

Original article

Onion and garlic induction of severe allergic reactions: sparse reporting cases

Somia Gul¹, Saba Javed Hussain²

Abstract:

Background: Allergic conditions strides by food sensitization and has lousy impact on the immune system of individuals and has also provokes IgE antibody that spearhead the activation of inflammatory mechanism. The aim of this current research is to evaluate the effect and the preponderance rate of symptoms appearance in garlic and onion allergies. **Methodology:** The cross sectional study was conducted among general population (N=200) of Karachi from January 2017 to October 2017. **Result:** Through current study it is revealed that only 50 out of 200 personals showed significant results. Diverse type of symptoms used to appearance in individuals suffering with onion and garlic allergies and it is importantly notifying that some genetic correlation is supposed to exists in these individuals for transmit of these allergies. **Conclusion:** Onion and garlic both are esoteric allergies, these allergies rate are increasing in our population and patients suffered from very annoying symptoms including some fatal conditions also. Genetic relation is another link of developing these allergies. Limited data has been reported yet but it should be further investigated to evaluate multiple other factors contributing to these allergies.

Keywords: Allergy; food sensitization; IgE; onion and garlic allergies

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Introduction:

Food allergy is exemplify by the National institute of allergy and infectious diseases expert panel that any inimical effect comes due to exposure of given food by the stimulation of immune system¹ There are enormous symptoms of clinical and immunological adverse effects links to food allergies¹. Food allergies can be overwhelms by skipping the specific culprit food which is responsible for the food allergies². Initially hypersensitivity reactions are developing that demonstrates the clinical symptoms and it vary from cell mediated reactions or from IgE mediated reactions such as pruritis, urticaria, flushing and angioedema³.

In spite of the antecedents effect of food allergen contacts the GIT mucosa whilst the target site

affected just outside the GIT mucosa by the allergic phenomenon. Those patients who suffered from food allergies may experience diarrhea, nausea, abdominal pain and vomiting as an instant hypersensitivity mechanism but also experiences fainting and unconsciousness⁴. By inhaling foreign particles and menace of allergic food there is cross allergies flourish by the activation of IgE mediated allergies in geriatrics and in growing age. By arousal of IgE antibodies there is array of allergic reactions evokes due to various food exposure⁵. Cross reactive allergen develops local, mild and systemic reaction⁶. Skin prick testing and determination of specific IgE in-vitro has deems the sensitization in individual. Risk of systemic reactions may aid to foresee by diagnoses. The oral challenge test have used to predict allergy if we do not have full flash history⁷.

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Allium sativum (Garlic) is susceptible to develop allergy and appertain of family Alliaceae. There is a case reported in which when the fresh garlic applied on the skin as the occlusive dressing. It motives the various other allergic reactions like (urticaria, contact dermatitis, angioedema (pemphigus, anaphylaxis and photoallergy)⁸.

Allergic contact dermatitis could be developed by garlic whereas main culprit in garlic which causes such kind of horrendous effects are due to diallyldisulfide, allicin and Allylpropyl disulfide. There are scant cases have been reported in literature for garlic allergy whereas there was one case reported in which when the woman applied fresh garlic on her skin she felt very sharp and intense pain because of increase pain perception⁹.



Figure 1. Garlic burn on the left side of face of patient.

Whereas the diallyldisulfide has tenacious effect among all of them and it is act as a heat sensitizer so it causes burning of skin¹⁰. There is another case reported in which patient took garlic as a home remedy for relieving toothache and placed its cloves in the mouth (buccal) and leave it for overnight and on the next morning she developed ulceration and burn injury caused by garlic in that specific region., but the diagnoses were made according to history that was taken by patient¹¹.

