

Development of Questionnaire as tool to analyze the factors affecting immunity

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INTRODUCTION

Immunity is the ability of an organism to resist diseases and thus is a protective mechanism of the body¹. An antigen is considered to be a foreign molecule which is detected by the defense mechanism of the body and initiates the immune response. Depending upon the efficiency of the immune system, the antigen is then removed from the body by different pathways. Physiology and mechanisms of functioning of organs, cells and chemical pathways play important role in the proper functioning of immune system². The system basically works depending upon two mechanisms related to either innate or adaptive immunity.

The Innate immunity implies to the first line defense mechanism that respond to the infection immediately or within few hours of host being attacked by a pathogen³. It acts upon the different barriers such as anatomical, physiological, phagocytic, and inflammatory barriers etc. whenever there is any pathogenic attack, the intracellular receptor present around recognizes the pathogens and immediately triggers the cellular innate immunity for response⁴. In case if there is insufficient innate immunity (some pathogens that crosses the defense mechanism of the innate immunity) then, the adaptive immunity gets activated. As it is adaptive immunity so it takes few days to activate the immune system for the effective response to eradicate the pathogen and its effect from the system⁵. Adaptive immunity is composed of two types, humoral and cellular immunity. Humoral immunity is considered as the production house of the immunoglobulin's (Igs) and germinal center reactions along with formation of memory B-cell which leads to the activation of T-helper 2 (TH2) cells and production of TH2 cytokines. Various immunoglobulin cells are having variable function for extracellular pathogens such as bacteria⁶.

Present research studies have reported the fact that due to either weak immunity or related problems, the spectrum of the Primary Immunodeficiency Disorder (PID) is expanding. Primary immune deficiencies are due to innate dysfunctioning of the immune system and are mainly genetic in etiology.

The immunity related problems can be lethal and can degrade the living standard of healthy life therefore, as a matter of concern the government also keeps a check on control and maintenance of the immunity related problems. In order to achieve the goal, the governments in many developed and developing countries have health departments taking care of the same. With the help of various surveys and introducing the supplements for improving health and immunity health and human services are provided to people for raising lifestyle⁷⁻¹⁰. Unfortunately, the services doesn't reaches to all group of people in many poor countries and developing countries too. There are multiple ways to keep oneself healthy and sound by

ensuring good immunity, one out of which is with good nutrition which can keep one strong. But, it has been observed that combination of various factors actually help to decide the state of good or weak immunity¹¹⁻¹².

2. REVIEW OF LITRATURE

2.1. Physical Factors Affecting Immunity

The different physical factors plays a major role in the immunity imbalance. There are several attributes which are categorized under this category which leaves prominent marks related to immunity of any person ¹³:

A. Environment

B. Lifestyle

- Sugar intake
- High Cholesterol
- Lack of sleep
- Alcohol
- Lack of exercise
- Dehydration
- Smoking
- Obesity
- Drugs

C. Nutritional Deficiencies

(A) Environmental Factors

Environment plays an important role in affecting the immunity. In the recent studies it has been found that the body's defenses are influenced by the environment around us. If a feature is hereditary, identical twins will be more likely to share it than sibling twins. After that these were allowed to spend time with variable environmental conditions. As the genetic makeup was similar but the environment had played bigger role in the creating differences in the immunity. These kind of studies signifies the variation in the immunity which can be created by the environment^{14- 16}.

(B) Lifestyle

Lifestyle is a factor that affects the immunity with considering different factor such as Sugar intake, High Cholesterol, Alcohol, Lack of exercise, Lack of sleep, Drugs, Smoking, Dehydration are the causes of the poor immunity.

• **Sugar intake:** Sustained and extreme intake of refined sugars and extremely processed foods containing artificial additives, and preservatives can deteriorate the immune system by suppressing the specific T-cell action. It is considered that most Americans eat around 5 ounces of sugar daily, the immune systems are

being concealed regularly and makes the person susceptible to develop unceasing circumstances. A study published in the American Journal of Clinical Nutrition has proved that the capacity of white blood cells to destroy bacteria is considerably hindered for up to 5 hours after eating 100 gm of sugar ¹⁷.

