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Impact of Covid-19 outbreak on dietary diversity and food security in rural and urban areas of Durgapur, West Bengal

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Abstract
In 2020, Covid-19 outbreak spread rapidly all over the world and caused fatal consequences on people's health. Adequate nutrition was required to boost the immune system & fight against Covid-19. Therefore, the knowledge, attitude & practice (KAP) towards Covid-19 prevention are most essential. The objective of this study is to assess the knowledge, attitude & practices regarding dietary diversity & food security of people before & during the Covid-19 outbreak. A cross sectional study was conducted over a period of three months with a pre tested validated questionnaire among 360 people of rural & urban areas of Durgapur. It is observed that 33% of rural people & 22% of urban people have lack of knowledge & attitudes regarding nutrition. But in practice they changed their food pattern during covid situation. The consumption of different food groups like pulses (7%), nuts (6%) & fruits (7%) were increased for urban population whereas for rural people mainly the consumption of vegetables (5%) were increased during covid situation in comparison to pre covid situation. As there is a lack of knowledge & attitudes, so proper nutrition education may potentially improve the practices to prevent covid-19 & other lifestyle diseases.

Keywords: Covid-19, knowledge, attitude, practice (KAP), nutrition, food security

Introduction

COVID-19 has spread widely & rapidly from Wuhan city to other parts of the world and threatened the lives of many people. By the end of January 2020, the World Health Organization (WHO) announced a public health emergency of international concern and called for the collaborative effort of all countries to prevent its rapid spread. Later, the WHO declared COVID-19 as a "global pandemic" (Hanawi *et al.*, 2020) [1]. The Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) is the source of COVID-19. It had severe consequences both in developed countries and developing countries. Low and middle-income countries (LMIC) face a more significant crisis considering the resource gap and pressures on health care systems (Li *et al*., 2021) [2]. Everyone is susceptible to the zoonotic illness but the immune system of the body plays a key role in battling the virus when it enters the body (Folasire *et al*., 2021) [3]. As a result, death rates among the elderly and those with certain illnesses that render them immune compromised are at higher risk than the younger & healthy population (Rothan and Byrareddy, 2020) [4].

According to clinical research, a healthy person's immune system may successfully combat the virus in a few of days. All cell types required for developing the immune system to heal an infected patient were seen to exhibit a complete immunological response (Chowdhury *et al*., 2020) [5]. Foods that can booster the immune system can be consumed during this virus outbreak from a nutritional perspective (Omar *et al*., 2020) [6]. Depending on the virus, different symptoms are shown in patients. Common cold symptoms, fever, a dry cough, shortness of breath and breathing difficulties are just a few examples. Unlike SARS, coronavirus can damage other essential organs in addition to the respiratory system. In severe cases, gastrointestinal issues such diarrhoea, acute respiratory failure, coagulation problems and renal failure have been recorded and may require dialysis (Marzban *et al*., 2022) [7].

There have been reports of changes in people's eating and cooking habits, food safety knowledge among consumers, attitudes towards food & hygiene and food-purchasing behaviour as a result of the COVID-19 outbreak (Chenarides *et al*.,2020; Faour *et al*.,2021) [8, 9]. According to reports, direct human interaction and respiratory droplets produced by sneezing or coughing are the virus's main means of spread. Contrary to popular perception, the COVID-19 virus is not foodborne (WHO, 2020) [10]. However, the entire event centred around food could serve as a means of transmission. For instance, an infected person could pass the virus to the food package, the utensils, the table tops, the money, the equipment, or even through a simple hand shake (CDC, 2021) [11].

Maintaining good health requires eating a balanced, nutritious diet that includes all the necessary minerals. Maintaining an effective immune response requires a balance of micronutrients (Alsan *et al*, 2021). Healthy eating has long been known to improve immunity and decrease illness. Numerous studies have demonstrated that a deficiency in some nutrients decreases the immune response and raises the risk of illnesses or their exacerbation (Luo *et al.* 2020; Kundu *et al*., 2021) [13, 14].

