scientific study in this locality. The aim of this case control study was to compare the pattern of use of soap and other skin care products between infants presenting with eczematous skin lesions and those without such lesions.

MATERIALS AND METHODS

This was a case control study conducted on infants seen at two well baby clinics situated at the KNH and the Mbagathi district hospital both located in Nairobi. The study was conducted over a five month period from August to December 1999. The cases were defined by presence of an eczematous skin rash which was characterised by the following features: erythematous patches with or without papules and or papulo-vesicles, weeping and crusted lesions, mildly erythematous patches with scaling, confluent skin coloured papules and lichenified lesions.

Cases were further classified based on stage of dermatitis into the following groups; Chronic: Evidence of dryness, erythema and papules, presence of lichenification. Sub acute: Moderate degree of erythema, exudation, vesicles, crusting and scaling. Acute: Significant erythema, exudation, vesicles, crusting and scaling. They were also classified based on the extent of bodily involvement as follows; Localised: one anatomical region involved. Intermediate: At least two anatomical regions involved. Generalised: Involving the face, extensor and flexor regions. Infants with lesions consistent with viral exanthemas including measles and chickenpox, fungal skin conditions, scabies, papular urticaria (firm pruritic

discrete papules with or without hyper pigmentation mainly on the trunk and extensor surfaces of the extremities) vesicobullous conditions and severely malnourished children were excluded from the study.

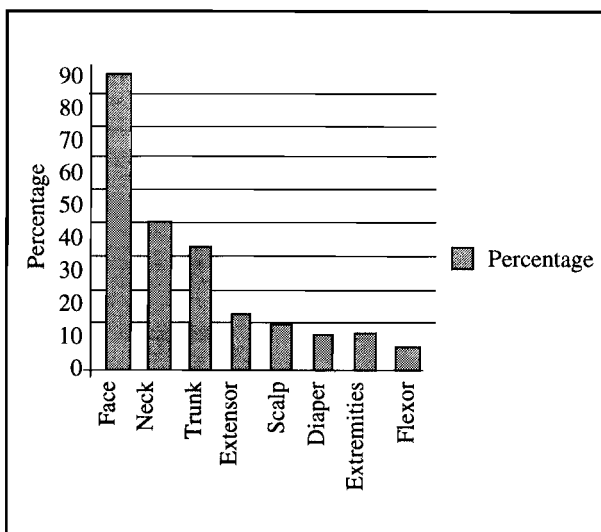
Infants without any skin lesions seen in the same facilities were recruited into the study controls and these were matched for age and sex. The aim of the study was explained to caregivers and an informed consent obtained. Each child was examined to ascertain the characteristics of the skin lesions for the cases and to confirm the absence of a skin rash in the controls. A structured questionnaire was used to obtain information regarding the demographic parameters, pattern of skin rash and skin care products to which the child had been exposed. Any changes made in the type of skin care product used, the reason for the changes and its effect on the child's skin condition were carefully recorded. The sample size was calculated using the EPI INFO version 6 programme for case control studies with 90% power and an expected odds of disease among the cases of 2.85. This gave a minimum sample of 88 pairs (i.e. 176). Statistical analysis of data was done using the SPSS/PC version 9. Chi square or Fischer's exact tests were used to determine the associations between presence and severity of skin lesions and the type of skin care product used by the child. The level of statistical significance was set at 0.05.

RESULTS

A total of 89 infants with eczematous skin rash were recruited as study cases with 89 age and sex-matched infants without skin lesions recruited as study controls. Each of the study sites contributed to approximately 50% of the study subjects. The median age was three months (range 2 months to 12 months). Nearly two-thirds of the subjects were aged three months or less. More male infants were recruited giving a male: female ratio of 1.4:1. The face was the most frequently affected anatomical region involved in 87% of cases (Figure 1).

Figure 1

Anatomical distribution of skin lesions among cases



The majority of infants had skin lesions in at least two anatomical regions with only 10% found to have generalised eczematous eruption. The extent of bodily involvement is shown in Table 1. Most infants had intermediate involvement with very few cases of generalised dermatitis.

Table 1*Extent of bodily involvement of skin lesions among cases*

Extent	No.	%
Localised	28	31.5
Intermediate	53	59.6
Generalised	8	9.0
Total	89	100.0

Similarly the majority of infants (50.6%) were classified as having sub acute eczema with only 8% having acute eczema. The most frequent morphological types of skin lesions seen in most anatomical regions were erythematous papules and confluent skin coloured papules. The exception to this was the scalp in which scaling was the predominant presentation. Most infants studied developed a skin rash before the age of two months (Table 2)

Table 2*Age of onset of skin rash*

Age of onset	No.	%
<2 months	52	58
2-6 months	33	37
>6 months	4	5
Total	89	100

In about half of the cases the skin lesions had been present for a duration of between 1 and 4 weeks while in one-third the lesions had persisted beyond four weeks. About half (52%) of cases had evidence of pruritis and 44% had xerosis. The use of baby bath soap was found to be almost universal with up to 93% of subjects using one type of soap or another. Although 15 different brands of soap were in use, only four of these namely Johnson's and Cussons baby soap, Sunlight and Barsoap (commonly referred to as Panga) contributed to more than 80% of soap exposure. The cases and controls did not differ significantly with regard to the type of soap that the child used at the time of the study (Table 3).

