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Original Research Article

Comprehensive assessment of elderly population in North India during era of SARS-CoV-2 pandemic

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ABSTRACT

Background: Elderly form a vulnerable population, during SARS-CoV-2 pandemic they are especially at risk due to immuno-senescence and increased number of comorbidities. The aim of this study was to assess the nutritional, physical and mental status of elderly living in urban areas of north India during the lockdown period.
Methods: A questionnaire was made in Google forms based on R-MAPP and MNA Score. The assessment was carried out using telecommunication and self-assessment Google forms.
Results: Amongst the elderly people, 91% suffered from comorbidities (e.g. hypertension and diabetes) with 37% having >2 comorbidities. The 8% of elderly were underweight, 45% were normal and 47% were overweight as per BMI. Out of total, 5% elderly were malnourished, 26% were at risk of mal nutritional and 69% had normal nutritional status. 38% of elderly observed a change in eating pattern during lockdown which included eating healthier food for many and increased snacking in some. The water intake was below 1.5 litres in 29%, 1.75-2.5 litres in 47% and >2.5 litres in 24% of the study population. Twenty percent suffered from high levels of anxiety and stress during this lock down period. Five percent of these had very high levels of stress or anxiety. Some were in the extreme range. Twenty six percent complained of loneliness.
Conclusions: The elderly population needs to be actively monitored for physical and mental wellbeing during lockdown periods by applying algorithms that effectively use telemedicine as a tool for regular check-ups.

Keywords: Elderly, Mental health, Nutrition status, SARS CoV-2

INTRODUCTION

Many countries at present are dealing with the second and third wave of SARS-CoV-2 pandemic. This besides putting stress on the healthcare system has affected many social and economic structures of society. The wide spread lock down have led to loss of job income and has severely deterring effect on mental and psychosocial wellbeing of people. The elderly population is a vulnerable group in which the existing co-morbidities and frailty compound the effect of the present situation created by SARS-CoV-2 pandemic.

The SARS-CoV-2 virus was first detected in Wuhan, China in the year 2019 and during the first quarter of the year, cases slowly began to rise. The virus spread all over the world with an alarming number of cases reaching beyond 60 million at the end of 2020 as per WHO coronavirus dashboard which displays that India alone has already contributed to 10 million cases.[1] Large number of people affected by SARS CoV-2 have mild symptoms like anosmia, cough, cold that resolve within a week but are highly contagious and are spreading fast in the community. Majority patients improve spontaneously within 2 weeks. However some develop neurological complications, 5 to 10% develop pneumonia. Also fatal complications of cytokine syndrome, increased thrombosis leading to stroke, MI and multiorgan dysfunction are being increasingly reported.[2] Higher rates of mortality have been reported in elderly in almost all

geographical areas of the world. These are related to immune senescence and frailty in elderly which is compounded by comorbidity like diabetes, hypertension, COPD, coronary artery disease and intake of multiple medications etc.[3,4]

This had led to lock down for a period of 3 months across the country, followed by restricted activities. Special advisory has been issued for elderly by government to stay indoors postpone elective surgery and practice social distancing. This has added mental and psycho-social stress on geriatric population which already has problems like impaired cognitive function, frailty impending fear and loss of job, loss of spouse, morbidity and dependence.

Staying confined in one's own house has definitely reduced the risk, however the present situation and lock down has led to neglect, loneliness, isolation, depression, anxiety.

To assess physical and mental status of the urban elderly population during lockdown a cross sectional observational study was conducted. Telecommunication, Google forms and scoring systems were used to remotely gather information to see how the present situation has affected their physical, nutritional and mental health.

METHODS

A cross sectional observational study was conducted during the covid-19 lockdown on 100 Indian elderly (>60 years) belonging to the urban middle class.

It is difficult to perform in-person health check-ups during lockdown conditions which is why a questionnaire was prepared (on Google forms) adapting from R-MAPP3 (refer to supplement for questionnaire). The nutrition status was assessed using a mini nutrition assessment scale. Questions were divided into groups' like- nutrition, hydration, muscular strength, mental health, general health and statistics focusing on any change in these parameters during the past 3 months of lockdown period. Interviews were taken via phone call/video call from urban middle class families.