Medical professionals frequently employ the knowledge, attitude, and practice (KAP) paradigm. According to the model, a person's knowledge and attitude decide their practices (behaviours). In order to comprehend how the public perception about COVID-19 and how they react to it, which is related to public adherence, the assessment of KAP

in terms of COVID-19 is necessary (Mansoorian *et al*., 2021) [15]. Addressing this requirement, this paper tries to assess the knowledge, attitude & practices regarding dietary diversity & food security of people before & during the Covid-19 outbreak.

The remaining portion of this article is structured as follows: section 2 creates a summary of literature and their findings. Section 3 highlights the objectives of this research. The methodology is discussed in section 4. Based on these techniques, result & discussion are described in section 5 & section 6 respectively. Finally section 7 provides a conclusion on the overall work.

Summary of literature review

Authors	Topic	Name of the journal	Findings
Kundu S *et al*.	Knowledge, attitudes, and preventive practices toward the COVID-19 pandemic: an online survey among Bangladeshi residents	Journal of Public Health: From Theory to Practice	Online health education programs focusing on young people, housewives, and people with less education may potentially improve the attitudes and practices to control the COVID-19 pandemic in the long term in such a low-resource setting.
Yutong Li *et al*.	Knowledge, Attitudes, and Practices Related to COVID-19 Among Malawi Adults: A Community-Based Survey	International Journal of Environmental Research and Public Health Article	A higher economic status was associated with better KAP. A low level of KAP was detected among the population. The people faced challenges regarding a lack of necessary preventive resources and formal information channels.
Folasire O.F *et al*	Nutrition-related knowledge and attitude of practicing Nigerian medical doctors to nutrition counselling during the covid-19 pandemic 2020	Ann Ibd. Pg. Med 2021	Respondents were deficient in the knowledge of common food items containing relevant nutrients essential for boosting immunity. Hence, there is a need to encourage physicians training in nutrition and nutritional counselling.

Authors	Topic	Name of the journal	Findings
Mansoorian M *et al*.	Nutritional knowledge, attitude and behaviours regarding Coronavirus Disease 2019 among residents of Gonabad, Iran	Public Health Nutrition	Participants' nutritional attitude and behaviours regarding COVID-19, at its early stage in Iran, were average and above average. The public education provided with this regard can have affected this result.

Objectives of the paper

- To assess the knowledge, attitude & practices regarding dietary diversity & food security of rural & urban people of Durgapur before & during the Covid-19 outbreak.
- Compare the knowledge, attitude & practices regarding dietary diversity & food security of rural & urban people of Durgapur before & during the Covid-19 outbreak.

Methodology

Study design

It was a cross sectional study. The subjects were recruited from different parts of Durgapur, West Bengal through random sampling. One to one interview method was used to collect the data.

Subjects

Total 360 adults above 18 years of age were approached through random sampling. The subjects willing to share their information regarding dietary pattern, knowledge, attitudes & practices during covid 19 outbreak were included in the study.

Inclusion criteria

Adults above 18 years were included in the study irrespective of the gender.

Exclusion criteria

Person below 18 years of age were excluded as they cannot give enough information regarding the diet pattern.

Study duration

The data collection was carried out for a period of 3 months during the month of September- November, 2022.

Study tools

A pre coded, pre tested questionnaire containing 36 questions were used to collect the data.

This questionnaire included demographic details of the subjects like name, age, gender, educational qualification, occupation, marital status, annual family income, local area where they live and presence of any diseases.

In all there were 36 questions of which 14 questions were related to knowledge regarding transmission of covid 19 through food, vitamins, protein or some specific minerals are helpful or not to prevent the occurrence of covid 19, factors responsible to boost or supress immunity, knowledge regarding food components that boost immunity. Questions related to attitudes towards immunity elicit information about good immune system through consumption of healthy foods. Food security related questions (3) included worry to run out of food, whether they received any kind of social protection from government or NGOs, crop production was affected or not during the lockdown period.

Dietary diversity was obtained through a 20 item food frequency questionnaire including consumption of green leafy & other vegetables, citrus fruits, eggs, nuts, fish, poultry, red meat, vegetable oils, processed foods, refined grains, desserts & ice cream etc. The frequency of consumption of these items were coded as "0-1 times/week", "2-3 times/week", "more than 4 times/week" before & during the pandemic.