- **High cholesterol:** Elevated blood cholesterol, triglycerides and bile acids slow down much immune cell action, thereby suppressing the capability to fight simple bacteria ¹⁷.
- **Lack of sleep:** As by having less rest, it has been proved that the people who lacks of enough sleep (those getting 6 hrs. or less) or the workers who do night shifts are more likely to suffer from common cold and flu. The immunity fighters get affected due to condensed ordinary killer cell action, suppressed interleukin-2 formation and amplified levels of circulating pro-inflammatory cytokines. So to manage this type of imbalance one should take Pascoflair that helps us to relax and ensure a restful sleep. Without proper sleep, the immune system doesn't get a option to rebuild, and it becomes weak. The lack of sleep also affects the secretion of melatonin by imbalancing the biological clock ¹⁷⁻¹⁹.
- **Alcohol:** Excess alcohol consumption leads to damaging of the immune system by dropping role of T and B lymphocytes, natural killer cells, monocytes and macrophages. This happens due to decreased inflammatory response and altered cytokine production that causes translation. Alcohol also causes the decreased consumption of white blood cells. Alcohol in high volume is unhealthy for the immune system. Although alcohol intake has been found to have positive effect & it is normally to have occasional glass of red wine. But it also indicates that it can reduce the development of adult brain cells by as much as 40 percent ¹⁷⁻²⁰.
- **Lack of exercise:** It has been revealed to repress immune action explicitly with infections. During modest exercising, blood flow increases which improves the process of eliminating noxious waste out of body. The enhanced blood circulation also increases the circulation of antibodies and white blood cells that are significant for combating off infections. Based upon a research, inactive people takes twice as many sick days in four months when compared to people who walked efficiently almost every day ^{17,19}.
- **Smoking:** Smoking is one of the factor found to be associated with stroke. A stroke or a brain attack is a sudden impairment in the functioning of the brain. Even exposure to smoke passively can affect the immune system. It can generate an asthma attack and worsen symptoms in people with allergies. The immunity of people who smoke has been estimated to be weaker as compare to non-smokers²⁰.
- **Obesity:** obesity is also a leading cause of the weak immunity. Because it affects the capability of white blood cells to proliferate, generate antibodies and stops inflammations ²⁰.
- **Drugs:** Some prescribed and non-prescribed drugs are chief toxins that can harm the immune system. Drugs like cytostatic and cortisone have found to cause the immune imbalance ²¹. Extreme utilization of

antibiotics and medicament to combat cold and fever has also found to weaken the immunity.

Researchers have reported that certain people consuming antibiotics had compact levels of cytokines that are the hormone messengers of the system. Therefore, excessive or unjustified medication can also give negative effect to immunity¹⁹⁻²¹.

(C) Nutritional Deficiencies

Improper nutrition: The people who takes usual diet are appears to be healthy but still due to improper balance of Protein and other nutrients which are required for immunity that affects cell- mediated immunity. Therefore, the malnutrition conditions are treated by supplementing the patient with vitamin and mineral. Vitamin C helps to fight against bacteria's and further can help to provide anti-viral and anti-bacterial activity by forming antibody. Zinc helps to improve cell mediated immunity and thymus functions.¹⁷.

2.2 Psychological factors affecting immunity

Stress, Anxiety and Fear: Stress is the major cause behind illness, so it is not an astonishing fact to know that psychological stress also increases the receptiveness to viral infection. The study has presented that the subjects open to the elements of stress showed augmented infection rates from 74 to 90%. It also leads to the release of histamines, which can activate severe bronchial constriction in asthmatic.¹⁹. Stress can make people more susceptible to colds and the flu, as well as additional serious health problems like heart disease, diabetes and other diseases. Anxiety and fear pressurizes the entire body, hormonal levels and the manner of defending by the immune system.¹⁸⁻¹⁹.

3. AIM OF STUDY

Aim: To develop questionnaire to analyze the factors which can affect the immunity of an individual.

Objectives:

1. To describe the components and functions of immune system and factors which can lead to difference in the immunity of various subjects.
2. To involve the people from pre-determined variability in population type, areas and profession to participate in the survey.
3. To examine the effect of physical, psychological, social and other relevant factors on immunity and related problems.
4. To make the participants aware about importance of immunity and suggestions to improve it.

4. Material and methods

4.1. Study Area

The area of this study can include participants from both rural and urban areas, to analyze if immunity has

any relation related with area of residence. The participants can be selected from diverse background with variable occupation and lifestyle. All the above mentioned aspects can be considered to ensure the possible variability of responses to conclude for better results.

4.2. Response collection

The survey can be conducted among variable age groups residing in different areas to collect the response related to immunity and related problems. For the collection of response the questionnaire has been developed. The response can be collected after the Informed consent of the participants either in person or online.

4.3. Data Collection and Analysis

Although population size can be kept large as per the outcome of the study. The volunteers should be assured of confidentiality and objective of study should be explained to the participants along with the importance of their contribution in the survey. Their willingness to participate in the survey should also be asked. The analysis then can be made by considering the responses to achieve the objective to find factors affecting immunity.