The questionnaire allows one to know about the elderly person along six vital dimensions. Their general anthropometric information (such as height sex, weight age), questions about their diet and eating habits, questions assessing muscle strength and tone, mobility, questions pertaining to hydration and fluid intake, their medical history and medications being consumed. Along with these parameters their mental health status and interaction with people was also assessed.

After this questionnaire was filled, they were assessed and graded for level of nutrition using mini nutritional assessment scale. Special note was also taken of the measures that people were taking to maintain or enhance their immunity to protect themselves during the pandemic. This included nutritional supplements, micronutrients, various spices and roots believed to enhance the immunity.

RESULTS

From a total of 100 elderly people surveyed, who had spent the last 3 months at home during lock down imposed due to pandemic. These included 49 females and 51 males with age ranging from 60 to 92 years, median age of 72 years. None of the people surveyed have any past history of contracting SARS-CoV-2 infection.

Table 1: Elderly people with history of comorbidity, people taking medications.

Co-morbidity	No. of people with history of co-morbidity	No. of people taking medication for it
Diabetes	43	37
Hypertension	67	53
Thyroid	16	16
Asthma	4	4
Low BP	4	4
Cholesterol	4	5
Prostate	2	4
Heart problems	9	8
CABG	2	2
Acidity	16	1
Ulcer	1	1
Arthritis	16	3
Osteoporosis	2	1
Cancer	6	6
Migraine	1	1
UTI	1	1
Seizure	1	1

The comorbidities were present in 91 percent of the surveyed population. 67% suffered from hypertension, 43% were diabetic and 16 were arthritic. Many were being treated for gastritis, ten were hypothyroid, 3 were asthmatic and 3 were hypotensive. One each suffered from seizure and UTI. Nine suffered from coronary artery disease and six had CABG, three had enlarged prostate. Almost all were taking medications for their ailments along with supplements. Thirty seven percent had more than one comorbidity majority were diabetic with hypertension followed by hypertension with hypothyroidism (Table 1).

Physical attributes

The weight ranged from 48 kg to 100 kg. Their BMI varied from 13.5 to 28. The BMI <18.5, underweight was present in 8 elderly, 45 had BMI in normal range 18.5-<25 and 47 had BMI 25-30 suggesting overweight. The

57% elderly had difficulty in climbing stairs, 31% faced difficulty in lifting moderate weight and 7% had difficulty in swallowing food. Many had some level of difficulty in walking either due to pain in leg, arthritis, breathlessness or fatigue. The majority did no or light exercises about 5% did moderate exercise (Table 2).

Table 2: Physical attributes and mental health of elderly in the study.

Weight range (in kg)	No.	BMI	N	Physical strength	Yes	No/sometimes
46-50	2	<18.5	8	Climbing stairs	33	24
51-55	8	18.5-<25	45	Lifting moderate weight	25	6
56-60	8	25-<30	47	Difficulty in swallowing	5	2
61-65	24	>30	Nil			
66-70	16					
71-75	19					
76-80	15					
81-85	2					
86-90	0					
91-95	2					
96-100	4					
Mental health dimension distribution in the study group						
Mental status	**No. of people who reported as high**			**No. of people who reported as very high**		
Stress	15			5		
Anxiety	15			5		
Loneliness	21			5		

Table 3: Nutritional status and MNA score of elderly in the study.

No. of meals in a day	No. of people			Fruit consumption		Beverage	No.
5	1	**Vegetarian**	74	**Daily**	74	Tea	73
4	4			Twice a week	5	Coffee	17
3	82			Occasionally	4	Milk	16
2	13	**Non vegetarian**	26	Thrice a week	5	Green tea	18
				Four times a week	4	Juice	8
				Five times	4	Lemonade	3
				No fruits	4	Other	3
Change in diet since lockdown began		Yes	38	**MNA score range**			**No.**
				<17 (malnutrition)			5
		No	62	17-23.5: at risk of malnutrition			26
Water intake (in litres)		**No.**		>24: normal nutritional status			69
1.5 litres and below		29					
1.75-2.5		47					
2.75 and above		24					

Nutrition

The study population belonged to northern states of India and have a typical north Indian diet which includes 3 to 4 meals. The 74% were vegetarian and 26% had one or another non-vegetarian source. Their diet typically constituted chapati (made of wheat flour), rice, pulses, vegetable and curd. Besides the main meal, the majority consumed fruits on a daily or weekly basis. Majority consumed fruits daily. The calorie intake varied from 1200 to 3600 kcal per day. The MNA score was calculated for nutrition status and 5% scored <17 which is indicative of malnutrition, 26% scored between 17-23.5 indicative of at risk of malnutrition and 69% had MNA score >24 considered as normal nutrition. All had beverages and the commonest was tea followed by coffee, some preferred green tea, milk and juice (Table 3).