Data collection

Questionnaire administration

Before administering the questionnaire, written informed consent was taken from each participant. Those who agreed to share their perception were requested to fill up the forms. The questionnaire was administered in interview mode. If

any participant was not willing to answer any question they were free to do so. M.Sc. Dietetics & Nutrition students visited various rural & urban areas of Durgapur to collect the data during the month of September- November, 2022.

Results

Analysing the overall data the demographic information is tabulated in table-1.

Table 1: Demographic information

Characteristics	Values	
Sex	Rural	Urban
Male	72 (40%)	117 (65%)
Female	108 (60%)	63 (35%)
Age group		
18-30 years	61 (33.88%)	149 (82.77%)
31-60 years	102 (56.66%)	31 (17.22%)
Above 60 Years	17 (9.44%)	Nil
Educational level		
Below Secondary	128 (71.11%)	Nil
Higher Secondary	35 (19.44%)	25 (13.88%)
Graduation	17 (9.44%)	104 (57.77%)
Post-Graduation	Nil	47 (26.11%)
Higher qualification	Nil	4 (2.22%)
Economic level		
Low	50 (27.77%)	10 (5.55%)
Average	119 (66.11%)	141 (78.33%)
High	11 (6.11%)	29 (16.11%)

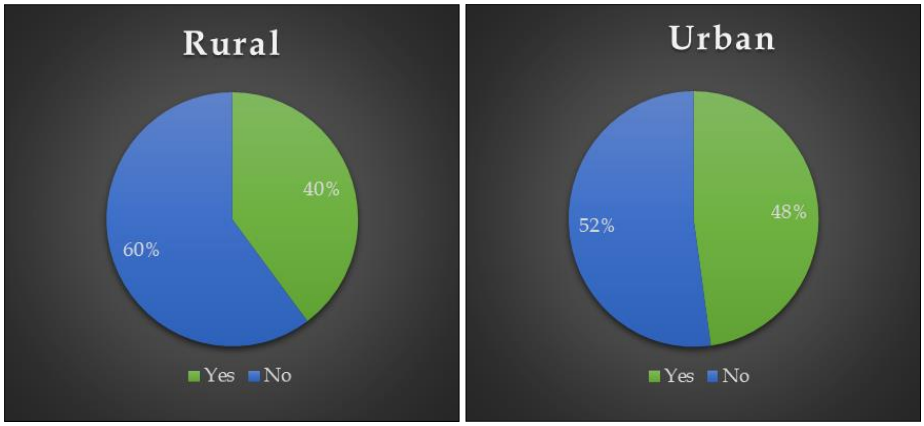

Fig 1: Can eating contaminated food transmit Covid 19?

There is no clear data available about spreading of corona virus through food but poor handling of food, improper sanitation, hygiene practices or individual could transfer the virus on to the food package, the utensils, table tops, cash, machinery or even via a simple handshake. It is observed in figure 1 that 48% urban people have the knowledge that contaminated food can transmit the virus where as 40% rural people reported to have the same knowledge.

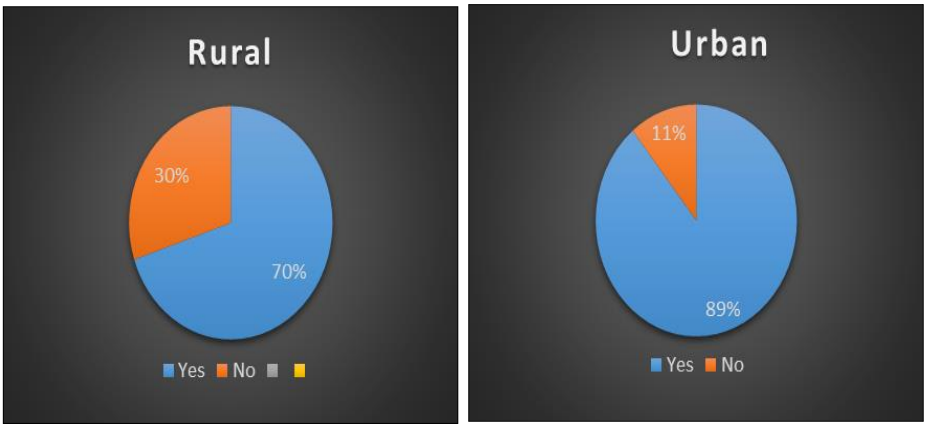

Fig 2: Does consuming food materials rich in vitamins D, B, C, A & E strengthen the immune system?