Food sensitization could be possible by aid of multiple biological tests constitutes as RAST (radioallergosorbent test/ radio allergo immuno specific test) techniques use for detection of specific IgEs basophil activation technique (BAT or FAST)¹². Amidst IgE test has been used to detect allergic manifestation in individuals due to its cheap cost and its availability. There have been a scarce clinical data reported of multi-detection assays on those individuals who are suffers from cross reactivity's (CR) or have shown false positive tests to pollens or latex, whilst RAST test showed its positive effect to veggies allergic patients¹³. Food sensitization should be judge in-vivo by skin prick-tests it shows it has

warm association to present clinical symptoms of patients. In spite of IgE test do not show any solid outcomes of initial line of diagnosis. Despite of other biological test standardized oral challenges have been used for the diagnosis of food allergy whilst RAST technique used to analyze and masked allergens in foods. Whereas these are also use for the screening of basophil activation, assays for leukotriene LTC₄ release (CAST) and detection of immune system and fecal IgEs assay are used¹⁴. There had been a data reported in which (RAST) Radio-allergo sorbent test was used to find out the garlic and onion specific IgEs antibodies immune CAP analyzer.¹⁵

A case of a woman has been reported who suffered with onion (raw/uncooked) allergy just by sniffed its aroma and felt nasal pruritis and went into panic attack. She had also been observed dyspnea, nausea, generalized pruritis, fatigue, watery eyes, throbbing pain, state of dilemma and syncope etc and still resist after 1 hour of its inhalation⁸. For 30 min after exposure of onion and garlic she experienced phantasmia and from onwards for few months altered perception of smell felt by her¹⁶

Another allergic case had been reported of garlic in which woman had severe erythematous rashes on her both fingertips when she had peeled bulbs of garlic and on next day that rashes disseminated into hyperkeratosis and in sub-ungual area (between the fingers) and it became fissured. Negative test came from RAST test whereas main culprit (diallyl disulfide), of garlic induced allergic contact dermatitis was also found negative by using patch test. Irritant contact dermatitis/garlic burn is another garlic induced rashes that lead to pemphigus vulgaris and acantholysis¹⁷.

Literature review reveals that raw garlic induced anaphylaxis represented symptoms of dermatitis, rhinitis, asthma, and urticaria. Sodium dodecyl sulfate-polyacrylamide gel electrophoresis (SDS-PAGE) and Western blot techniques were used to determine the protein extract of raw and cooked garlic and had a high amount of IgE found in raw garlic which is responsible of anaphylaxis whilst its allergens breaks down during heating¹⁸. A case has been reported of onion induced asthma after ingestion of high content of SO₂ in Spanish pickled onions and lessens pH that developed asthma¹⁹. In 2012, a case was reported of onion allergy in which a man came in emergency department with symptoms of chest tightness, weakness, and Skin erythema with generalized pruritis on body. All of these symptoms

developed in about 20 minutes just after the intake of onions at dinner. Whereas that patient was allergic to garlic, onions and green onions but the patient whenever suffered from the symptoms previously he took fexofendine for its resolution. On physical examination he got urticaria with raised body temperature and swelling on face, extremities and trunk^{20,21}.

An alternative hypothesis is suggested that the development of eczema on the skin having environmental exposures that has many allergens existence²². Reported evidence has revealed that there is a closet genetic link of developing allergy as the mother has passed of about half of its genes to baby instead of that other non-genetic factors also contributes it²³. Whereas our chore assumes that there may be the closet link of genetic association or hereditary link of allergies development. Food allergies or IgE linked allergies perturbs the quality of life in suffered patients due to their bizarre symptoms experienced²⁴.

Case reported in literature in which a woman complains about throbbing headache, anaphylactic shock, dysthartia, phonobhobia, photophobia, soreness of tongue, syncopal sensation, palpitation, nausea, felt tingling effect around her mouth all of these symptoms still reside there after 1 hour of exposure and patient also suffered from pallinomia after exposure of garlic and onion for 30 minutes. The scant aroma of raw onion is the source of developing burning sensation in throat and nasal irritation upon their exposure.²⁵

