ARAŞTIRMA

STRIAE GRAVIDARUM AND RELATED FACTORS*

Sermin TİMUR TAŞHAN**   **Derya SEVER*****

_____

ABSTRACT

The study aim to examine the prevalence of striae gravidarum in primiparae and identify related risk factors.The study was conducted at a large Government Hospital in Adıyaman, Eastern Turkey. The sample of thestudy consisted of 256 primipara women chosen with the improbable random sampling method.The total striae scores were obtained at the abdomen, thighs and breast. Data were analyzed using chi-squared test, t-test and backward stepwise logistic regression. Of all women, 78% were developed striae gravidarum. Of all Women during pregnancy, 39% developed striae gravidarum on the abdomen, 36% developed striae gravidarum on the breasts, and 45% developed striae gravidarum on the thighs during their pregnancy. Development possibility of striae gravidarum increased by 0.8 times with a given decrease in age, 3.6 times in the individuals with family history of striae gravidarum, and 2.0 times with a given increase in newborn height. It was concluded in the study that maternal age, birth height of baby and family history were related with striae gravidarum.

Keywords: Pregnancy; nursing; related factors; striae gravidarum,

ÖZET
Stria Gravidarum ve İlişkili Faktörler

Çalışmanın amacı primiparlarda stria gravidarumsıklığı ve etkileyen faktörlerin belirlenmesidir. Çalışma Türkiye'nin doğusunda bulunan Adıyaman ilindeki büyük bir devlet hastanesinde yürütülmüştür. Araştırmanın örneklemini basit rasgele örnekleme yöntemiile seçilen toplam 256 primipar kadın oluşturmuştur.Veriler kikare testi, t testi ve backward stepwise lojistik regresyon analizi kullanılarak değerlendirildi. Tüm kadınların %78'inde stria gravidarum gelişmişti. Kadınlar gebelikleri sırasında %39'unda karın bölgesinde, %36'sı göğüste, %45'i kalça gölgesinde stria gravidarum geliştiğini belirtmişlerdir. stria gravidarum gelişme riski yaş artışı ile 0.8 kat, aile hikayesinde stria gravidarum varlığı 3.6 kez, yenidoğanın boyundaki artış ile 2.0 kat arttığı saptanmıştır. Çalışmanın sonucunda anne yaşı, yenidoğanın boyu ve aile hikayesi stria gravidarum için risk faktörleri olarak saptandı.

Anahtar Kelimeler: Gebelik; hemşirelik; ilişkili faktörler; stria gravidarum.

_____

INTRODUCTION

Pregnancy is a period that creates important changes in women's body image. Stria gravidarum (SG) is a dermatological problem that causes esthetic anxiety in about 90 percent of pregnant women. SG is the most common connective tissue change in pregnancy. It occurs especially in the 6th and 7th months of pregnancy (Özdemir and Özdemir 2006, Pençe, Kundakçı and Avşar 1994, Susanne and Frank 1997, Yılmaz 2007). Its prevalence, though showing variations, generally changes between 50%-90%. (Atwal, Manku, Griffiths and Polson 2006, Özdemir and Özdemir 2006, Yılmaz 2007). SG develops usually around abdomen, thigh, gluteal region and breast. In the beginning, stria gravidarum appears as an atrophic strip with pink-purple color. Sometimes, it is accompanied with itchiness. Strias appear pale atrophic in the postnatal period. This makes strias less apparent, but they never disappear completely (Fuhrman 2000, Susanne and Frank 1997). This situation further increases the importance of strias which affect the body image in pregnancy. SG development is attributed to hormonal factors and tissue tenderness caused by the expansion of sub-tissues; however, the reason is not known

_____

for certain. It was reported that there is a correlation between SG development newborn weight gained during pregnancy. SG is not frequent among Asian and African people, which indicates family susceptibility (Özdemir and Özdemir 2006, Yılmaz 2007). It was reported in literature that other factors such as maternal body mass index, mother's age, skin color and weight gained during pregnancy could be effective, as well. Possible effects of cream/lotion use on SG have not been completely explained yet (Susanne and Frank 1997,Young and Jewell 2000). Precautions to prevent SG development in pregnancy should be taken before or in early periods of pregnancy. Health staff should take responsibility in this process. Informing women on SG and developing suitable approaches to modifiable risk factors are among the important responsibilities of health staff.