Vitamins A, C, E & B act as a powerful antioxidants. They help to scavange the free radicals to make our body toxic free. It is observed in figure-2 that 70% of rural people & 89% of urban people have the knowledge that food

materials rich in vitamin-A, B, C, D, E help to strengthen our immune system.

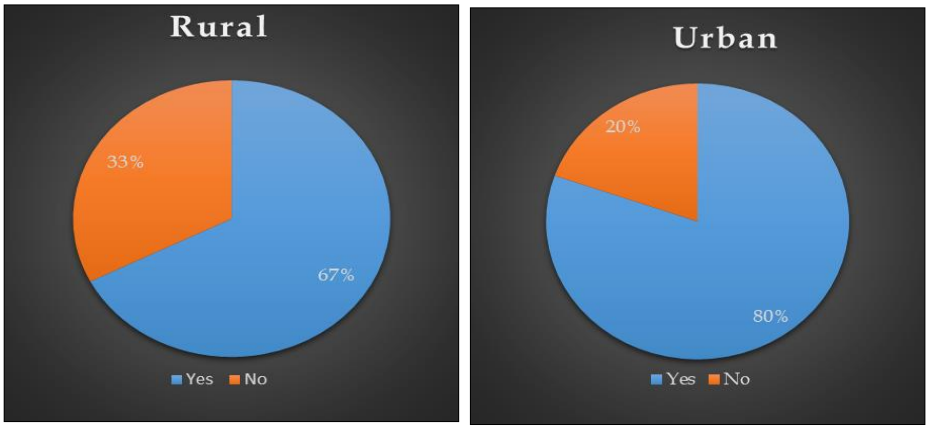

Fig 3: Does consuming Fe, Zn help to strengthen body immunity?

A low zinc status has been associated with increased risk of viral infections. Zinc has been shown to be important for skin maintenance and mucosal membrane integrity. Iron & zinc are powerful antioxidants. Figure 3 shown that 67% rural people agreed that iron & zinc help to strengthen body immunity where as for urban people the knowledge percentage was 80%.

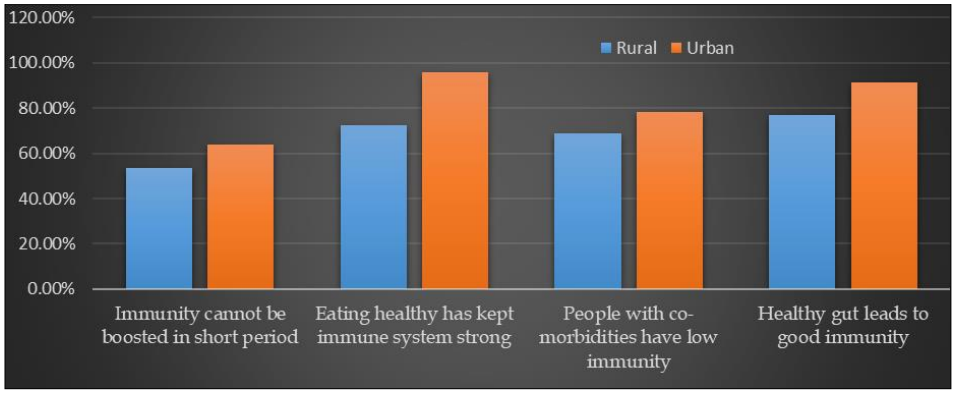

Fig 4: Attitudes towards immunity

In figure 4, attitude towards immunity is discussed for rural and urban people. 53.3% of rural people & 63.9% urban people reported that immunity cannot be boosted up in short period. Urban people (95.7%) have more knowledge that consumption of healthy food can keep our immune system strong in comparison to rural people (72.3%). 78.3% urban people believe that people with co morbidities have low immunity whereas for rural people the percentage was 68.7%. Healthy gut is more important to keep our immune system strong.