Change in eating patterns was observed by 38% elderly. This included eating home cooked food, less non vegetarian food or less frequent meals. Some experienced an increase in appetite with more intake of food and increased snacking during lock down. The water intake

was below 1.5 litres in 29%, 1.75 to 2.5 litres in 47% and >2.5 litres in 24% of the study population.

Seventy percent of elderly during lock down were taking supplements, Ayurveda, homeopathic drugs, spices or roots to enhance their immunity. These included vitamin C, zinc tablets, Vitamin D and B complex, ayurvedic drug, a mix of spices and herbs (Kadha) and spices (Table 4).

Table 4: Immunity boosters taken to enhance immunity.

Supplement/alternative therapy/spices and roots	Elderly taking
Calcium	23
Vitamin D	19
Multivitamin	11
B complex	7
Vitamin C	20
Zinc	10
Iron	3
Ayurvedic medication	17
Homeopathic medication	2
Turmeric	8
Kadha	22
Spices	7
Tea	7
Ginger	2
Pepper	4
Tulsi	5
Lemon/citrus fruits	11
Other fruits	6

Mental health

Twenty percent suffered from high levels of anxiety and stress during this lock down period. Five percent of these had very high levels of stress or anxiety. Some were in an extreme state. Twenty six percent complained of loneliness (Table 2).

DISCUSSION

Elderly are a growing and vulnerable population in times of the pandemic. Research has shown that they are more likely to be responsive towards telemedicine. This is especially important during a lockdown where telemedicine is one of the most easily available resources. There has been significant research on how SARS-CoV-2 virus is more lethal in people with pre-existing comorbidities as they enter the critical stage faster.[5]

A large fraction of India's elderly population suffers from diseases such as diabetes, hypertension, arthritis, and heart problems. It makes them more vulnerable to getting infected and having a less promising prognosis.[6] In our study comorbidities were present in 91 percent of the surveyed population. 67% suffered from hypertension, 43% were diabetic and 16% were arthritic. Thus study group is vulnerable and needs active preventive measures to save from fore seen morbidity or mortality in event of acquiring covid. An adequate nutrition, diet rich in protein, micronutrients, good hydration and probiotics have been documented to boost immunity and prevent severe complications of SARS-CoV-2 infection.[7]

The problems pertaining to elderly include reduced appetite, dysphagia and sarcopenia.[8]

In addition to this lock down during the pandemic has increased mental stress which is compounded by loneliness and inability to move about.[7]

In previous studies in elderly in Indian subcontinent a significant number were found to be malnourished or at borderline risk of malnutrition.[10-12] In our cohort of elderly population the MNA score revealed that 5% were malnourished, 26% were at risk of malnutrition and 69% had normal nutrition. The majority of the population was vegetarian taking a typical Indian vegetarian diet. In this diet the carbohydrate intake can be on the higher side of the dietary recommendations which leads to high risk for diabetes.[13] Thirty eight percent people reported change in eating habits during the lockdown period which included eating more of home cooked food, whereas few others had increased appetite leading to weight gain. The hydration status is as important as the nutrition. In our study the water intake of the majority was lower than daily recommended levels, 29% drank below 1.5 litres, 47% 1.75 to 2.5 litres and 24% >2.5 litres. All had beverages and the commonest was tea followed by coffee, some preferred green tea, milk and juice.

Adding vitamin C, vitamin E and even certain herbs, spices and roots have shown to have anti-oxidant and anti-inflammatory effects. Vitamin D has shown to act via ACE receptors which are main proprietors of SARS CoV-2 infection. Also increasing dietary fibres can lead to production of short chain fatty acids which have anti-inflammatory effect.[14,15] Seventy percent of elderly during lock down were taking supplements, ayurvedic, homeopathic drugs, spices or roots to enhance their immunity. These included vitamin C, zinc tablets, Vitamin D and B complex, ayurvedic drug, a mix of spices and herbs (Kadha) and spices (Table 4).