Determining the frequency of SG and effective factors will help women to cope with SG problems. For this reason, this study aims to determine the frequency of SG and effective factors in the process.

METHODS

A descriptive study was conducted at a large Government Hospital in Adıyaman, in the eastern Turkey. The data were collected from the postpartum unit of the gynecology service, between 1 April 2009 and 30 September 2009. Study population consisted of primipara women who gave birth in the above mentioned hospital in the dates specified. The sample of the study consisted of 256 primipara women chosen with the improbable random sampling method. The data were collected via questionnaire and physical examination. A total of 256 primiparae agreed to interview and examination which would be implemented by an observer within the first 48 hours (h) of delivery. All the women included in the study were at over 38 weeks of their pregnancy because the preterm deliveries were not admitted to State hospital of Adıyaman province. Sixty two primipara who did not want to participate were excluded from the sample. As the reason for not participating, 37 out of 62 primipara stated that they did not want to spend time on the mentioned activity, and the rest (15 primipara) stated that their husband wouldn't allow them to participate. Ten (10) mothers who had lost their baby during pregnancy, and multiparae or multiple pregnant mothers were not included in the study.

Data Collection

The data obtained were from patients in the first 12-48 hours post partum in the hospitalized. Data were collected during five days in week. Women who agreed to participate in the study data through interviews with the researcher himself completed by.

Data Collection Forms

Data were collected using the Interview Form (IF). The Interview Form was developed by the investigators based on literature (Atwal, Manku, Griffiths and Polson 2006, Chang, Agredano and Kimball 2004, Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz 2007, Osman, Rubeiz, Tamim and Nassar 2007). It contains 32 questions on such subjects as age, education, occupation, family income, health insurance, pre-pregnancy and delivery body mass index at delivery (BMI), total weight gain during pregnancy, baby's neonatal weight and height, family history of striae, sex of baby, gestational week of delivery, habits (smoking, drinking water), gestational health problems, mode of delivery, skin disease, cream use and gestational age when the first signs of SG appeared.

Skin types were determined by the Fitzpatrick Classification Scale (FCS). The Fitzpatrick Classification Scale was developed in 1975 by Thomas Fitzpatrick. This scale classifies a person's complexion and their tolerance of sunlight (Goldman 2008). The scale is composed of three main divisions and ten questions including the reactions of skin to sunlight exposure and the type of sunbath. Each question is graded between 0-4 points. The type of skin is categorized between I-IV groups according to the points obtained from the scale. 0-7 points are defined as skin type I, 8-16 points are skin type II, 17-25 points are skin type III, 26-30 points are skin type IV, and 30< points are skin type V and VI. Type I is characterized with a very white or freckled skin and always burns with sun exposure, Type II is characterized with a white skin and usually burns with sun exposure, Type III is with a white or olive skin tone and sometime burns with sun exposure, Type IV is with a brown skin and rarely burns with sun exposure, Type V is with a dark brown skin and very rarely burns with sun exposure, Type VI is with a black skin, never burns with sun exposure (Goldman 2008). No skin type

other than FCS II, III and IV was detected in the study.

SG presence on abdomen, thighs, and breasts was assessed by a researcher based on a scale developed and validated by the research team. This scale is based on proportional representations of body parts covered with SG, in which <25% was rated as light, 25-50% as moderate, and >50% as severe. The scale provided a useful way to incorporate the number of SG as well as the width of SG covering the affected area. Only the SG, formed during pregnancy, was taken into consideration. The IF was piloted on 10 women to determine its ease of use and comprehensibility.

Ethical Considerations

Ethical review of the study was approved by the Adıyaman Health Directorate Committee. Participant women were informed by the investigators that they would not be paid for their participation in the study and they did not receive payment.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences 10.0 (SPSS 10.0). Descriptive statistics were used to analyze demographic data and independent variables. Data were analyzed using chi-squared test, t-test and backward stepwise logistic regression. The significance level was set at $\alpha = 0.05$.