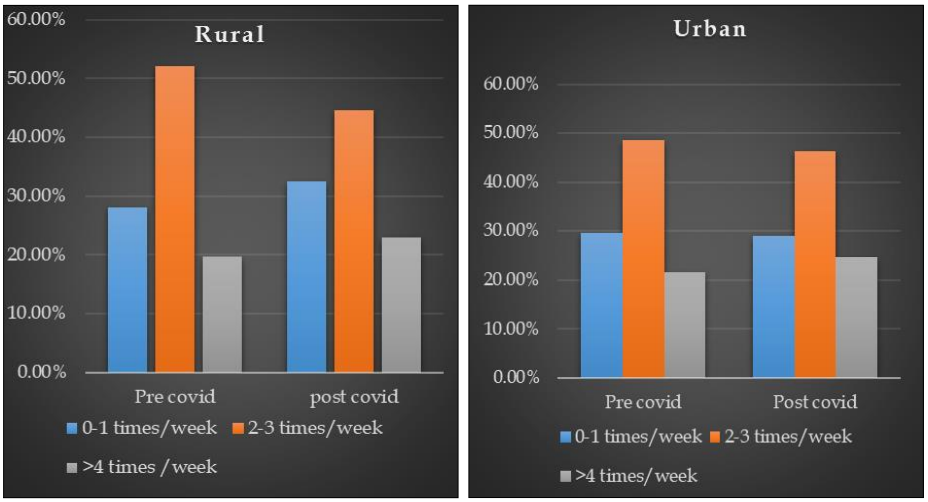

Fig 5: Practices regarding consumption of vegetables

Figure 5 highlighted about the practices of consumption of vegetables during covid time. It is observed that 6% rural people started to take other vegetables more than 4 times/week during covid time.

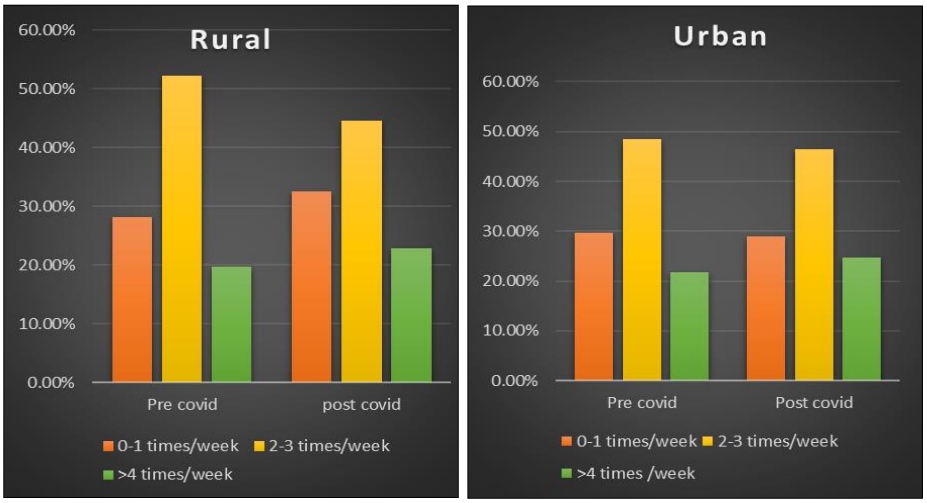

Fig 6: Practices regarding consumption of fruits

Fruits consumption was increased in the post pandemic period by 7% for urban people whereas for rural people it was 3%. (Figure-6)

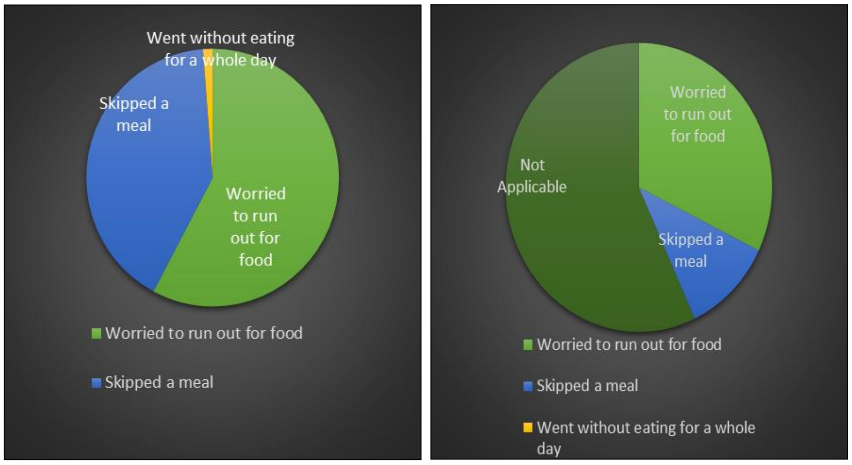

Fig 7: Food security

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" But during covid pandemic 41% of rural people worried to run out of food & 57.7% skipped a meal due to lack of adequate food (Figure-7). But in case of urban population 32% only thought to run out of food & for 57% of people it was not applicable.