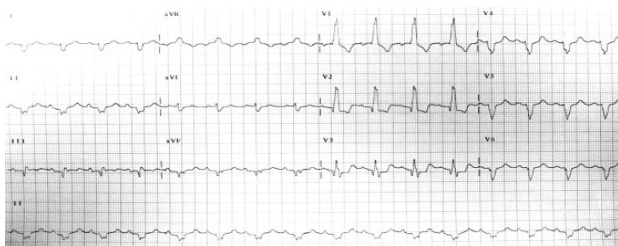


Figure 2: Post-PCI ECG showed Q wave in inferior lead.²⁸

There was another case of onion allergy reported in 2012 in which patient was admitted in ER (emergency dept.) due to skin erythema, chest tightness, dizziness, weakness and generalized pruritis. Patient had known history of garlic and onion allergy. Due to onion anaphylactic shock and cardiogenic shock was developed in patient and for the cardiogenic shock its emergency treatment

was used to restore the hemodynamic stability and used intra-aortic balloon pump(IABP) and PCI (percutaneous coronary intervention) whereas the ECG revealed the myocardial infarction. Laboratory data revealed the normal level of eosinophil level up to 0.4% and high leukocytes (16,800/ μ L). After the administration of methyl prednisolone the generalized rashes disappeared and but the chest congestion still there because the patient had a history of cardiovascular disease. And the patient had hypotension with blood pressure up to 89/51 mmHg) so, the temporary pacemaker was used for the cardiogenic shock management²⁶.

Onion extract act as an antibacterial against *Bacillus sp*, *enterobacter sp*, *staphylococcus sp* and *E.coli*²⁷ Due to the presence's of many types of alkyl tio-sulfinate, flavonoids, phenols and alkaloids make onion antimicrobial agent²⁸. The onion is not only used for medicinal purpose instead it is also assumes toxic if left over prolong time in peeled form. If we have observed the color of raw onion (in peeled form) i.e. left for few period of time, it changes its color and not capable to add it in foods and it gives harm if used after left it for prolong period of time but no case of its toxicity reported yet officially.

The main concern of current study is to evaluate the prevalence of onion and garlic allergies among general population and to find out main symptoms, indications, and diagnosis and treatment options of these allergies.

Methodology:

It is randomized study in which we took 200 persons (n=200) from general population of Karachi, whereas 50 of them had showed the positive results of having onion and garlic allergy but those who did not show any symptoms of garlic and onion allergy had suffered from ginger, eggs, vegetable and whole grain allergies. The study was conducted from January 2017 to October 2017 in which the general population was comprehended. In this assessment we have assessed the garlic and onion allergies in those patients in which we have inspect the symptoms that they experienced when they get exposed, we have garner the information about the diagnostic tools either they did test them or not, also estimate that the connection of these allergies from their families or relative along with the occurrences of symptoms that sensed by the patients.

Ethical clearance: The study was approved by ethics committee of Jinnah University for Women, Karachi.

RESULTS:

Our current study’s results have been represented in the following graphs.

