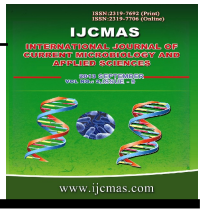
Int.J.Curr.Microbiol.App.Sci (2013) 2(9): 119-124

International Journal of Current Microbiology and Applied Sciences
ISSN: 2319-7706 **Volume 2 Number 9 (2013) pp. 119-124**
http://www.ijcmas.com



Review Article

Nutritional Scenerio in Bronchial asthma

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Keywords

Bronchial asthma; Food Allergy; Anti-oxidant; Nutrtion.

A B S T R A C T

Asthma is one of the most common chronic diseases in the world. It is associated with variable airflow obstruction, airways hyper-responsiveness and chronic airway inflammation. Increasingly, research has moved toward studying compounds in individual foods to gain a greater understanding of their specific role(s) and the mechanisms involved in the prevention and reduction of asthma disease in humans. The prevalence of disease is increasing in many countries over the recent decades and it highlights the need for a greater understanding change in traditional to a westernized lifestyle. Dietary constituents can play both beneficial as well as detrimental role in asthma. The possible association of food with asthma can be described as follows, some food nutrients such as egg, milk, soy its acts as a food allergen can cause asthma while some other such a of breastfeeding play important role in the prevention of asthma. It has been also suggested that low intake of anti-oxidative dietary constituents might be a risk factor for asthma. The role of cautions such as Food Allergy, Anti-oxidant, fruits, vegetables has been associated with a risk factor in the development of asthma and intake of fatty acids especially the omega-3 and omega-6 fatty acids play important role in case of asthma. On the basis of previous literature, it is suppose in this review what is currently treandsnutrion in bronchial asthma patients.

Introduction

Asthma is one of the most common chronic diseases in the world. It is associated with variable airflow obstruction, airways hyper-responsiveness and chronic airway inflammation. The advent of modern science led to the realizations that not only are certain nutrients essential, but also that explicit quantities of each were necessary for optimal health, thereby leading to such philosophy as dietary recommendations, nutritional epidemiology, and the realization that food can directly contribute to disease onset. In the past decades prevalence of asthma globally increases.

Several research studies have suggested this, and others are ongoing, but the association between diet and asthma

remains inconclusive. One recent study of asthma and diet showed that teens with poor nutrition were more likely to have symptoms like asthma. Those individuals who didn't get enough fruits and foods with sufficient vitamins C, vitamins E and omega-3 fatty acids were most likely to have poor lung function. Some researchers believe that it might be due to the interaction of vitamins, minerals, and antioxidants naturally occurs in food and have the beneficial effects on health . Intake of vitamins, minerals and other food supplements may help in asthma control and prevent symptoms of asthma.

Food Allergy with Asthma

Food is most important factor for cause allergic disease like asthma, urticaria , Rhinitis etc. some researchers would argue that an allergic component contributes to more than 80% of young asthmatics and approximately 40% of adult asthmatics (Plaut, 1997). It is found that about 6-8% of infants and about 1.5% of adults are allergic to food (Lessof *et al.,* 1980). Food is very important cause of asthma but is often ignored, as usual skin tests are often negative and history is often not helpful. In most of the patients, symptoms appear gradually hours or days after ingestion of the food. It has been estimated that less than 10% of asthmatics may notice that their symptoms are provoked due to certain foods or drinks (Onorato *et al.,* 1986; Yunginger, 1992). In case of Children they are more sensitive to foods than adults. A death in children, adolescents, and adults is reported due to the ingested foods, to which they were highly allergic (Yunginger *et al.,* 1988; Bernaola *et al.,* 1994). The majority of these deaths are due to severe allergy to peanut and nuts. Asthma appears to be an important risk factor for such type of allergy (Oppenheimer *et al.,* 1992).They are more Sensitive by ingestion of minute quantities of food allergens (Blanco Carmona *et al.,* 1992; Bernaola *et al.,* 1994) and even by inhalation of food allergens present air or in cooking fumes (Valero Santiago *et al.,* 1988; Koerner and Sampson, 1991; Walker and Isselbacher, 1974; Sampson, 1993)**.** The most important food allergens are milk, eggs, fish, peanuts, soy, yeast, cheese, wheat, rice and chocolates which may be causing the asthma.

