



A STUDY TO ACCESS THE AWARENESS AMONG PREGNANT WOMEN ON THEIR DIETARY HABITS DURING PREGNANCY

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ABSTRACT

The purpose of this study is to explore the knowledge and attitude of pregnant women towards the importance of balanced diet during pregnancy. There is tremendous changes in dietary habits of people in our country. Nutrition in pregnancy refers to dietary planning several months before conception, as well as throughout pregnancy and breast-feeding. Maternal and child under nutrition account for more than 10 percent of global burden of disease. Epidemiology of maternal under nutrition is mostly in many low- and middle-income countries leads to various complications like Anaemia in the pregnant women, poor foetal development. Nutritional requirements before concept include the following Take folic acid supplement, Maintain ideal weight, vitamin A intake should be within normal limit, giving up smoking. Nutritional requirements during pregnancy and lactation, vary depending on a woman's age, BMI and activity level. Normally, caloric intake should increase by 300 k cal/day, recommended protein intake is 60 g/day, carbohydrates 45-64%. Recommended Dietary Allowances rise for most vitamins and minerals during pregnancy. Nutritional problem during pregnancy include Anaemia, pica, Hyperemesis Gravid arum, Heartburn, pre-eclampsia, Gestational weight gain, insulin resistance, managed by eating wholesome diet as recommended. Preserve ideal weight, at preconception obesity (BMI less than 30) inhibit ovulation due to change insulin activity and effect on hormone activity, underweight (BMI less than 18.5) increase chance of low birth weight. In present study total 150 pregnant women's get knowledge about balanced diet information from elders (52%), from social media 38%. 52% of women showed dietary intervention to improve mental health during pregnancy. In pregnant women's exercises performance 11% women's did every day exercises whereas 32% never did exercises. Pregnant woman's takes no. of meals per day 4 times meals (66% women's), 3 times meals consumption by 34% women's, 2 times meals by 5% women per day. Junk food consumption in pregnant women's 21% women's never consumed junk foods whereas 33% women's consumed everyday junk foods. Pregnant women's Drinking water per day 42% women's takes 2 liters per day whereas 13% women's take less than 1 liter per day.

KEY WORDS: Pregnant women's, Balanced diet knowledge, Dietary intake

INTRODUCTION

The adequate maternal nutrition plays a key role in normal pregnancy progress, optimal foetal development and normal birth weight of the foetus. Adequate Maternal nutrition plays a key role in normal pregnancy progress and optimal foetal development. proper diet during pregnancy progress and optimal foetal development. proper diet during pregnancy should provide an appropriate amount of energy and all essential nutrients such as protein, fats, carbohydrates, vitamins and minerals. Calorie requirement during pregnancy is increased for maintaining the growth of the foetus, placenta and maternal tissues and for the increased basal metabolic rate. Increased iron is necessary for fetal growth, expansion of maternal tissues including the red cell mass, iron content of placenta and the blood losses during parturition. Maternal folate deficiency not only has consequences for the mother's own health, but has also been shown to result in foetal growth retardation. Vitamin A and carotene levels in the third trimester or at birth have also been found to be predictive of low birth weight and prematurity.

(Mudasir Maqbool, Mohammed Amir Dar et al 2019)

A good balance of macro nutrient is achieved by slightly rise in energy intakes within the dietary guidance recommendations. In addition, especially in obese and overweight women with increased risk of miscarriage, pre-eclampsia, gestational diabetes, as well as type 2 diabetes and obesity is the outcome by excess calories and macro nutrients intake during pregnancy may be just as damaging as their deficiency (Bruce 2014, Catalano and Demouzan 2015). Folic acid (folates, vitamin B9) play a vital role in several metabolic reactions occurring in the body like the biosynthesis of DNA and RNA, methylation of homocysteine to methionine, amino acids metabolism, among others. To ensure maternal well being and favourable outcomes of pregnancy variation in consumption of a balanced diet from the preconception period is also important. Specific dietary intakes during pregnancy and lactation are often



insufficient even in the most industrialized countries. Therefore ,pregnant should be advised to eat balanced diet rich in high -quality carbohydrates,proteins,vitamins and other classes of food. (Sadia Hassan,Mohammed Adil Farooq etal 2020)

MATERIALS AND METHODS

METHOD

This is a local area- based cross-sectional review.pregnant women from the age below20 -40 years age from hospital ,community,and family provided a total of 1500 individual samples.The individuals in the sample were gathered from hospital ,community,family.A poll was utilized to complete the review.