FINDING AND DISCUSSION

The general characteristics of the study sample are shown in Table 1. The mean and Standard Deviation (SD) age of the 256 women in the study was 23.85 (4.18) years. 60% of women were below 25 years old. The majority were housewives (86.7 %). Only 4.3 percent were smokers and continued to smoke during their pregnancy. Of all newborns, 46% were males and 53% were females. Of all women, 23.8 % did not have any skin illness. Of all women, 2.7 % were suffered from gestational diabetes and 9% suffered from hypertension. 37.1 of them had cesarean section. The predominant skin type in our population was found Fitzpatrick III (81.3%) and II (16.8%). BMI average of women was 21.56 (SD=2.81) before pregnancy and 33.42 at birth. The mean gestational age of women was 39.05 years (SD=1.94) at birth. The weight gained during the pregnancy ranged from 2 to 30 kg with a mean value of 14.9 kg. Daily water consumption of women was 10 glasses. The birth-weight (BW)

ranged between 1200 and 3500 g with a mean value of 3408 g. Average height of the babies was 50.25 cm (SD =1.54). Detailed information of the participant women are given Table 1.

Of the 256 women enrolled in the study, 200 (78%) developed SG in at least 1 part of the body. Of all women, 21% had none or no significant striae (Figure 1). The prevalence of SG reported in the literature varies between 50% and 90% (Pençe et al. 1994, Yılmaz 2007, Özdemir and Özdemir 2006, Atwal, Manku, Griffiths and Polson 2006, Osman, Rubeiz, Tamim and Nassar 2007, Chang, Agredano and Kimball 2004, Ghasemi, Gorouhi, Firroozabadi, Jafarian and Firooz 2007, J-Orh, Titapant, Chuenwattana and Tontisirin 2008, Thomas and Liston 2004). The findings of this study are in agreement with the results of the previous studies. Of all women, 69% were developed SG on the abdomen, 36% developed SG on the breasts, and 45% developed SG on the thighs during their pregnancy. Of the abdominal striae, 61 (23%) were classified as light, 46 (18%) were moderate, and another 70 (27%) were severe (Table 2). Approximately three out of four women have abdominal striae. Osman, Rubeiz, Tamim and Nassar (2007) determined the highest appearance frequency (61.8%) of SG in abdomens in their study. Of all women, 36% were developed SG on the on the breasts, and 45% developed SG on the thighs during their pregnancy. Of the breasts striae, 25% were classified as light, and 11% were moderate. Of the thighs striae, 14% were classified as light, 21% were moderate, and 9% were severe (Table 2). Of all women, 32% had used a cream or lotion during their pregnancy in an attempt to avoid the development of SG (Table 2). In literature, any cream/lotion use with massage was found to decrease SG appearance frequency to some degree. However, which ingredient of creams or lotions is effective on SG is not known for certain (Young and Jewell 2000). A large proportion of the population in Turkey was using one or more creams/lotions in an attempt to prevent the development of SG; however, no correlation was detected between cream use and SG development. In a study conducted by Osman, Rubeiz, Tamim and Nassar (2007), no significant relation was found, either. However, in another study conducted by Osman, Usta, Rubeiz, Abu-Rustum, Charara and Nassar (2008), and

Table 1. General Characteristics of The Study Sample (n=25)

Age (Years)		
>25	155	60.5
≥25	101	39.4
Occupation		
Housewife	222	86.7
Working out of the home	34	13.3
Education level		
No education	13	5.1
Literate or primary school	137	53.5
High school or university	106	41.4
Family income		
Low	148	57.8
Medium	92	35.9
Good	16	6.3
Health insurance		
Yes	217	84.8
No	39	15.2
Current smoking		
Yes	11	4.3
No	245	95.7
Baby's Sex		
Female	136	53.1
Male	120	46.9
Skin disease		
Yes	61	23.8
No	195	76.2
Systemic diseases		
Gestational diabets	7	2.7
Hypertension	23	9.0
Delivery mode		
Vaginal delivery	95	37.1
Caesarean section	161	62.9
Fitzpatrick classification		
II	43	16.8
III	208	81.3
IV		2.0
Pre-pregnancy BMI(kg/m^2)		
25<	227	88.7
25≥	29	11.32
(mean ±SD)	21.56±2.81	
Delivery BMI (kg/m^2) (mean ±SD)	33.42±3.33	
Gestational age at delivery (weeks) (mean ±SD)	39.05±1.94	
Weight gain (kg) (mean ±SD)	14.92±4.82	
Water consumption (glasses) (mean ±SD)	10.09±4.40	
Newborn (mean ±SD)		
Weight (g)	3408.20±20.35.6	
Height(cm)	50.25± 1.54	
Age (mean ±SD)	23.85±4.18	