Similarly when the type of soap product ever used by subjects was analysed the cases and controls still did not differ significantly. The extent of dermatitis among the cases was also not significantly associated with the type of soap used. Most subjects studied (93%) were exposed to a skin application. Although a total of 11 skin creams and lotions were in use, Vaseline petroleum jelly accounted for over 75% of exposure in both study arms. The cases and controls did not differ significantly with regards to the type of skin cream used. The study found that significantly more cases than controls had made a change in the type of soap and /or skin cream used by the child (Table 4).

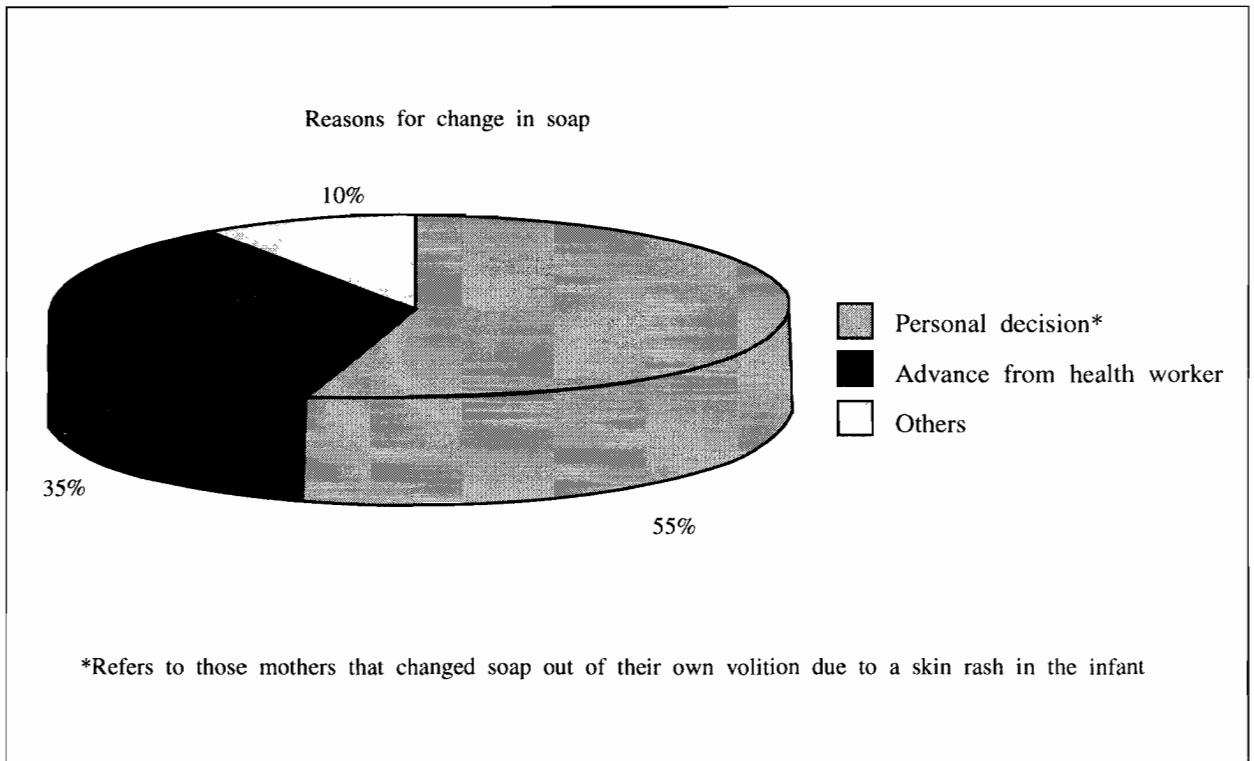
Table 3*Current soap exposure among cases and controls*

Soap	Cases n = 81	%	Controls n = 84	%	p-value	OR	95% CI
S1	19	23.5	27	32.1	0.213	0.65	0.31,1.36
S2	18	22.2	14	16.7	0.367	1.43	0.61,3.33
S3	18	22.2	17	20.2	0.755	1.13	0.50,2.53
S4	16	12.3	16	19.0	0.238	0.60	0.32,1.52
Others	16	19.8	10	11.9	0.167	1.92	0.72,4.68

Code: S1 = Johnson's baby soap
 S2 = Bar soap
 S3 = Sunlight soap
 S4 = Cusson's baby soap

Table 4*Changes in type of Skin Care Products*

Product	Cases n = 88	%	Controls n = 89	%	p-value	OR	95% CI
Have changed type of soap	32	(36.4)	8	(8.99)	0.0001	5.79	(2.33,14.80)
Have changed type of skin cream	26	(29.6)	11	(12.4)	0.00559	2.93	(1.26,6.88)

Figure 2*Reasons for changing type of soap*

It was further found that in more than 90% of the changes, skin rash in the child was the reason for changing products (Figure 2).