MATERIALS

A questionnaire was designed and used as a medium foe collecting the data.The questionnaire was divided into different parts.Questions about demographic information are included in the first section.The second part includes questions about the balanced diet for pregnant women,complications faced by poor dietary intake,exercise performed,positive and negative effects of diet,no of meals,frequency consumption of junk food during pregnancy.The next part include questions about the what do usually pregnant women have for Breakfast,lunch,and dinner consumption of Alcohol,craving for particular food item,consumption of fruits and vegetables as snacks,frequency of consumption of water ,sports drink,and caffeinated drinks (Tea,Coffee) during pregnancy .

STATISTICAL ANALYSIS

Interpretation of data was done using Microsoft excel.The results are expressed as mean(+ -) standard deviation.

RESULTS AND DISCUSSION

Interpretation of data was done using Microsoft excel .The results are expressed as mean (+ -) standard deviation

Characteristics of the respondents

Table:1 Age , Activity of respondents pregnant women

Item	Category	N	Percentage
Age	Below 20 years	3	2 %
	21-30 years	100	66.06%
	31-40	47	31.03%
Activity	Mild moderate	63	42%
	Moderate	73	48.06%
	Heavy	14	9.03%
Mean		39.05	
Standard deviation		41.03	

Table 1 displays the age and activity of respndents. A total of 150 pregant women where approach of which pregnant women with age below 20n age group where 2%(pre) and the age group of 21-30 where 66.6%(100),and the last age group 31-40 where 31.3% (47).

Table 2 sources to no importance of balanced diet during pregnancy

Sources	N	Percentatge
Newspaper	6	4 %
Socialmedia	57	38 %
Elders	78	52 %
Nojn of the above	9	6 %

The above table shows the frequency , percentage ,mean, standard deviation of number of respondents to know the impornance of balanced diet during pregnancy from diffrence sources like newspapers 4%(6), social media 38%(57),elders52%(78), non of the above 6%(9).

Table 3

Positive and negative effects of balanced diet during pregnancy positive effect of diet during pregnancy

Postive effects	N	Percentage
gives energy to keep you active	22	14.06%
growth and repair	6	4.%
Boost immunity	7	4.06%
all of the Above	115	76.06%



Negative effects	N	Percentage
Fatigue	13	8.06%
Anaemia	23	15.03%
Immuno deficiency	5	3.03%
All the above	109	72.06%

The above table shows the frequency , percentage ,mean, standard deviation on positive and negative effects of balanced diet during pregnancy. positive effect which include options gives energy to keep u active was 41.06% (22) growth and repair 4%(6), Boost immunity 4.06%(7), all the above 76.06% (115). Negative effects include fatigue 8.6%(13), anemia 15.03%(23), immuno deficiency 72.06%(5), all the above 72.06%(109).

Table 4 Current Trending Dietary Intervention to Improve Maternal Health During Pregnancy

Variable	N	Percentage
Yes	24	16%
No	15	10%
Somewhat	78	52%
No Idea	33	22%
Mean	18.8	
Standard Deviation	27.05	

This table shows the percentage frequency mean standard deviation on current trending dietary intervention to improve maternal health during pregnancy which include option yes which is 1+6%(24), no 10%(15), somewhat 52%(78), no idea 22%(33)

Table 5 How often do Pregnant Women Perform Exercise

Variables	N	Percentage
Everyday	11	7.03% ^
Never	32	21.03%
Sometime	84	66%
1 To 3 Times A Week	23	15.03%
Mean	18.8	
Standard Deviation	28.9	

This table shows the percentage frequency mean standard deviation on performance of exercise during pregnancy which include option everyday 7.03%(11), never 21.03%(32), sometimes 56%(84) , 1 to 3 times a week 15.03%(23).