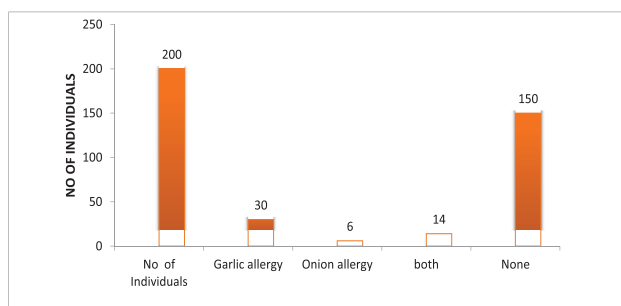


Table No 1: Ratio of Onion and Garlic Allergy in General Population

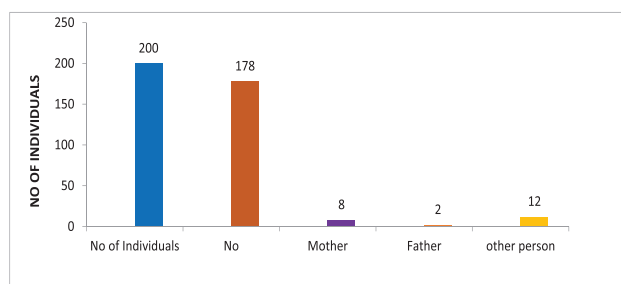


Table No 2: Genetic Association to Develop Onion and Garlic Allergy

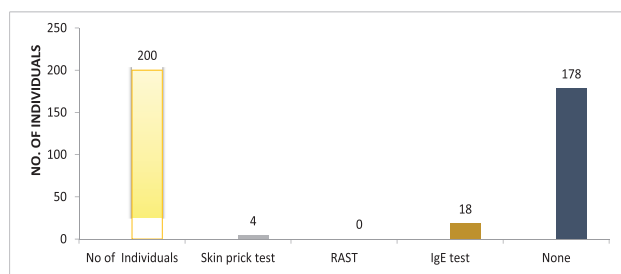


Table No 3: Allergic Test Used to Diagnose Onion and Garlic Allergy

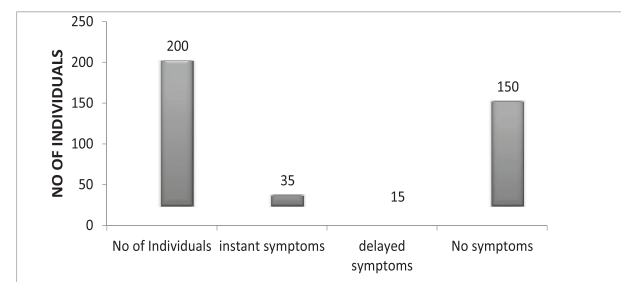


Table No 4: Appearance of Symptoms in Patients suffering with Onion and Garlic Allergy

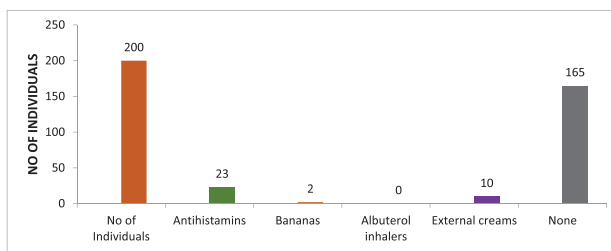


Table No 5: Medications most commonly utilized by Allergy Suffered Patients

Table No 6 : Appearance of Symptoms Revealed with Onion and Garlic Allergies;

Symptoms of Onion and Garlic Allergy	Individuals Suffered From Onion Allergy	Individuals Suffered From Garlic Allergy	Individuals Suffered From Onion And Garlic Allergy
Lip swelling	2	6	1
Rashes or dry skin flakes	0	4	3
Fatigue	3	4	1
Mental disorientation	2	0	0
Hives	0	7	0
Bloating	0	3	1
Diarrhea	0	1	0
Nausea	4	4	0
Puffy eyes and face	1	7	3
Fainting	5	1	0
Mouth blisters	0	1	0
Burning sensation on the mouth	0	0	0
Anaphylactic shock	3	4	0
Breathing problems	1	1	1
Finger bed swelling	0	6	3

Discussion:

There are many food allergies that the people suffered from a long time ago. Some are attentive and some are not whereas egg allergy, nuts allergy, milk allergy, cereals allergy and allergy from artificial juices are the common allergies found among population. Onion and garlic allergies are the unusual allergies which is considered as untouched and very few of them in general population are aware about it but whom suffered from them have very severe symptoms appearance whilst there is very few data reported

on these allergies but it exists in many peoples. So, we ruled out the study by took those personal who have these allergies by took (n=200) subjects where only 50 had significant results and we have found the diverse variety of symptoms in them and data was collected from January 2017 to October 2017.

Food linked allergies arouse the immune system of the person and its outcome seen in about 8% in young children's and adults also impinge up to 2% and its provenance rises up day by day.²⁹

Onion and garlic allergies do not have any age restriction^{30,31}. The symptoms of onion and garlic allergies are quite similar to other diseases like (chronic skin allergies or asthma).³²

The diagnostic test (IgE or skin prick test) is performed by many subjects. The diagnostic test helps to inspect the allergic conditions and by the aid of diagnostic test the presences of the antigen in blood also testified but unfortunately the apprehension of these both allergies is quite deficient among population.