The egg is one of the most allergenic among all food nutrients and even a minute amount of egg can cause asthma and the symptoms appear within minutes, including anaphylaxis. This is also seen after contact with egg through non-oral routes (Valero Santiago *et al.,* 1988; Hill, 1987). Allergic reactions may occur first time in a child who is given egg. Major allergens identified in egg white are ovalbumin, ovomucoid, and ovotransferrinand 10 other allergens of lesser importance are identified and present in egg yolk in lesser quantities (David, 1984) Patients who are very sensitive to milk allergy may react to a very small quantity of milk protein, plus minor contamination, and even inhalation of milk powder and cause asthma (Koerner CB, Sampson, 1991).Soy protein may cause As asthma symptoms and anaphylaxis (Hill, 1987; Baldo BA, Righley, 1978). It is a harmful hidden allergen. Wheat is also the most allergenic in all cereals. IgE antibodies have been present to many components of wheat. Wheat is also rich in gluten in comparison to the other grains which containing a lesser mixture of gluten and gliadin (Sutton *et al.,* 1984; Baldo *et al.,* 1975; Smith, 1989).The individuals having wheat hypersensitive may recommend using the

products of oats, rice, rye, barley and corn Peanuts are also one of the most allergenic foods and peanut allergy is one of the most common food allergies (Bernaola *et al.*, 1994; Breslin *et al.,* 1973; Ayres and Clark, 1982; Ayres and Clark, 1981).It can cause asthma and anaphylaxis and hence may be leading cause of death in many cases. A fish oils have beneficial role in asthma. It is generally recommended that patients allergic to fish should avoid all fish species (Baldo *et al.,* 1975) since the fish is one of the common causes of food allergy (Valero Santiago *et al.,* 1988) Children with tropical fish allergy had an early age of onset of clinical symptoms, male preponderance and urticaria as the most common manifestation. In addition the mainstream developed symptoms on the first exposure to the particular fish suggesting alternate routes of sensitization. Some Sulfites and sulfating agents such as sulfur dioxide, sodium bisulfite, potassium bisulfite, sodium meta-sulfite, potassium meta-sulfite, sodium sulfite used in food processing, have been found to trigger asthma (Smith, 1989) Common food sources of sulfates and other sulfating agents or dried fruits and vegetables, potatoes, wine, beer, bottled lemon or lime juice and pickled foods. All food allergens commonly affect the children under the age of six years (Sampson and McCaskill, 1985).

Anti Oxidants with asthma

Here it was observed an increase in asthma at the same time as the decline in dietary intakes of antioxidant-rich foods. Many observational epidemiological studies have related dietary antioxidants to asthma and allergic outcomes (Tricon *et al.,* 2006). Most studies have been of cross-sectional or case–control design and studies in adults predominate. These observational studies are beset with the usual problems of quantifying dietary intake, but in addition to individuals with asthma and allergies may alter their diet because of their disease. Furthermore, reduced blood antioxidant levels may be a consequence of the systematic oxidant stress associated with the inflammatory processes of asthma (Katsoulis *et al.,* 2003). The toxicity of oxidants which are caused due to cigarette smoking, air-pollution or it may be generated through an inflammatory process such as in response to allergen and viral infection is normally balanced by the protective activity of the endogenous antioxidant defense system which may be functionally dependent on an adequate supply of nutritional antioxidants. The Reactive oxygen species, released from eosinophills, alveolar macrophages, and neutrophills seem to play a key role in asthma. They may directly contract airway smooth muscles; stimulate histamine release from mast cells and mucus secretion (Troisi *et al.,* 1995). For Asthma is also associated with oxidative-antioxidative imbalance. Antioxidant status may also affect asthma risk by influencing the development of the asthmatic immune phenotype, the asthmatic response to antigen and inflammatory response during and after asthma attach (Olusi *et al.,* 1979). Flavones and Flavanoids are naturally occurring antioxidants found particularly presents in fruits and red wine and may account for protective effect associated with these fruits (Aderele *et al.,* 1985; Schwartz and Weiss, 1990; Schwartz and Weiss, 1994; Ness *et al.,* 1996)**.** These are also having the property of mast cell stabilizer (Hill, 1987). In a study the levels of antioxidant carotenoids, lycopene, lutein, β-Cryptoxanthin, α-carotene and β-carotene in whole blood was measured and it has been found that the levels are significantly lower in asthma