Table 6: how often do Pregnant Women Take Snacks as Fruits And Vegetables

Variables	N	Percentage
Everyday	11	7.03%
Never	32	21.03%
Sometime	84	56%
1 To 3 Times A Week	23	15.03%
Mean	18.8	
Standard Deviation	30.3	

How often do pregnant women take junk food

Variables	N	Percentage
Never	21	14%
1 To 2 Times A Week	83	55.03%
Everyday	33	22%
More Than Once A Day	13	8.06%
Mean	18.8	
Standard Deviation	28.6	

Table 6

This table shows the percentage frequency mean standard deviation on consumption of snack as fruits and vegetables during pregnancy which include options never 5.03%(8), once in a while 10%(15), 2 to 3 times a week 28%(42), everyday 56.06%(85).



Consumption of junk food during pregnancy which include option never 14%(21) 1 to 2 times a week 55.03%(83) everyday 22%(33), more than once a day 8.06%(13).

Table 7 Pregnant Women Everyday Water Consumption

Consumption Rate	N	Percentage
2 Litres A Day	42	
1 Litre A Day	42	28%
Less Than 1 Litre A Day	13	8.06%
1.5 Litre A Day	53	35.03%
Mean	18.8	
Standard Deviation	22.8	

Consumption of fruit drinks sports drinks caffeinated drinks (coffee and tea) among pregnant women

Consumption Rate	N	Percentage
Never	8	5.03%
1 To 3 Times A Week	49	32.06%
6 Times A Week	35	23.03%
1 Time A A Day	58	38.06%
Mean	21.7	
Standard Deviation	23.3	

This table shows the percentage frequency mean standard deviation on consumption of frequency of water in take during pregnancy 2 litres a day 28%(42), 1 liter a day 28%(42), less than 1 litre a day 8.06%(13), 1.5 litre day 35.03%(53). Consumption of fruit drinks sports drinks caffeinated drinks (coffee and tea) which include option never 5.03%(8), 1 to 3 times a week 32.06%(49), 6 times a week 23.03%(35), 1 time a day 38.06%(58)

Table 8: No of meals pregnant women have in a day

No of meals	N	percentage
6	11	7.03%
4	100	66.06%
3	34	22.06%
2	5	3.03%
Mean	18.8	
Standard deviation	34.7	

Table 9 Choice of pregnant women breakfast lunch and dinner

Food Item	N	Percentage
Fasts Food	9	6%
Coffee Tea And Toast	18	12%
Protein Shake Or Smoothie	15	10%
Home Made Food And Salad	105	70%
Mean	18.4	
Standard Deviation	35.6	

Table 8 showed that Number of meal during pregnancy six 7.03%(11), four 66.06%(100), three 22.06%(34), two 3.03%(5). Choice of pregnant women breakfast lunch and dinner fast food 6% (9), coffee tea and toast 12%(18),protein shake or smoothie 10%(15), home made food and salad 70%(105)

Statistical analysis was done using Microsoft excel.Descriptive statistics including frequency,percentage,Mean and standard deviation described the socio-demographic details percentage,frequencies,Mean,and standard deviation were computed for following items like Age,Activity,balanced diet for pregnant women should contain which food groups,frequency of exercise during pregnancy,positive and negative effects of poor diet during pregnancy,sources by which they came to know the importance of balanced diet during pregnancy,Awareness on current Dietary intervention for pregnancy ,no of meals,frequency of junk food consumption,frequency of intake of fruit and vegetables as snack,water ,fruit drink and caffeinated drinks(Coffee,tea)frequency of no of meals among pregnant women ,choices of pregnant women for breakfast,lunch,dinner etc.