Buchanan, Fletcher and Reid (2010) Cocoa butter lotion was determined not to decrease SG development risk. The findings of the present study are also compatible with literature (Buchanan, Fletcher and Reid 2010, Osman, Rubeiz, Tamim and Nassar 2007, Osman, Usta, Rubeiz, Abu-Rustum, Charara and Nassar 2008). On account of thescarcity of studies on cream/lotion, this subject should be further studied in detail.

The mean gestational age when SG first appeared was 19.89±12.05 weeks (table 2). Many women (31%) reported to have SD between 21st and 28th weeks. It was found as 24th week by Chang, Agredano and Kimball (2004) and 27th week by Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007). The finding in the present study is lower than the findings of both Chang, Agredano and Kimball (2004) and Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007). Another limitation of the study was to ask women questions about past events which they might not remember. Comprehensive studies which will observe women for SG from the beginning of pregnancy should be performed to explain such differences. Table 3 shows the results of logistic regression analysis of some variables related with SG. Backward stepwise logistic regression analysis was used to see the covariance of independent variables which were found to be related with striae gravidarum in bivariate analyses.

Of the 20 variables investigated, four were significantly related with the presence of striae. The covariates of the model included age, newborn height, weight gain and family history of SG. As shown in Table 3, newborn height (OR = 1.34, 95% CI = 1.04–1.72), family history of SG (OR = 3.66, 95% CI = 1.90–7.08) and decrease in age (OR = .87, 95% CI = .81–.94) were all among the risk factors for striae gravidarum.

SG may occur due to structural connective tissue changes that include realignment, reduced elastin and fibrillin in the dermis. Fragility of fibrillin increases in younger skin (Watson, Parry, Humphries, Jones, Polson, Kielty et al. 1998).
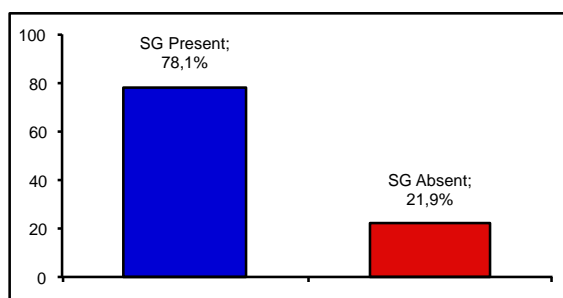
Figure 1. Distribution of Striae Gravidarum

Table 2.Striae Gravidarum Characteristics of the Study Sample (n= 256)

Variables	n	%
Abdomen		
Absent	79	30.9
Light	61	23.8
Moderate	46	18.0
Severe	70	27.3
Breasts		
Absent	164	64.0
Light	64	25.0
Moderate	28	11.0
Thighs		
Absent	139	54.3
Light	38	14.8
Moderate	56	21.9
Severe	23	9.0
Cream/Lotion Use		
Yes	84	32.8
No	172	67.2
Family history of SG		
Yes	187	73.0
No	69	27.0
Gestational week of onset of striae (mean ± SD)		19.89±12.05
<12	64	25.0
12-20	55	21.5
21-28	81	31.6
>28	56	21.9

SG, Striae Gravidarum

In the study, a statistically significant relation was found between age and SG formation, and SG formation was determined to increase by 0.8 times with a given decrease in age (Table 3).

This finding is compatible with literature (Atwal, Manku, Griffiths and Polson 2006, J-Orh, Titapant, Chuenwattana and Tontisirin 2008, Osman, Rubeiz, Tamim and Nassar 2007, Thomas and Liston 2004).