Development of Questionnaire to collect responses from population

PART-A

S.No	Questions	Chose answer	Remarks
1	Do you think you take diet, which is rich in vitamins like vitamin A, C, E (Green vegetables, Fruits, Almonds etc.)?	Yes	
		Sometimes (How often)	
		No	
2	Do you take any probiotic like Yoghurt or any other supplements other than diet?	Yes	
		Sometimes (How often)	
		No	
3	Do you like having foods such as cucumber, nuts, beans which have soluble fibres?	Yes	
		Sometimes (How often)	
		No	
4	Do you consume soft drinks? Is it occasionally more often?	Yes	
		Sometimes (How often)	
		No	
5	Do you exercise daily for around 30 minutes? If more or less than kindly mention the exercise and time duration.	Yes	
		Sometimes (How often)	
		No	
6	Is your weight normal as per body conditions or you are suffering problems related being underweight/ Overweight?	Yes	
		Don't Know	
		No	
7	If you have to evaluate the consumption of water on daily basis, how much water do you drink?	Less than 2Litre	
		2-4Litre	

		More than 4Litre	
8	Do you smoke or indirectly/ passively involved in exposure to cigarette smoke?	Yes	
		Sometimes (How often)	
		No	
9	Do you take care of the personal hygiene like cutting nails, washing hands before meals, bathing etc?	No	
		Sometimes	
		Yes	
10	Is there any chronic disease like diabetes, hypertension or any other in the family history?	No	
		Don't Know	
		Yes	

PART-B

S.No.	Questions	Chose answer	Remarks
1	Do you remain in state of stress related to studies/Job often?	Yes	
		Sometimes (How often)	
		No	
2	Do you fall ill when in state of stress? (Headache, stomach pain, fever, Hypertension etc.)	Yes	
		Sometimes (How often)	
		No	
3	Do you think that after falling ill, the recovery is fast when you take break from work/study as compared to when you don't?	Yes	
		Sometimes	
		No	
4	What kind of state of mind do you keep while handling daily challenges?	Cheerful	
		Stressed	
		Constant (No emotions)	
5	Have you felt depression/ mood swings/fear because of various tasks and challenges in life?	Yes	
		Sometimes (How often)	
		No	
6	Do you feel any sleep disturbances?	Yes	
		Sometimes (How often)	
		No	
7	Is there any emotional challenge or state of confusion which makes you to feel low emotionally and physically?	Yes	
		Sometimes	
		No	
8	Are you able to think clearly and logically, and do you find the memory functions well?	No difficulty	
		Slight difficulty	
		Considerable difficulty	
9	Have you ever feel stressed if yes, then tell have you suffered	Yes	

	from long illness?	Sometimes (How often)	
		No	
10	Do you think Taking decision in positive way improves your stress or relieves from stress?	Yes	
		Sometimes	
		No	

INSTRUCTIONS: Please tick (✓) mark the number which best describes the frequency or severity of your complaints. Leave the question blank if it does not apply to you. 0 = RARELY OR NEVER EXPERIENCE SYMPTOM

PART-C

S.NO.	Questions asked	0	1	2	3	Score
1.	Do you get frequent sore throat?					
2.	Experience frequent cold or runny nose?					
3.	Easily get infected or susceptible to infections?					
4.	Problem related to late wound healing?					
5.	Feel fatigue or get tired easily and doesn't feel relieved even after sleep?					
6.	Do you have hair growth related problems or uncontrolled hair fall?					
7.	Have you caught four or more infections an year in the ears, lungs, skin, eyes, oral cavity, or private parts?					
8.	Do you feel chronic muscle and joint aches?					
9.	Cannot tolerate perfume or smoke?					
10.	Do you feel numbness/tickling or tremors in any body parts?					
11.	Are there Recurrent digestion problems?					
12.	Do you go through mood swings often?					
13.	Suffer from respiratory problems related to Asthma or breathing heavily					
14.	Weight fluctuations of 2-3 Kg in one day accompanied by puffiness in face/ankles/fingers					
15.	Do you get allergic reactions or are allergic to most of the food items?					

Total Score:

Total Score	Immunity Status	Total Score	Immunity Status	Total Score	Immunity Status	Total Score	Immunity Status
0	No problem, Good	1-15	Mild problem, Sensitive, can be improved	15-30	Moderate Problem, Needs attention, seek medical help.	30-45	Severe Problem, must get medical help.

CONCLUSION

From the developed questionnaire and from observed response analysis, the conclusion can be drawn clearly about certain factors which can affect the immunity of any person. The significance of these factors although has to be determined statistically and can be an extensive part of this project. As depending upon the constrains related to selected population and time, the present study can be extended for response

collection, analysis and representation of results graphically. Furthermore, the survey can also help to spread awareness among the populations about the causes and problems related to immunity. Although the factors were selected depending upon the availability of theoretical consideration but, these were found to implement in practical aspects as well.

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