Item	Percentage	
Age		
Below 20	2%	
21-30	66.06%	
31-40	31.03%	
Activity		
Mild moderate	42%	
Moderate	48.6%	
Heavy	9.3%	
Sources to know importance of balance diet during pregnancy	News paper	4%
	Social media	38%
	Eleders	52%
	Non of the above	6%
Positive effects of balanced diet during pregnancy	Gives energy to keep you active	14.06%
	Growth and repair	4%
	Boost immuniuty	4.06%
	All the above	76.06
Negative effects of Balanced diet during pregnancy	Fatigue	8.06%
	Anemia	15.03%
	Immuno deficiency	3.03%
	All the bov	72.06%
Awareness on current trending dietary intervention to improve maternal health during pregnancy	Yes	16%
	No	10%
	Some what	52%
	No idea	22%
Frequcy for performing exercises during pregnancy	Everyday	7.03%
	Never	21.03%
	Sometime	56%
	1 to 3 times a week	15.03%
Snacks as fruits and vegetables	Never	5.03%
	Once in a while	10%
	2-3 times a week	28%
	everyday	56.06%
Junk food during pregnancy	Never	14%
	1to2 times a week	55.03%
	Everyday	22%
	More than once ad day	8.06%
Frequcy of water consumption during pregnnacy	2 litres a day	28%
	1 litre day	28%
	Less than 1 litre day	8.06+%
	1.5 litre a day	35.03%
Frequcy of fruit drink,sport drink, caffeinated drink(COFFEE TEA)during pregnancy	Never	5.03%
	1-3 times a week	32.06%
	6 times a weeeek	23,.03%
	1 times a day	38.06%
Number of meal	6 meals per day	7.03%
	4 meals per day	66.06%
	3 meals per day	22.06%
	2 meals per day	3.03%
Breakfast lunch and dinner of pregnant women	Fast food	6%
	Coffee tea& toast	12%
	Protein smoothie	10%
	Homemade food & salad	70%



CONCLUSION

Based on the data provided, several conclusions can be drawn. Balanced diet plays a significant role in pregnancy. The study reveals that balanced diet has a considerable impact on pregnancy. Regarding Age and Activity of pregnant women, most pregnant women belong to the age group 21-30 years, markedly pregnant women have moderate Activity Lifestyle during pregnancy. Regarding Sources to know the Importance of balanced diet during pregnancy, Pregnant women usually gain knowledge about the importance of balanced diet during pregnancy mainly by Elders and social media. Regarding Positive and negative effects of balanced diet during pregnancy, Considerable pregnant women have good knowledge and are fully aware of positive and negative effects of balanced diet during pregnancy. Regarding Awareness on current trending Dietary intervention to maternal health during pregnancy, Remarkable pregnant women have a mediocre level of awareness on current trending Dietary intervention to improve maternal Health during pregnancy. Regarding Exercise performed during pregnancy, Large pregnant women performed exercise "sometimes" they usually do not exercise daily. Regarding Frequency of consumption of fruit and vegetable as snack and, junk food intake during pregnancy, Large pregnant women have snack as fruit and vegetables and the rest have junk food. Regarding Frequency of consumption of water, fruit drinks and caffeinated drinks (coffee, tea) during pregnancy, Pregnant women usually have 1.5 liters of water a day, and notable pregnant women have fruit drinks, caffeinated drink (coffee, tea) 1 time a day. Regarding No. of meals and choices of pregnant women for breakfast, lunch and dinner during pregnancy, Remarkable pregnant women have 4 meals in a day and an incredible number of pregnant women have Homemade food and Salad for Breakfast, lunch and dinner etc.