In the study, no relation was found between newborn weight and SG; however, a statistically significant correlation was found between newborn height and SG. In the logistic regression analysis, increasing newborn height was found also to increase the SG development risk by 1.3 times (Table 3). Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007) determined in their study that babies of SG developing mothers would be taller. Our findings support the findings of Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007). There are certain studies in the literature (Buchanan, Fletcher and Reid 2010, Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz 2007, J-Orh, Titapant, Chuenwattana and Tontisirin 2008, Özdemir ve Özdemir 2006) which report a relation between SG and newborn height and also some other studies which report no relation between them (Osman, Rubeiz, Tamim and Nassar 2007).

In the study, family history of SG was determined as the most important risk factor for SG development in women. In the logistic regression analysis, SG development risk was found to increase by 3.6 times in people with family history of SG (Table 3). Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007) established that family history of SG increases SG development risk by 3.3 times, which is similar to the findings of the present study. Findings of the present study are also compatible with the literature (Halperin, Raz, Ben-Gal, Or-Chen and Granot. 2010 J-Orh, Titapant, Chuenwattana and Tontisirin 2008).

In literature, there are certain studies reporting a relation between SG development and Body Mass Index before pregnancy and after birth (Atwal, Manku, Griffiths and Polson 2006, Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz 2007, J-Orh, Titapant, Chuenwattana and Tontisirin 2008), while some other studies determined no relation (Chang, Agredano and Kimball 2004, Halperin, Raz, Ben-Gal, Or-Chen and Granot. 2010). In the study, no relation was found between them (Table 3).

It was reported in literature that there is a relation between SG and weight gained during pregnancy (Özdemir ve Özdemir 2006, Yılmaz 2007). A relation was found between SG and weight gained during pregnancy; however, logistic analysis determined that this weight doesn't pose a risk for SG development (Table 3). Findings on this subject are contradictory in literature. Certain studies in the literature (Chang, Agredano and Kimball 2004, Ghasemi,

Gorouhi, Firoozabadi, Jafarian and Firooz 2007) didn't report a statistically significant relation, whereas others detected significant relations (Atwal, Manku, Griffiths and Polson 2006, Buchanan, Fletcher and Reid 2010, Osman, Rubeiz, Tamim and Nassar 2007).

In the study, gestational diabetes did not increase the risk of SG, which is compatible with a previous report (Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz 2007). In addition, parameters including hypertension, smoking and mode of delivery did not have any role in SG formation. Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007) didn't find a significant relation between SG development and gestational diabetes, hypertension, smoking and mode of delivery; similarly, Osman, Rubeiz, Tamim and Nassar (2007) didn't find a significant relation between smoking and SG. In addition, Atwal, Manku, Griffiths and Polson (2006) didn't find a significant relation between SG and mode of delivery, which are all compatible with the findings of the present study.

In literature, no relation was detected between newborn sex, gestational age and SG development, which is similar to the findings of the present study (Atwal, Manku, Griffiths and Polson 2006, Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz (2007), Osman, Rubeiz, Tamim and Nassar 2007).

In the study, daily water consumption of pregnant women was 10 glasses. In the statistical analysis, it was found that water consumption didn't pose a risk for SG development (Table 2). However, in the study conducted by J-Orh, Titapant, Chuenwattana and Tontisirin (2008) in Thailand, women's water consumption was found 7-8 glasses, and water consumption was also determined as a risk factor for SG development. It can be thought that the difference was caused by the fact that women's water consumption was higher in our study and the studies were conducted in two very different cultures and regions. Women included in the study were formed by only white women, and other ethnic groups couldn't be studied, which is an important limitation of this study. In addition, all skin types were not represented or identified accurately. The predominant skin type in our study was Fitzpatrick III. In the study, a statistically significant relation was found between Fitzpatrick type skin and SG, which is compatible with literature (Ghasemi, Gorouhi, Firoozabadi, Jafarian and Firooz 2007, Osman, Rubeiz, Tamim and Nassar 2007). However, Chang, Agredano and Kimball (2004) found that race didn't pose a risk for SG.

