



Research Article

EFFECTIVENESS OF MATERNAL-INFANT SKIN CONTACT “MISC” ON THERMO-REGULATION AND INITIATION OF BREAST-FEEDING

Selinamma Devasia (sr. Dhanya)

HOD OBG Department, Athena College of Nursing, Falnir Road, Mangalore

ARTICLE INFO

Article History:

Received 19<sup>th</sup> October, 2016

Received in revised form 27<sup>th</sup> November, 2016

Accepted 14<sup>th</sup> December, 2016

Published online 28<sup>th</sup> January, 2017

Key words:

Maternal-infant skin contact (skin to skin care); newborn infants; thermo-regulation; initiation of breast feeding.

ABSTRACT

Early skin to skin contact with the mother promotes **thermo-regulation**, decreases crying and facilitates initiation of **breast-feeding**, increases breast milk volume, and longer breast-feeding duration.<sup>1</sup>

**Objective:** -To determine the effectiveness of maternal-infant skin contact on thermo-regulation and initiation of breast-feeding

**Methods:** - Using a quasi-experimental time series non-equivalent control group design, the investigator collected data. Sixty mothers and their full term infants were selected using purposive sampling and were randomly assigned to experimental (Group 1) and control group (Group 2) (n=30 in each group). Tools used were baseline proforma of the mother, baseline proforma of the infant, observation checklist to assess the physiological parameters such as body temperature and Apgar score and observation checklist to assess the initiation of breast-feeding. Data were analysed using descriptive statistics and inferential statistics such as unpaired ‘t’ test, ANOVA for repeated measures, and Fisher’s exact test.

**Results:-** There was significant difference in thermo-regulation between the groups at different time periods ( $t_{(58)}=5.00$ ,  $t_{(58)}=20.77$ ,  $t_{(58)}=24.37$ ;  $p<0.001$ ). Significant difference was also found between the breast-feeding scores at various time periods ( $t_{(58)}=4.88$ ,  $t_{(58)}=40.40$ ,  $t_{(58)}=19.00$ ,  $t_{(58)}=19.00$ ,  $t_{(58)}=14.90$ ;  $p<0.001$ ). The experimental group had 100% success in the subsequent feeds because of the maternal-infant skin contact and early initiation.

ANOVA for repeated measures showed that there was significant difference between the different time period with respect to axillary temperature in group 1 and group II ( $F_{(4,116)}=63.019$ ,  $p<0.01$ ;  $F_{(4,116)}=283.533$ ,  $p<0.01$ ) and between the breast-feeding scores of Group 1 and Group II ( $F_{(4,116)}=80.458$ ,  $p<0.01$ ,  $F_{(4,116)}=6.095$ ,  $p<0.01$ ) at different time intervals. Fisher’s exact test used to test the association of MISC with selected variable showed that there was significant association between the selected variables at some time periods.

© Copy Right, Research Alert, 2017, Academic Journals. All rights reserved.

INTRODUCTION

Newborn infants cool down or heat up much quicker than adults, because they cannot regulate body temperature as well. In general newborn needs a warmer environment than adults. In fact, a naked newborn exposed to a room temperature of 23<sup>o</sup> c (73.4<sup>o</sup> F) suffers the same heat loss as does a naked adult at 0<sup>o</sup> c (32<sup>o</sup> F). Most cooling of the newborn occurs during the first minute after birth. In the first 10 – 20 minutes the newborn may lose enough heat for the body temperature to fall by 2 – 4<sup>o</sup> C (3.6<sup>o</sup>– 7.2<sup>o</sup> F) with even greater fall in the following hours if proper care is not given<sup>2</sup>.

While the newborn is being dried it should be on a warm surface such as mothers’ chest or abdomen (skin-to-skin contact) to prevent heat loss from conduction. Covering the baby with a second towel and putting a cap on its head also prevent heat loss from convection. Review of literature has shown that early skin contact between mother and baby has a

positive effect in maintaining infant’s body temperature and initiation of breast-feeding<sup>3</sup>.

Skin-to-skin contact with the mother immediately after birth creates an optimal environment for the adaptation of newborn infants to extra uterine life. This simple and cost free procedure is recommended as an important improvement in care immediately after delivery and was included as a requirement in the World Health Organization/United Nations Children’s Fund<sup>4</sup>.