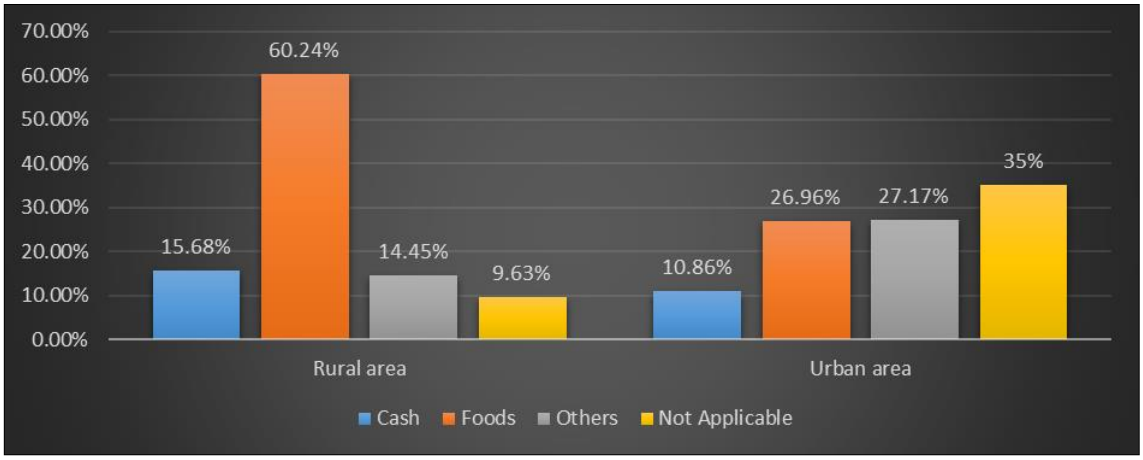

Fig 8: Assistance in cash or other

Social assistance is highlighted in figure 8. 60.24% rural people got the assistance of foods but in case of urban people the assistance of cash or foods were minimal.

Discussion

The novel disease caused by a new strain of Coronavirus called Severe Acute Respiratory Syndrome Coronavirus (SARS-COV-2) popularly called COVID-19 was firstly discovered in Wuhan city. In front of this COVID-19, the elderly population with immuno-compromised conditions faced more risk with associated greater mortality than the younger healthy population. It is reported that adequate nutrition can be vital in preventing an over-inflammatory response to SARS-Cov-2 infection. Thus, improper diet and poor health can reduce resistance to infection and increase the severity of illness. So our study assessed & compared the knowledge, attitude & practices regarding dietary diversity & food security of rural & urban people of Durgapur before & during the Covid-19 outbreak.

It is observed that 33% of rural people & 22% of urban people have lack of knowledge & attitudes regarding nutrition. But in practice they changed their food pattern during covid situation.

5% rural people changed their intake of green leafy vegetables from 2-3 times/week to more than 4 times/week whereas urban people had no change.

6% rural people started to take other vegetables more than 4 times/week during covid time.

Fruits consumption was increased in the post pandemic period by 7% for urban people whereas for rural people it was 3%.

All the data were self-reported. Only adults were considered to participate in the study. The study was conducted only in Durgapur area. So inclusion of more subjects can give better outcome.

Conclusion

Our study introduced a questionnaire in multidimensional scale with strong psychometric features on KAP regarding dietary diversity & food security before & during covid-19. This designed tool is a valid questionnaire that helps the researcher to analyse the knowledge, attitudes & practices of the subjects regarding dietary diversity & food security before & during the Covid 19 outbreak. Though there was a gap of knowledge among subjects but a certain change was observed in their attitudes & practices during pandemic. Lack of proper knowledge about diet can increase the chances of being affected by the disease & also can delay recovery. It is very important to generate nutrition awareness programme to improve the knowledge, attitude & practices of people.

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