patients than in control (Hazi *et al.,* 2000) Overall, supplementation studies have suggested a minor role for individual antioxidants in asthma prevention , perhaps working in larger food groups instead. The toxicity of oxidants which are caused due to cigarette smoking, air pollution or it may be generating by inflammatory process. (Shukla *et al*., 2013, 2011; Kumar *et al.,* 2012).

Fruits and Vegetables with asthma

Vegetables and fruit provide a significant part of human nutrition is important sources of nutrients, dietary fiber, and phytochemicals. Though, it is indecisive whether the risk of certain chronic diseases can be reduced by increased consumption of vegetables or fruit by general public, and what potency of confirmation has to be allocated to such an association. High intake of fruits is associated with a reduced risk of decline in FEV_1, over a time (Stone *et al.,* 1989; Sunde R. Selenium, 2000; Bowie AG, O'Neill, 2000)

Fatty Acids with Asthma

Dietary fatty acids play important role in asthma. Some fatty acid play beneficial role such as intake of omega-3 fatty acids and other have a detrimental role such as of omega-6 fatty acids in asthma (Aderele *et al.,* 1985; Schwartz and Weiss, 1990; Schwartz and Weiss, 1994; Ness *et al.,* 1996). It has been suggested that a reduced ratio of omega-3 fatty acid/omega-6 fatty acid leads to high risk of asthma. It has been found that the proposed mechanisms of action of dietary polyunsaturated omega-6 and omega-3 fatty acids includes the modification of the expression of the gene as well as signal transduction pathways and production of eicasanoids, the prostaglandins and leukotrienes which are potent inflammatory mediators (Kankaanpaa *et al.,* 1997; Villani *et al.,* 1998; Simompulos, 1996)**.**

Sources of omega-3 fatty acids are fish oil, fish, shellfish and leafy vegetables. Sources of omega-6 fatty acids are vegetable fats such as margarine and processed foods. Unsaturated fatty acids in trans-configuration found in ruminant fat, dairy products and industrially hydrogenated fats and have been found to be associated with inhibitory effect on the saturation and chain elongation of essential fatty acids in precursors of inflammatory mediators and on the activity of cycloxigenase (Plaut, 1997).

In the previous study role of nutrition with bronchial asthma is very interesting. This article summarizes that foods and nutrients connected to asthma. At the present there is insufficient evidence to advise individuals with asthma, pregnant women, parents and children to change or supplement their diet in order to treat or reduce the risk of developing asthma. Overall finding underscores the importance of conducting prospective studies and clinical trials to better understand the role of diet in the etiology of asthma.

References

Aderele, W.I., S.I. Etle and Oduwole, O. 1985. Plasma vitamin C (ascorbic acid) levels in asthmatic children. Afr. J. Med. Sci. 14: 115-20.

Ayres, J., and Clark, T.J.H. 1981. Contrasting effects of ethanol on airflow in asthma. Br. J. Dis Chest. 75: 316.

Ayres, J., and Clark, T.J.M.1982. Alcohol in asthma and the bronchoconstrictor effect of chlopropamide. Br. J. Dis .Chest. 76-9.