The healthy full term infant has a specific preceding behaviour, when cared for skin-to-skin, immediately after birth. The infant starts with a period of relaxation, followed by spontaneous sucking and rooting movements. These are gradually increased and the infant starts hand to mouth activity. At about one hour of age the infant identifies the breast by itself and starts suckling. This early suckling and

touching of the nipple seems to improve early maternal bonding and successful breast-feeding<sup>5</sup>.

When mothers initiate breast-feeding within one to half hour of birth, the baby's suckling reflex is strongest, and baby is more alert<sup>6</sup>. The immediate postnatal period is a sensitive period where mother and baby develop a synchronous, reciprocal, interaction pattern if they remain together and in intimate contact. Early maternal-infant skin contact is a pleasurable and low risk interaction with many positive benefits.

**MATERIAL AND METHODS**

An evaluatory research was conducted using a quasi-experimental time series non-equivalent control group design in the labour room and the postnatal wards of Father Muller medical college hospital and Nirmala Health Centre, Ullal, Mangalore with an aim to assess the effectiveness of maternal-infant skin contact on thermo-regulation and initiation of breast-feeding from 3-7-06 to 23-8-06. Sixty women who delivered normally with 38-41 weeks of gestation and their normal newborns who met the inclusion criteria was selected using a purposive sampling. After taking the informed consent the women were randomly assigned to two groups of thirty each. The tool used to collect the data consisted of; Baseline proforma of the mother and of the infant, observation checklist to assess the physiological parameters of the infants such as Body temperature and Apgar scoring and observation checklist to assess the initiation of breast-feeding of infants. This consisted of the following sub-headings: Latch, Sucking and Swallowing, Type of breast, Positioning and mother's comfort and infant's behaviour.

The experimental group infants were wiped, dried and suctioned, followed by cutting the cord soon after birth and their axillary temperature and Apgar score were checked. Later the infant with bare body was placed on the bare chest of the mother in prone position. During the treatment the infant's back and head were covered with the hospital front-open gown worn by the mother and a single layer of cotton hospital top sheet used by the mother. Axillary temperature (for 3 minutes) was taken at 15 minutes, 45 minutes, 1 hour 15 minutes and 1 hour 45 minutes after birth. The breast-feeding was initiated as soon as the infant was ready to feed. The procedure of MISC was given for one hour at 12 hours, 24 hours, 36 hours and 48 hours of delivery and breast-feeding was observed by using the observation checklist.

The control group infants received the routine hospital care. As soon as the baby was born, the infant's body was wiped, dried, suctioned and cord was cut, axillary temperature was checked for three minutes and Apgar score taken immediately after placing the infant in the warmer. The axillary temperature was checked for three minutes at 15 minutes, 45 minutes, 1 hour 15 minutes and 1 hour 45 minutes after birth. Breast-feeding was observed as soon as the mother was shifted to the ward (approximately 2 hours) with the observation checklist at 12 hours, 24 hours, 36 hours and 48 hours after birth.

**RESULTS**

Most of the women in Group I (50%) and Group II (66.7%) were belonging to the age group of 20 – 25 years and were primigravida. Majority in Group I (70%) and in Group II

(60%) were Muslims and least in Group I (10%) and in Group II (13.3%) were Christians. Most of the women in Group I (63.3%) and in Group II (76.7%) were from the semi-urban area. In Group I most of the infants (53.3%) were females whereas in-Group II most of them (56.7%) were males.

With regard to birth weight the highest number in Group I (30%) and Group II (56%) weighed between 2.5 – 3.0 kg. Infant's gestational age varied in both the groups. In Group I the highest percentage (46.7%) had gestational age of 38 weeks and in Group II (56.7%) had gestational age of 39 weeks. Majority of the infants had the Apgar score "9" in Group I(86.7%) and most of the infants in Group II had the Apgar score "8" (53.4%) at first minutes. Majority of the infants (96.7%) in Group I had Apgar score of "10" and in Group II 56.7% had Apgar score "8" at five minutes.