Our study in elderly population is an example to follow and adopt on a large scale by public health services. It has been researched that poor nutrition can impact the immune system, the elderly should be frequently screened for malnutrition and hydration status. Timely intervention by providing nursing care, education, emotional support, in between finger food, food fortification can help. The supplements like protein supplements and probiotics have shown to have a positive impact on health and immunity status of elderly. They should also be encouraged to do keep fit exercises at home.

An Italian survey about change in eating habits and lifestyle was conducted during the early part of lockdown. The survey and its questionnaire was centred on people's adherence to the Mediterranean diet, their lifestyle habits and the changes brought upon them during lockdown. Mediterranean diet consists of fresh fruits, vegetables, nuts, legumes and fish. It was found that the majority of people adhered more to this diet during the lockdown.[16]

In our study we found that elderly were adhering to a typical Indian vegetarian diet.

Another Italian study conducted on elderly who are infected with SARS-CoV-2 shows that the severe complications in elderly people are more directly related to a person's physiological age than their chronological age. This is determined more so by their comorbidities and functional status. It talks about the close relation between sarcopenia and malnutrition in the elderly which makes for a poor clinical outcome.[17]

In our study sarcopenia was found in 31% and malnutrition was found in 5% with borderline nutritional status in 26% of elderly during lockdown.

An Indian study compared the nutrition of elderly at home and residing in old age homes. They revealed that the majority of elderly at old age homes were either malnourished or at the risk of malnutrition. The elderly at home were found to be more well-nourished. They recommended a 'permanent screening centre' in old age homes for detection of nutritional deficiency.[11]

There is a greater risk of malnutrition among the elderly population living in old age homes, which seems to be worsening with the advancing age. Asian countries mostly follow a joint family system and the elderly live together with the rest of the family. With an increase in nuclear families in Asia, the elderly come at a survival disadvantage.

A study conducted about the lifestyle and eating habits of elderly from a rural background. It was revealed that the elderly in question were either malnourished or at high risk of malnutrition. The findings of the study suggest that the existing programmes for the welfare of the aged must focus on health by reducing risky substances and promoting healthy practices and adding values in the health care system by geriatric medicine section in rural area and bringing out opportunities for the growing elderly population.[12]

It has been demonstrated that there is increased protein and calorie requirement in elderly and more in the event of acute or chronic infections like SARS-CoV-2. They particularly need high amount of protein and essential aminoacids.[17]

A tele programme connecting all elderly in a community can be done to update health status using remote apps like R-MAP to reassess the health and mental well-being of most experienced members of our society.[3] ESPEN guidelines have provided very clear guidelines and recommendations for nutrition and hydration in geriatrics.[8] The possible outlay of a public health programme by the use of artificial intelligence can be created on such recommendations which can be integrated in the existing health care system. An algorithm is suggested by us for such programmes (Figure 1). This can be tried and will prove most helpful in the present circumstance of pandemic and country wide lock down.

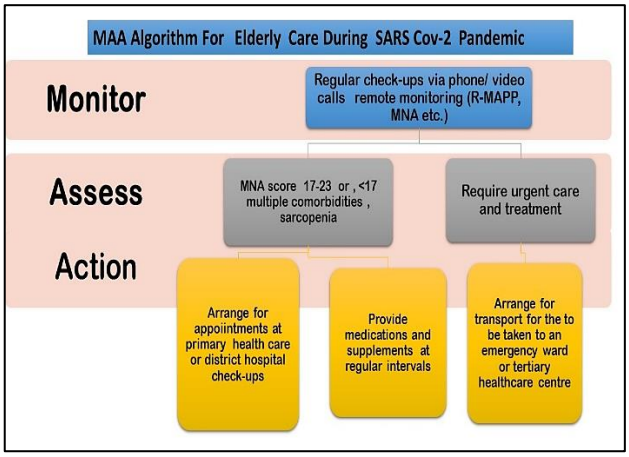

Figure 1: Algorithm for elderly care during SARS-CoV-2 pandemic.

CONCLUSION

The geriatric population in any community or country is one of the most vulnerable populations. They are therefore at high risk of morbidity and mortality by SARS-CoV-2 virus. A proactive and preventive action is required of elderly to improve their nutritional, hydration and emotional wellbeing.

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