Baldo, B.A., and Righley, C.W. 1978. IgE antibodies to wheat fl our components: studies with sera from subjects with bakers asthma or celiac condition. Clin. Allergy. 8: 109-24.

Baldo, B.A., R. Sutton and Wrighley, C.W. 1982. Grass allergens, with particular reference to cereals.ChemImmunol 1982; 30: 1-66. 34.

Bernaola, G., S. Echechipia, I. Urrutia, E. Fernandez, M. Audicana and Fernandez de Corres L. 1994. Occupational asthma and rhinoconjunctivitis from inhalation of dried cow's milk caused by sensitization to alpha-lactalbumin. Allergy. 49: 189-91.

Blanco Carmona, J.G., S. JustePicon, M. GarcesSotillos and Rodriguez Gaston, P.1992. Occupational asthma in the confectionery industry caused by sensitivity to egg. Allergy. 47: 190-1.

Bowie, A.G., and O'Neill, L.A. 2000. Vitamin C inhibits NF-kappa B activation by TNF via the activation of p38 mitogen-activated protein kinase. J. Immunol. 165: 7180-8.

Breslin, A.B.X., D.J. Hendrick and Pepys, J. 1973. Asthma and alcohol. Clin. Allergy. 3: 71.

Bush, R.K., S.L. Taylor and Nordlee, J.A. 1989. Peanut sensitivity (review).Allergy. Proc.10: 261-4.

David, T.J., Anaphylactic shock during elimination diets for severe atopic eczema. Arch. Dis. Child. 59: 983-6.

Hazi, N., B. Abalkhail and Seaton, A. 2000. Diet and childhood asthma in a society in transition: a study in urban and rural Saudi Arabia. Thorax. 55 (9): 775-9.

Hill, D.J., 1987. Clinical recognition of the child with food allergy. Ann. Allergy. 59: 141-5.

Hoffman, D.R., 1975. The specificities of human IgE antibodies combining with cereal grains. Immunochem. 12: 535-8.

Kankaanpaa, P., Y. Sutas, S. Salminen, A. Lichtenstein and Isolauri, E. 1999. Dietary fatty acids and allergy. Ann Med. 31: 282-7.

Katsoulis, K., T. Kontakiotis, I. Leonardopoulos et al., 2003. Serum total antioxidant status in severe exacerbation of asthma: correlation with the severity of the disease. J. Asthma. 40: 847–854.

Koerner, C.B., and Sampson, H.A. 1991. Diets and nutrition. In: Metcalf DD, Sampson HA, Simon RA, editors. Food allergy.Adverse reactions to foods and food additives. Boston: Blackwell Scientific Publications.pp. 333-53.

Kumar, C., R.K. Shukla, S. Kant, S. Awasthi and Bhattacharya, S. 2012. Genetic Association of glutathione-s-transferase gene Polymorphisms in Bronchial Asthma Patients: a study in northern India. Inter. J. Biol. Pharma. Res. 3(4): 502-506.

Lessof, M.H., D.G. Wraith and Merrett, T.G. 1980. Food allergy and intolerance in 100 patients, local and systemic effects. Q. J. Med. 49:259.

Monteleone Ca., and Sherman, A.R. 1997. Nutrition and asthma. Arch. Intern. Med.157: 23-4.

Ness, A.R., K.T. Khaw and Bingham, S. 1996. Vitamin C status and respiratory function. Eur. J. Clin.Nutr. 50: 573-9.

Olusi, S.O., O.O. Ojutiku and Jessop, W.J. 1979. Plasma and white blood cell ascorbic acid concentrations in patients with bronchial asthma.Clin.Chim.Acta. 92: 161-6.

Onorato, J., N. Merland, C. Terral, F.B. Michel and Bousquet, J. 1986.Placebocontrolled double-blind food challenge in asthma. J.Allergy. ClinImmunol. 78: 1139.