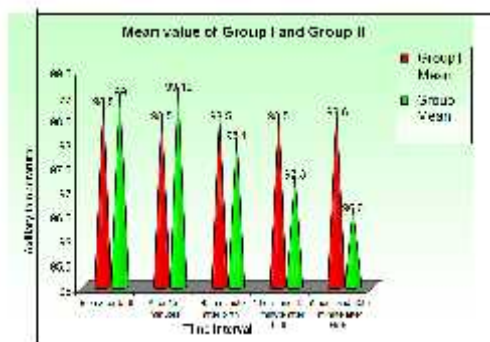
There was significant difference between the temperature of the groups. Soon after birth and in the first 15 minutes, the control group infants had significantly higher temperature than those in the experimental group. This may be because of the fact that these infants were kept under an electric warmer soon after birth. But at 45 minutes, at one hour and fifteen minutes and at one hour and forty five minutes, the experimental group maintained higher temperature. Group I maintained normal temperature (98-99°F) throughout the period whereas the control group had lower temperature at 1 hour 15 minutes and 1 hour 45 minutes and above normal at 15<sup>th</sup> minute. The statistical significance was 0.001 level. (Table 1)

**Table 1** Thermo-regulation scores according to axillary temperature for Group I and Group II

n=30+30=60

Time interval	Group I		Group II		t' value
	Mean	SD	Mean	SD	
Soon after birth	98.80	0.146	99.00	0.190	4.880
After 15 minutes	98.50	0.177	99.12	0.370	8.378
At 45 <sup>th</sup> minute after birth	98.50	0.113	98.10	0.419	5.000
At 1 hour 15 minutes after birth	98.50	0.124	97.30	0.338	20.770
At 1 hour 45 minutes after birth	98.60	0.089	96.60	0.466	24.390

Table value  $t_{58}=3.46$ , p = 0.001



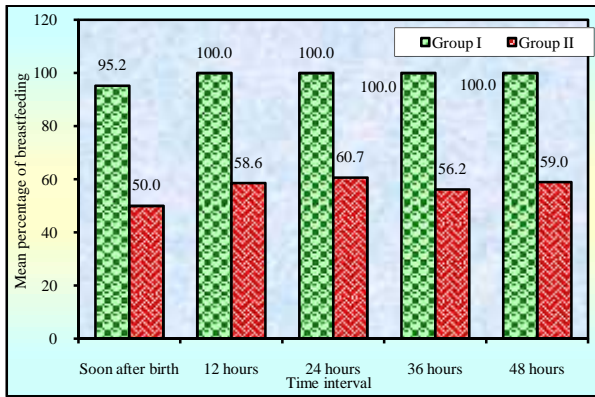
**Figure 1** Cone diagram showing the distribution of mean temperature of Group I and Group II at different time intervals.

There was also significant difference between MISC and initiation of breast-feeding at different time intervals such as soon after birth, after 12 hours, 24 hours, 36 hours and 48 hours in Group I and Group II(p<0.001). Group I had 100% success in the subsequent periods because of the MISC and early initiation.

**Table 2** Distribution of the mean scores and percentage mean score of breast-feeding and 't' value of the two groups according to the observation checklist

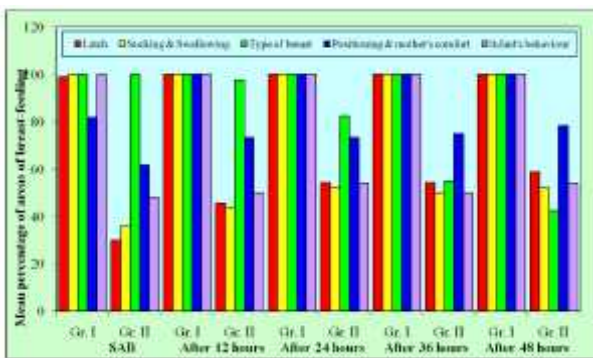
Time interval	Group I			Group II			't' value
	Mean	SD	Mean %	Mean	SD	Mean %	
Soon after birth	27.8	0.702	95.20	14.5	2.156	50.00	4.88
12 hours	29.0	0.000	100.00	17.0	15.600	58.60	44.40
24 hours	29.0	0.000	100.00	17.6	3.440	60.69	19.00
36 hours	29.0	0.000	100.00	16.3	3.860	56.20	19.00
48 hours	29.0	0.000	100.00	17.1	4.592	58.97	14.90

Maximum possible score = 29  $t_{(58)} = 3.46, P < 0.001$ , highly significant



**Figure 2** Bar diagram showing the distribution of mean percentage of breast-feeding Scores of Group I and Group II at different time intervals

Area wise difference of mean breast-feeding scores at various time periods shown in fig. 3 reveals that there is significant difference between both the groups except in the area of type of breast, soon after birth, since the calculated value at various time intervals are very much higher than the table value ( $t_{58}=3.46, P<0.001$ ). Group I had very good success in all the areas of breast-feeding compared to the control group.