REFERENCES

1. Antop. Rajkumar, ks „Jacob k.s. jacob „(December 2008), are antidepressants safe during pregnancy., *the British journal of psychiatry*, volume 193., issue 6 ,pg no 508. <https://doi.org/10.1192/BJP1936.508>.
2. Eleni Petridou : Eleni ,Mary kasseri ,Neytiri Toupadaki ,Sotiris Youroukos, Antigoni Papavassiliou, Stephaw Pantelakis, Jorn Olsen and Dimitrios Trischopoulos, (17 november 1997) Diet during pregnancy and cerebral palsy, *British Journal Of Nutrition* (1998), volume 79 ,issue 5 pg no :407-412., <https://doi.org/10.1079/BJN19980069>.
3. D.J.Mellor ;DJ,(1987)Nutrition effects on foetus and mammary gland during pregnancy, *Proceedings of the nutrition society*, volume 46 issue 2 ,pg no 249-257, <https://doi.org/10.1079/PNS19870032> .
4. MS Charnley; MS ,Aweckson JC Abayomi, (2015) Does the diet quality of obese women deteriorate during pregnancy., *proceedings of the nutrition society*, volume 74, issue 4, Irish section meeting, 17-19 june 2015, nutrition at key life stages .new findings ,new approaches, 2015, E257. . <https://doi.org/10.1017/S0029665115002992>.
5. Kristine B pezdirz; Kristine, Alexis j hure, michelle L Blumfield and clare E collins (3 february 2012), *Listeria monocytogenes and diet during pregnancy ,balancing nutrient intake Adequacy v/s Adverse pregnancy outcomes. Public health Nutrition* , volume 15, Issue 12, pg no 2202-2209, <https://doi.org/10.1017/S1368980012000717>.
6. M.Bouga, M. E. Lean and E. Combet (2016) ,Dietary guidance during pregnancy iodine nutrition ; a qualitative approach , *Proceedings of the nutrition society*, volume 75, issue 3, <https://doi.org/10.1017/S0029665116000987>.
7. Karen MO Callaghan : Karen MO Mairead E .Kiely (may 2018.), *Ethnic disparities in the dietary requirement for vitamin D during pregnancy considerations for nutrition policy and research .proceedings of nutrition society*, volume 77, issue 2, pg no 164-173. <https://doi.org/10.1017/S002966511>.
8. Michael E Symonds: M.E. Symonds (july 1995) pregnancy, parturition and neonatal development ,interactions between nutrition and thyroid hormones ..., *proceedings of nutrition society* , volume 54, issue 2, pg no 329-343. <https://doi.org/10.1079/PNS19950002>.
9. John L.L. Sun, Ismail.al.Badawi and Christopher R.Honey (February 2000), Hemorrhagic Moyamoya disease during pregnancy , *Canadian journal of neurological science* , volume 27 ,issue 1, pg no, 73-76., <https://doi.org/10.1017/S0317167100052021>.
10. Nan R. Taggart, Ruth M. Holliday and A.M Thomson (may 1967), changes in skinfolds during pregnancy , *the British journal of nutrition* , volume 21 ,issue 2 pg no 439-451. <https://doi.org/10.1079/BJN19670045>.
11. Kammoun, R. Kammoun, M .Karou, and F. Ellouze. April 2021, mental disorders during pregnancy and postpartum period , *European psychiatry*, volume 64, special issue 51., abstract of the 29th European congress of psychiatry ,pg no 605 . <https://doi.org/10.1192/J.eurpsy.2021.1614>.
12. K.M Cashel, D Crawford and V Deakin, December 2000, milk choice made by women :what influences them and does it impact on calcium intake ?, *public health nutrition* ., volume 3, issue 4, pg no. 403-410 . <https://doi.org/10.1017/S1368.98000000046.x>.
13. Michelle L Blumfield ., 3RD September 2014., high protein diets during pregnancy., healthful or harmful for offspring? *The American journal of clinical nutrition*, volume 100, issue 4, pg no 993-995, <https://doi.org/10.3945/ajcn.114.096511>.
14. Steven H Zeisel .H Zeisel, 30th December 2008, is maternal diet supplementation beneficial, optimal development of infant depends on mothers diet., *The American journal of clinical nutrition* , volume 89, issue 2 ,pg no., 6855-6845, <https://doi.org/10.3945/ajcn.2008.26811F>.
15. Beverly S Muhlhauser, July 2021, maternal fish intake and infant neurodevelopment ;casualty or a red herring? , *The journal of nutrition* ., volume 151 issue 7 pg no 1688-1689, <https://doi.org/10.1093/in/nxab143>.
16. J.J Hoet, M.A Hanson 8 september ,2004, intrauterine nutrition; its importance during pregnancy critical periods for cardiovascular and endocrine development. *The journal of physiology* , volume 514., issue 3 pg no 617-627. <https://doi.org/10.1111/j.1469-7793.1999.617.adx>.
17. M. Dhobale 2017, chapter thirteen neurotrophic factors and maternal nutrition during pregnancy, vitamins and hormones. Volume 104 issue ., pg no 343-366, <https://doi.org/10.1016/bs.vh.2016.10011>.
18. Naser A. Alshairi 25 july 2020, the infant gut microbiota and risk of asthma; the effects of maternal nutrition during pregnancy and lactation. *www.Mdpi.com /journal /microorganisms*, volume, issue 8 pg no 119., <https://doi.org/10.3390/microorganisms8081119>.