Table 3. Risk Factors of Striae Gravidarum According to Logistic Regression Model[+] (n=256)

Factors	β	SE[a]	df[b]	p	OR[c]	95% Cl[d]
Age	-.12	.03	1	.001	.87	.81-.94
Newborn height	.29	.12	1	.021	1.34	1.04-1.72
Family history of SG (referent: No)						
Yes	1.30	.33	1	.001	3.66	1.90-7.08

+ Backward Stepwise Logistic Regression; SE[a]: Standard Error; df[b]: Degree of freedom;
OR[c]: Odd's ratio; Cl[d]: Confidence interval

CONCLUSION

In the study, age, newborn height and family history of SG were determined as risk factors for SG development. Nurses and midwives be trained about the risk factors and SG. Considering risk factors, necessary education should be given from the beginning of pregnancy to prevent SG development in women. In addition, further studies are required to determine the SG-preventive effects of cream or lotion and the effects of SG on women's body image.

REFERENCES

Atwal GSS, Manku LK, Griffiths CEM, Polson DW. Striae Gravidarum in Primipara. The British Journal of Dermatology 2006; 155(5): 965-969.

Buchanan K, Fletcher HM, Reid M. Prevention of Striae Gravidarum with Cocoa Butter Cream. International Journal of Gynecology and Obstetrics 2010; 108(1): 65–68.

Chang AL, Agredano YZ, Kimball AB. Risk Factors Associated with Striae Gravidarum. Journal of the American Academy Dermatology 2004; 51(6): 881–885.

Fuhrman L. Common Dermatoses of Pregnancy. The Journal of Perinatal and Neonatal Nursing 2000; 14(1): 1-16.

Ghasemi A, Gorouhi F, Firoozabadi MR, Jafarian S, Firooz A. Striae Gravidarum: Associated Factors. Journal of the European Academy of Dermatology and Venereology 2007; 21(6): 743-746.

Goldman MP. Universal Classification of Skin Type. In: Melvin AS, Sid JM, Samuel ML, Chelso GC eds. Simplified Facial Rejuvenation. Springer Berlin Heidelberg; 2008.p.47-50.

Halperin O, Raz I, Ben-Gal L, Or-Chen K, Granot M. Prediction of Perineal Trauma During Childbirth By Assessment of Striae Gravidarum Score. Journal of Obstetric, Gynecologic, & Neonatal Nursing 2010; 39(3): 292-7.

J-Orh R, Titapant V, Chuenwattana P, Tontisirin P. Prevalence and Associate Factors for Striae Gravidarum. Source Journal of the Medical Association of Thailand 2008; 91(4): 445-451.

Osman H, Rubeiz N, Tamim H, Nassar AH. Risk Factors for the Development of Striae Gravidarum. American Journal of Obstetrics&Gynecology 2007; 196(1): 62-67.

Osman H, Usta IM, Rubeiz N, Abu-Rustum R, Charara I, Nassar AH. Cocoa Butter Lotion for Prevention of Striae Gravidarum: A Double-Blind, Randomised and Placebo-Controlled Trial. International Journal of Obstetrics and Gynaecology 2008; 115(9): 1138-1142.

Özdemir M, Özdemir S. Physiologic Skin Changes in Pregnancy. Dermatose 2006; 5: 22-25.

Pençe B, Kundakçı N, Avşar F. Sking Changes and Dermatoses of Pregnancy. Turkish Journal of Dermatol 1994; 4(2): 81-90.

Susanne V, Frank CP. Physiological Changes in The Skin During Pregnancy. Clinics in Dermatology 1997; 15: 35-43.

Thomas RGR, Liston WA. Clinical Associations of Striae Gravidarum. Journal of Obstetrics and Gynaecology 2004; 24 (3): 270–271.

Watson RE, Parry EJ, Humphries JD Jones CJP, Polson DW, Kielty CM et al. Fibrillin Microfibrils are Reduced in Skin Exhibiting Striae Distensae. The British Journal of Dermatology 1998;138(6):931-938.

Yılmaz E. Physiologic Skin Changes in Pregnancy. Dermatology 2007; 13-18.

Young G, Jewell D. Creams for Preventing Stretch Marks in Pregnancy. Cochrane Database of Systematic Reviews 2000; 2: CD000066