**Figure 3** Area-wise distribution of mean score of breast-feeding of Group I and Group II

ANOVA for repeated measure was computed and findings are given in table 3 and figure 3.

F-values of Group I and Group II Findings revealed that both groups had maintenance of temperature: but the experimental group has got a very low significance than the control group. In the control group the difference in temperature at different time intervals is high ( $F_{(4,116)} = 63.019, 283.533$ ) (Table.3).

With regards to significant difference between the breast-feeding scores of Group I and GroupII at different time intervals reveals that, as the time intervals increased there was remarkable improvement in the experimental group and all were able to achieve the maximum score (29), whereas in the

**Table 3** F-values of Group I and Group II based on axillary temperature at different time periods

Time period	Mean±SD	
	Group I	Group II
Soon after birth	98.8 ± 0.146	99.0 ± 0.190
At 15 <sup>th</sup> minute	98.5 ± 0.177	99.12 ± 0.370
At 45 <sup>th</sup> minute	98.5 ± 0.113	98.10 ± 0.419
1 hour 15 <sup>th</sup> minute	98.5 ± 0.124	97.30 ± 0.338
1 hour 45 <sup>th</sup> minute	98.6 ± 0.089	96.60 ± 0.466
F value	63.019	283.533

(ANOVA for repeated measures)  $F_{(4,116)} = 3.48, P < 0.01$

control group the difference in score at different time intervals was negligible ( $F_{(4,116)}=80.458, F_{(4,116)} = 6.095$  respectively). The maximum score obtained was only 17.6 The statistical significance was very high in the experimental group ( $P < 0.001$ ).

**Table 4** F-values of Group I and Group II based on the breast-feeding scores at different time periods

Time period	Group I	Group II
	Mean±SD	Mean±SD
Soon after birth	27.8±0.702	14.5±2.156
After 12 hours	29.0±0.000	17.0±1.560
After 24 hours	29.0±0.000	17.6±3.44
After 36 hours	29.0±0.000	16.3±3.86
After 48 hours	29.0±0.000	17.1±4.92
F value	80.458	6.095

(ANOVA for repeated measures)  $F_{(4,116)} = 3.48, P < 0.01$

Result also revealed significant association between the axillary temperature and certain baseline variables such as infant's weight and gestational age at one hour and forty-five minutes in Group I. There is no significant association between these variables in Group II (Table:5)

**Table 5** Association of axillary temperature and selected variables

Time Interval	Variables	n=30+30=60	
		Group I	Group II
Soon after birth	Infant's sex	0.467	0.514
	Infant's weight	0.730	0.660
	Gestational age	0.770	0.930
At 1 hour 45 <sup>th</sup> minute	Infant's sex	0.715	0.390
	Infant's weight	0.010*	0.520
	Gestational age	0.021*	0.370

\* significant

There was also significant association between the MISC on breast-feeding and certain baseline variables such as infant's weight and gestational age soon after birth and at forty eight

hours in Group I. There was no significant association between these variables in Group II (Table:6)

**Table 6** Association of breast-feeding and selected variables

n=30+30=60

Time Interval	Variables	Group I	Group II
Soon after birth	Infant's sex	0.720	0.026
	Infant's weight	0.010*	0.570
	Gestational age	0.021*	0.379
After 48 hours	Infant's sex	0.710	0.245
	Infant's weight	0.010*	0.527
	Gestational age	0.021*	0.153

\* significant.

**DISCUSSION**

Unpaired “t” test was used to find out the effectiveness of MISC on thermo-regulation of Group I and Group II at different time intervals. The result showed that there is significant difference between the groups soon after birth, at first fifteen minutes, at forty-five minutes, at one hour and fifteen minutes and at one hour and forty five minutes. But in the soon after birth period and at first fifteen minutes the control group infants showed significantly higher temperature than those of the infants in the experimental groups. This may be because of the fact that these infants were kept under an electric warmer soon after birth. But in the subsequent periods the experimental group maintained higher temperature and the significance was at 0.001 level.