20. James c.King 1 april,2001, the journal of nutrition, volume 131,issue 4 pg no 13553-13585. . <https://doi.org/10.1093/jn/131.4.13555>.
21. D Yusufi,V .I Mathan and S.JBaker 1973 ,iron folate and vitamin B12 nutrition in pregnancy .a study of 1000 women from southern india . ., Bull World health organ ... volume48(1), issue ,pg no. 15-22, <https://pubmed.ncbi.nlm.nih.gov/45411/>.
22. Mudasir Maqbool, ,Mohamad Amin Dar : 20 february2019 , maternal health nutrition in pregnancy:an insight, world journal of pharmacy and pharmaceuticals sciences., volume 8,issue 3 pg no 450-459, <https://doi.org/10.20959/wjpps.20193-13290>.
23. Cecily young,Susan Ayers march 2021 ,risk and resilience in pregnancy and birth .,social psychology, volume .,issue , pg no 57-c3.p145. <https://doi.org/10.1093/050/9780190095888.003.0004>.
24. Kolokotroni,M.E Conomou, A Koutrouba .25 october 2022 , knowledge,beliefs,experience of adopting health habits in pregnancy: a mixed methods study ., European journal of public health ., Volume 32 issue supplement 3 pg no 130-245. <https://doi.org/10.1093/europub/ckac130.245>.
25. Yeyi Zhu 9 november 2021 ,are you what you eat ?through the lens of pre-pregnancy planto -based diets and risk of gastetional diabetes. The American journal of clinical nutrition . volume 114 issue 6 ,pg no 1892-1893. <https://doi.org/10.1093/ajcn/nqab334>.
26. Kenga Skoracka ,Iwona Krula, Kazmierarczak ,17 june,2021. Female fertility and the nutritional approach:the most essential aspects, .advances in nutrition, volume 12, issue 6,pg no 2372-2386,. <https://doi.org/10.1093/advances/nmab068>.
27. Irma Silva,zolezzi, 3 january,2017 . maternal nutrition : opportunityes in the presentation of gestationaldiabetes, nutrition reviews , volume 75 ,issues supplement1 pg no 32-50., <https://doi.org/10.1093/nutrit/nuw033>.
28. Rachel R. , W Neil :Rachel R , march 2004, does maternal nutrition in pregnancy and birth weight influence level of CHD risk factor in adult life . ,British journal of nutrition, volume 91 issue 3 pg no 459- 468 . <https://doi.org/10.1079/BJN20031052.1>
29. Sarah louise killen, Aisling A ,Geraghty ,Eileen C . O 'Brien , Sharleen L .O Reilly ,Cara A .yilverton and fionnuala M .Mc Auliffe (27 october 2021),Addressing the gaps in nutritional care before and during pregnancy ,Proceedings of the nutrition society, Volume 81,issue 1,pg no :87-98 <https://doi.org/10.1017/S0029665121003724>
30. C.S Williamson's,(21-February 2006),Essential fatty acids and pregnancy, Nutrition Bulletin ,volume 31, issue 1,pg no :28-56 <https://doi.org/10.1111/j.1467-010.2006.00541.x>
31. Williamson :C.S ,(21 February 2006) pre-pregnancy nutritional issues ,Nutrition Bulletin ,volume 31,issue 1,pg no :28-59 <https://doi.org/10.1111/j.1467-3010.2006.00541.x>
32. Silvia fogacci,Federica fogacci,Arrigo F.G Cicero (31 -january-2020) Nutraceuticals and Hypertensive disorders in pregnancy :The Available clinical evidence, nutrient 2020,volume 12,issue 2,pg no :378,<https://doi.org/10.3390/n412020378>
33. Sadia Hassan,Neelam Faiza,Mohammed Adil Farooq,Chukwuebuka Egbuna ,Habib – Ur-Rehman,Ahmed olatunde (August 2020),Role of Nutraceuticals in Maternal Nutrition , Functional foods and Nutraceuticals,volume -,issue-,pg no 527-541)doi:10.1007/978-3-030-42319-3-24.
34. Williamson :CS., (21 February 2006), Nutritional requirements during pregnancy ,Nutrition Bulletin, Volume 31,Issue 1,Pg no 28 – 59, <https://doi.org/10.1111/j.1467-3010.2006.00541.x>
35. Williamson :CS.,(21February 2006),Diet related conditions during pregnancy Nutrition Bulletin ,volume 31,issue 1, pg no 28-59, <https://doi.org/10.1111/j-1467-3010.2006.00541.x>
36. Williamson:CS(21 february 2006),Food safety issues during pregnancy ,Nutrition Bulletin,Volume 31, issue 1,pg no 28-59,<https://doi.org/10.1111/j1467-3010.2006.00541.x>