Although the pervasiveness has been rise up in the Pakistani population from last few years. The major complexity comprises of anaphylaxis that is IgE (antibody) induced that provokes immune system along with that Urticaria also witness. Some peoples have suffered from eosinophilic esophagitis and enterocloitis induced by food proteins. Many food allergies are associated to allergic antibody i.e. IgE Allergies can be deviate from epidemiology, in age or belonging to different race

Hypersensitivity reactions are mostly seen on the body of allergic suffered patients when their skin having direct environmental exposures that has many allergens existence. There is a closet genetic relationship in patients who have onion or garlic allergies Whereas our chore estimates that there may be the closet link of genetic association or hereditary link of allergies development as mentioned in (Table no: 2) instead of those other non-genetic factors also contributes it. Food allergies or IgE linked allergies perturbs the quality of life in suffered patients due to their bizarre symptoms experienced.

The onion and garlic allergies have very nasty effects in the subjects. There preponderance rate is now quite high in general population So, to find out the intensity of symptoms in the particulars we conducted the study among general population in which we had

found that all of the individual had showed different symptoms in which the rashes, mouth blisters and nausea are the common instant appeared symptoms whereas bloating, rashes, malaise are the delayed symptoms and are mentioned in Figure no 4. Both of the allergies (Garlic and onion) grants as typical allergies but very few of the individuals have had their diagnostic test to done and scrutinize these allergic reactions. IgE test, RAST and skin prick tests is the most common test used to detect skin allergies but very few of the patients had tested skin prick test. Most of the suffered patients had chronic allergies. The IgE level (antibodies) in the suffered personals has rise up by taken their blood samples as its frequency described in Table no 3.

In Karachi, Pakistan many hospitals offers skin prick test and IgE test included Aga khan hospital, Jinnah post graduate hospital, Dow university hospital, Shaukat Khanum Memorial Cancer Hospital & Research Centre, Shifa International Hospitals etc

Although the manifestation deviates in peoples i.e. mention in the chart of symptoms (Table 6). In our current study we have accomplished that individuals who are suffered from garlic allergy have lip swelling (6 in no), rashes (9 in no) and hives (7 in no) appearances on their body, felling fatigue (4), puffy eyes and face (7). Very few of them suffered from anaphylactic shock (4 in no). Whereas the individuals who have onion allergy suffered from lip swelling (2 in no), fatigue (3 in no), altered mental status (2 in no), felt nausea (4 in no) and even felt syncope (5 in no) and anaphylactic shock (3 in no).

While the treatment is being used by many subjects either to resolve it symptomatically or locally. These allergies are associated to inflammation so antihistamines creams or drugs are commonly used not only to treat inflammation but also for burning sensation around there mouth or on lips too. Through our study we have found that the symptoms of both allergies have highest ration on developing rashes (hives) on body whilst malaise and puffy eyes also considers as the major symptoms.

Through current study it is revealed that it's a rare disease although, it is an untouched disease which needs attention to treat it. The victims who suffered from these allergies experienced severe symptoms. Few subjects have suffered from acute symptoms whilst others have showed delayed symptoms

whereas the treatment requirements are quite less in which the severe symptoms appeared. The treatments for local symptoms are quite less used and even does not consider by the subjects if they are not severe. Very few of the studies have been reported but it should be conducted on a large scale to find more parameters linked to onion and garlic allergies.

Conclusion:

It is concluded through our chore that onion and garlic allergies are prevalent conditions but they are not preeminent conditions, although both are insubstantial allergies whose outcomes are worse but it remain prevail in scarce population and we can infer that it might has interlink genetically. Further investigation is strongly recommended for

prevalence, prevention and specific treatment options regarding these allergies.

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Authors's contribution:

Data gathering and idea owner of this study: Somia Gul and Saba Javed

Study design: Somia Gul

Data gathering: Somia Gul and Saba Javed

Writing and submitting manuscript: Somia Gul and Saba Javed

Editing and approval of final draft: Somia Gul

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