The change was made spontaneously in over half of the subjects while in the remainder it was upon the advice of a health worker. Further, most changes (80%) were made away from two scented baby bath soaps, Johnsons and Cussons to other brands in the market. Slightly over half (53%) of the mothers reported temporary improvement followed by recurrence of skin lesions while about a third of the mothers reported improvement without further deterioration following change of soap. A smaller proportion (15%) reported no change.

DISCUSSION

In our study the younger infants formed the bulk of the population with 60% aged less than three months and 80% less than six months. This is most likely due to the nature of the study setting, namely well baby clinics. It has been observed that most visits are made during the period of administration of the DPT vaccine, which spans over the ages of six and fourteen weeks. It has been suggested that the 3rd DPT vaccine, given at fourteen weeks is a most reliable indicator of compliance to the KEPI schedule. The second explanation is that eczematous skin rash is more prevalent at a younger age thus recruitment of cases

would reduce with time. The setting of a well baby clinic was selected since it is more representative of the general population of children when compared to a dermatology clinic, which is a highly selected group. However the nature of the setting would also explain why very few children with severe dermatitis were seen, such children are more likely to be referred to the specialist clinic for follow-up.

The consistently high proportion of facial involvement suggests that a sizeable number of children had features in keeping with atopic dermatitis in its infantile phase. This predominantly affects the face and is frequently associated with pruritus and xerosis, both of which were observed with a high frequency in the cases(8). Although it seems prudent to correlate the inflammatory lesions with a common condition such as atopic dermatitis, it is notable that most of the infants in our study developed the skin lesions while below two months, an age earlier than that recognised for atopic dermatitis which is between two and six months.

Our study findings indicate that the use of soap is almost universal among children both with and without skin disease. It is clear that most mothers prefer to use some kind of soap or other on their baby. Two scented baby bath soaps manufactured by Cussons and Johnsons companies respectively were found to be quite popular, accounting for well over one third of the exposure to soap among the infants studied. This could be due to the fact that the two have been available in the local market for a considerable length of time coupled with the effect of advertisement. An interesting but not altogether unexpected finding is the emerging popularity of Bar soap as a baby bath soap. Bar soap is a locally manufactured product that was initially intended for laundry and kitchen cleaning. This trend is most probably due to the fact that this product does not contain added fragrances. Many parents and health workers perceive added fragrances to be associated with harshness in a given soap product. Unlike the aforementioned products, Bar soap is not a homogeneous entity rather; it is manufactured by various companies and marketed under different brand names. The other commonly used product was Sunlight soap, which is a locally manufactured product, intended for laundry, personal use and kitchen cleaning. It is considered less perfumed than the two baby bath soaps discussed earlier.

The study demonstrated that exposure to various soap products was not significantly different between infants with eczema and those without. No particular brand of soap was found to be superior or advantageous with respect to extent of dermatitis. It therefore appears that exposure to soap or skin creams alone does not explain the presence of skin rash and it is likely that other factors come into play.

We however found a highly significant difference in the frequency of change in the soap products between the cases and controls (p-value <0.00001). Moreover

the largest proportion of changes was made away from scented baby bath products, namely Johnsons and Cussons. It is evident that most mothers attributed skin rash in their baby to the use of these soap products and hence out of their own volition changed the type of product. A smaller proportion did so following the advice of health workers. Conversely the mothers whose children had no skin lesions would not have had a reason to change the type of soap products. Change in the type of products used in response to skin rash has been reported in other studies as well. In Cetta's study, 37% of the mothers who reported skin rash in their baby made a change in the type of product used(1). Palacios similarly reported a preference for unscented products by mothers of children with atopic dermatitis, citing worsening of skin lesions following the use of scented products(9). In our study, a small proportion of mothers reported improvement in the child's skin condition upon change in the type of product but this could not be verified due to the nature of the study. Our findings indicate that a large number of caretakers and some health personnel attribute eczematous skin rashes in children to the type of products used. However we do not find a statistically significant difference in exposure to soap and skin creams between the infants with eczema and those without. Our findings are consistent with Macharia's in an earlier study although the subjects in the latter study were generally older children most of whom had chronic lesions of atopic dermatitis(16).

It is possible however, that in a smaller group of infants, eczematous skin rash may be related to specific products and thus abate when these products are withheld. This is plausible given the recognised irritant action of soap in individuals with atopic dermatitis. The challenge remains to identify this group of infants that may develop adverse effects following the use of certain products. A prospective study would be a better design to answer this important question and is therefore recommended.

The limitations of our study include the fact we could not obtain an ingredient list for any of the products studied and thus were unable to relate skin lesions to particular constituents. This is because none of the manufacturers posted an ingredient list on the packaging of the products. Further, our information was purely based on the mother's recall, which may not always be accurate especially when considering type of products used some time ago.

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