ANOVA for repeated measures was used to find out the significant difference in temperature between the various time periods. The results shown that there is significant difference in the temperature at different time periods in Group I (F=63.019, p<0.01) and in Group II (F=283.533, P<0.001). These findings of the present study shows that in Group I though the initial temperature was low compared to Group II. Group I was able to maintain the temperature at different time intervals compared to control group infants who were kept under electric warmer at the initial period. The reason may be that mother infant skin contact prevents heat loss, preserves energy, and accelerates metabolic adaptation.

The findings of the present study are consistent with the findings of other studies and strongly supports the effectiveness of mother infant skin contact in maintaining body temperature of the infant compared to infants kept under electric warmer. The findings were statistically significant at 0.001 level<sup>7</sup>.

Keeping the infant on the mother’s chest or abdomen (skin-to-skin contact) prevents heat loss from conduction. Early skin-to-skin contact between infant and the mother has a positive effect in maintaining infant’s body temperature<sup>3</sup>.

An experimental study conducted to find out the oxygenation, heart rate and temperature in low birth weight babies showed that babies were able to maintain temperature during skin-to-skin contact with their mother<sup>8</sup>.

The present study is also consistent with a randomized clinical trial conducted in Baltimore to compare the Kangaroo care to the incubator care in maintaining body warmth. The result showed that experimental group was warm when removed from the incubator and placed against the maternal breast in kangaroo care (F=7.4, p < 0.01)<sup>9</sup>.

Unpaired ‘t’ test was used to find out the effectiveness of MISC on initiation of breast-feeding of Group I and Group II at different time intervals. The result showed that there is significant difference between the groups at different time intervals (p<0.001). Group I had 100% success in the subsequent periods because of the MISC and early initiation.

ANOVA for repeated measure was used to check the difference in various time periods within the groups. Difference between the initiation and success of breast-feeding at various time interval in Group I (F<sub>(4,116)</sub> = 80.458, p < 0.001) and Group II (F<sub>(4,116)</sub> = 6.095, p < 0.001) shows the significance. This indicates that the experimental group had very high significance than the control group. In short early initiation has brought very good success in the subsequent feeds. The mean score in the experimental group at the initial feed was 27.8 and subsequent feed was 29 (maximum score 29). On the contrary in the control group the mean score at the first observation was 14.5 and maximum score obtained at subsequent feeds was only 17.6. These findings clearly show that early mother infant skin contact not only maintains body temperature but also helps in initiating early sucking and initiation of breast-feeding without difficulty.

The findings of the study are consistent with findings of other studies that maternal-infant skin contact is very effective for proper initiation and duration of breast-feeding<sup>5</sup>.

At about one hour of age the infant identifies the breast by itself and starts suckling. This early suckling and touching of the nipple improves early maternal bonding and successful breast-feeding<sup>4</sup>. In one of the studies conducted in India it was observed that when the infants were breast fed several hours after delivery readiness to suck was not as strong as when this is started at early hours<sup>10</sup>.

The findings of this study is in agreement with the findings of several other studies<sup>11, 12, 13</sup> which showed that early breast-feeding and skin-to-skin contact of the mother and infant helps in successful breast-feeding.

The present study findings are also consistent with the findings of the study done to identify maternal-infant skin contact on maternal milk production and duration of breast-feeding. A more stable milk production was noted in skin-to-skin contact group<sup>14</sup>.

Fisher’s exact test was used to compute the association of research variables with selected baseline variables such as infant’s sex, weight and gestational age and it shows significant association in Group I in certain baseline variables.

In short the findings of the study suggest that early maternal-infant skin contact is very effective for thermo-regulation and initiation of breast-feeding among infants. This method is cost free and can be practiced easily in the hospital as well as at home.

**CONCLUSION**

The findings of the study have brought out certain facts that have far reaching implications for nursing in the areas of practice, education, administration, community and research.

Infants are at risk of hypothermia and one of the major problems a nurse faces in the postnatal period is the initiation of breast-feeding. Since skin-to-skin contact is an easy intervention with lot of effects especially for thermo-

regulation and initiation of breast-feeding, it can be advised to the patients and their family members so that they may happily accept this method. It is also a method in which mothers reports a sense of efficacy, increased self esteem, relaxation and joy and state that they feel confident in taking home their newborn and caring for their infants.