Oppenheimer, J.J., H.S. Nelson, S.A. Bock, F. Christensen and Leung, D.Y. 1992.Treatment of peanut allergy with rushimmunotherapy. J. Allergy. ClinImmunol. 90: 256-62.

Plaut, M., 1997. New directions in food allergy research. J. Allergy. ClinImunol.100: 7.

Sampson, H.A., 1993.Adverse reactions to foods.in Allergy: Principles and

Practice, Middleton E Jr, Reed CE, Ellis EF. Eds. 4th ed. Mosby, St. Louis, pp. 1661.

Sampson, H.A., and McCaskill, C.C. 1985. Food hypersensitivity and atopic dermatitis: evaluation of 113 patients. J Pediatr 1985; 107: 669-75.

Schwartz, J., and Weiss, S.T. 1990. Dietary factors and their relation to respiratory symptoms. The Second National Health and Nutrition Examination Survey. Am. J. Epidemiol. 132: 67-76.

Schwartz, J., and Weiss, S.T. 1994. Relationship between dietary vitamin C intake and pulmonary function in the First National Health and Nutrition Examination Survey (NHANES I) Am. J .ClinNutr. 59: 110-4.

Shukla, R.K., A. Tilak, K. Chandan, S. Kant, B. Mittal, A. Kumar and Bhattacharya, S. 2013. Association of CYP1A1, GSTM1 and GSTT1 gene polymorphisms in lung cancer susceptibility in a northern Indian population. Asian Pacific. J. Cancer. Prev. 14 (5): 3345-3349.

Shukla, R.K., S. Kant, S. Bhattacharya and Mittal, B. 2011. Association of Genetic polymorphism of *GSTT1*, *GSTM1* and *GSTM3* in COPD Patients in a north Indian population. COPD: J. Chronic Obstru. Pulmon. Dis. 8(3): 167–172.

Simompulos, A.P., 1996. The role of fatty acids in gene expression: health implications. Ann. Nutr.Metab. 40: 303-11.

Smith, T., 1990. Allergy to peanuts (editorial). BMJ 1990; 300: 1354. 36.

Steinman, H.A., 1996. "Hidden" allergens in foods. J. Allergy. Clin.Immunol. 98: 241-50.

Stone, J., L.J. Hinks and Beasley, R. 1989. Reduced selenium status of patients with asthma. Clin.Sci. 77: 495-500.

Sunde, R., 2000. Selenium. In: Stipanuk M, editor. Biochemical and physiological aspects of human nutrition. Philadelphia: Saunders.

Sutton, R., J.H. Skerrit, B.A. Baldo and Righley, C.W. 1984. The diversity of allergens involved in bakers asthma. Clin. Allergy. 14: 93107.

Tricon, S., S. Willers , H.A. Smit et al., 2006. Nutrition and allergic disease. Clin. Exp. Allergy. Rev. 6: 117–188.

Troisi, R.J., W.C. Willett, S.T. Weiss, D. Trichopoulos, B. Rosner and Speizer, F.E. 1995. A prospective study of diet and adult onset asthma. Am. J. RespirCrit. Care. Med.151: 1401-8.

Valero Santiago, A., P. Amat Par, J. SanosaValls, P. Sierra Martinez, A. MaletCasajuana and Garcia Calderon, P.A. 1988. Hypersensitivity to wheat fl our in bakers. Allergol.Immunopathol. 16: 309-14.

Villani, F., R. Comazzi and De Maria, P. 1998. Effect of dietary supplementation with polyunsaturated fatty acids on bronchial hyperreactivity in subjects with seasonal asthma. Respiration. 65: 265-9.

Walker, W.A., and Isselbacher, K.J. 1974. Uptake of macromolecules by the intestine: possible role in clinical disorders. Gastroenterol. 67:531.

Yunginger, J.W., 1992. Lethal food allergy in children. N. Engl. J. Med. 327: 421-2.

Yunginger, J.W., K.G. Sweeney and Sturner, W.Q. 1988. Fatal food induced anaphylaxis. JAMA. 260: 1450-2.