A nurse has many opportunities to influence the mother by giving adequate information and motivation of the practice of caring for their infants skin-to-skin in the early days of life. It is also better that the health personnel do not disturb the mothers and interfere with them with various procedures when she provides skin-to-skin contact to her newborn. The results of this study shows that early maternal-infant skin contact has lots of advantages to the mother and the newborn and it is a very useful intervention for thermo-regulation and initiation and successful breast-feeding.

#### Acknowledgements

It is my pleasure to express my deep sense of gratitude and thanks to Rev. Sr. Flora D'Souza, my guide, the director and administrators of Father Muller College of Nursing and Father Muller Medical College and Nirmala Hospital for their best wishes, blessings and timely help, Rev. Sr. Jacintha D'Souza, for the support, encouragement and advice, Rev. Dr. (Sr.) Alphonsa Ancheril, Rev. Sr. Loredana Korah, Rev. Sr. Ann Rose D'Almeida, for their constructive suggestions, advise, encouragement and help. To Mrs. Sucharistha Suresh, my statistic teacher for her valuable guidance and support and to all the mothers, doctors and staff of both hospitals for their cooperation, support and help.

#### References

1. Anderson GC, Chiu SH, Dombrowski MA, Smith JY, Albert M, Wada N *et al.* Mother newborn contact in a randomized trial of Kangaroo (skin-to-skin) care. *J Obstet Gynecol Neonatal Nurs* 2003; 32(5):604-611.
2. Thermal protection of the newborn. A practical guide – Annexe [http://www.who.int/reproductive-health/publications/MNM\\_971995](http://www.who.int/reproductive-health/publications/MNM_971995) Thermal protection of new born. Page 1-15.
3. Neu M, Browne JV, Vojir C. The impact of two transfer technique used during skin-to-skin care on the physiologic and behavioural responses of pre-term infant. *Nurs Res* 2000; 49(4): 215 –223.
4. Kostyra KM, Mazur J, Boltruszko I. Effect of early skin-to-skin contact after delivery on duration of breast-feeding, a prospective cohort study. *Acta Paediatr* 2002; 91:1301-1306.
5. Jansson UM., Mustafa T, Khan MA, Lindblad BS, Widstrom AM. The effect of medically oriented labour ward routines on prefeeding behaviour and body temperature in newborn infants. *J Trop Paediatr* 1995; 41:360-363.
6. Widstrom AM, Wahlberg V, Matthiesen AS, Eneroth P, Uvnas-Moberg K, Werner S, *et al.* Short-term effects of early suckling and touch of the nipple on maternal behaviour. *Early Hum Dev* 1990; 21:153-63.
7. Judit A, Fardig CNM. A comparison of skin-to-skin contact and radiant heaters in promoting neonatal thermo-regulation. *J Nurse Midwifery* 1980; 25(1):19-28.
8. Acolet D, Sleath K and Whitelow A, Oxygenation, heart rate and temperature in very low birth weight infants during skin-to-skin contact with their mothers. *Acta Paediatr Scand* 1989; 78:189-193.
9. Susan M. Ludigton-Hoe, Nhuha N, Swinth JY, Rose Marie D. Sallyishur. Kangaroo care compared to incubator in maintaining body warmth in preterm infants; *Biological Research for Nursing* 2000; 2(1):60 – 73.
10. Cyriac P. Relationship between labour analgesia and breast-feeding behaviour of new born. *The Indian Journal of Nursing and Midwifery* 1999; 2(1):31-40.
11. Carfoot S, Williamson P, Dickson R. A randomized controlled trial in the north of England examining the effects of skin-to-skin care on breast-feeding. *Midwifery* 2005; 21(1):71-79.
12. Richard L, Margaret OA. Effects of delivery room routines on success of first breast-feed. *Lancet* 1990; 336(3):1105-1107.
13. Riva E, Banderali G, Agostoni C, Radaelli G and Giovannini M *et al.* Factors associated with initiation and duration of breast-feeding in Italy. *Acta Paediatr* 1999; 88:411-415.
14. Bier JA, Ferguson AE, Morales Y, Liebling JA, Archer D, *et al.* Comparison of skin-to-skin contact with standard contact in low birth weight infants who are breast-fed. *Arch Paediatr Adolescent Medicine* 1996; 150:1265-1269.

\*\*\*\*\*