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A study on Quality of Life in Indian adults – Outcomes and role of nutrition

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ABSTRACT

Understanding factors influencing the Quality of Life (QoL) of people has been a subject of growing interest, as measurement of QoL includes subjective dimensions of general well-being of individuals. The present study is aimed at assessing the QoL as perceived by Indian adults and arriving at a cutoff for categorizing QoL. A cross-sectional survey was conducted on a stratified sample of 2762 adults in 8 cities representing 4 geographical zones of India - North, South, East and West. WHOQoL-BREF was self-administered to measure QoL while a structured questionnaire and an app-based 24-hr diet recall were used to assess perceptions and practices about health and nutrition that affect QoL. The QoL scores were computed in accordance with WHO manual and cutoff value was arrived based on percentage mean score to categorize respondents as having poor and good QoL. Descriptive statistics were reported as mean, standard deviation, percentage for the scores and other variables, while a two-sample t-test was performed to compare the QoL scores for independent variables. The QoL percentage mean score of 68.5 for the sample population was obtained which was considered as a cutoff for categorizing QoL. It was observed that nearly half of the respondents (46.2%) had poor QoL. Men had a better QoL score than women while older adults had lower scores than younger adults ($P < 0.01$). Being employed and higher socio-economic status positively impacted the QoL. From the 8 cities, Mumbai had the highest percentage of respondents with good QoL. Almost all respondents agreed that nutrition plays an important role in having good QoL, however, protein and micronutrient intake showed a huge gap. In conclusion, QoL assessment could be an important tool towards holistic approach to health and can assist individuals and healthcare professionals to take impactful steps towards improving QoL of the population.

Keywords: *Quality of Life, Indian population, Nutrition, Protein, Physical health, Healthcare, Awareness, WHOQoL-BREF*

1. INTRODUCTION

Quality of Life (QoL) encompasses a multi-dimensional concept of an individual's general well-being status in relation to their value, environment, cultural and social context. As per WHO's definition of QoL, it is an "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" [1]. QoL goes beyond the traditional definition of health and hence, issues related to QoL in patients or people have persistently gained more importance among healthcare professionals [2]. With an increase in life expectancy, higher emphasis is placed on a better QoL for maintaining long-term good health. QoL and well-being have been a focus not only for management of chronic and life-threatening diseases but also for population in general across different stages of life [3, 4, 5].

The ongoing crisis from the SARS-CoV-2-caused COVID-19 pandemic has turned out to be distressing to human society in terms of economy, health and lifestyle [6]. The pandemic has put a restriction on our ability to cope with events transforming our daily habits [7]. The restrictions many nations have applied on their human, health and economic resources have shown that this pandemic impacts people's lives financially [8], psychologically [9, 10, 11, 12] and physically [6, 13, 14] thus affecting the overall quality of life (QoL) [15, 16]. Diet, physical activity, sleep, and mental wellbeing have been greatly impacted due to various factors during the pandemic [14]. All these factors in turn affect the QoL [17].

The lock-down restrictions have led to reduction in physical activity of most people. Losing lean body mass through inactivity are undesirable yet innate concerns resulting from an imbalance between muscle protein synthesis and breakdown [18]. Such an imbalance can aggravate in stressful periods. Low mobility has shown to negatively affect the QoL independent of age, which can imply that even young people are susceptible to the effects of lower mobility [19].

In the current scenario, with both nutrition and physical activity being negatively impacted, appropriate steps must be taken to ameliorate the impact on overall QoL. Adequate physical activity is desirable for anabolic stimulus. However, with limited physical activity and exercise in the current scenario, ensuring adequate protein intake could help maintain lean body mass. Studies have also shown that amino acids from protein offer an effective acute anabolic stimulus in healthy young and elderly subjects [19, 20]. Amino acids from protein stimulate muscle protein synthesis at rest and during exercise recovery [21]

Indian diets are mainly cereal-based which makes it challenging to meet the protein needs both in terms of quantity as well as quality. The PRODIGY study [22] conducted in 2015 highlighted that 9 out of 10 people had a diet deficient in protein, irrespective of the gender and the socio-economic group and over 90 percent Indians were unaware of their daily requirement for protein. Similar results about protein deficient Indian diets have been reported by many researchers previously [23-28].

Further to this, lack of adequate nutrients in the diet have resulted from an increase in ‘emotional eating’ especially ‘comfort foods’ that are rich in sugar and fat. A considerable increase in snacking, with midnight snacking becoming more common and higher consumption of processed, unhealthy snacks has been reported in current pandemic times [29, 30]. A recent study reported that 84% of the urban Indian households had low Food Diversity Scores for most of the food groups [31]. Reduced availability of fresh produce has also contributed to dependence on highly processed and convenient foods that are mostly not considered as healthy. All these lifestyle factors put together could have led to increase in BMI of Indians compared to pre-pandemic times [32].

Diet and lifestyle, the two factors playing a key role in QoL perception, are modifiable risk factors that can easily be improved with appropriate guidance and intervention strategies [33]. Therefore, an improvement in nutritional status stands to be an influencing factor on the overall QoL. An early assessment is important for improving QoL. Clinical researchers have long used QoL assessments as part of their studies and it has been successfully used in general population as well [34, 35].

The WHOQOL-100 quality of life assessment tool was developed by the WHOQOL Group to allow detailed assessment of each individual facet relating to quality of life applicable cross-culturally. WHOQOL-BREF, an abbreviated 26 item assessment has been developed to provide a short form quality of life assessment that looks at Domain level profiles from WHOQOL-100. This tool evaluates QoL in varied target populations whether it be about the physiological condition, a age-group, culture or any factor that is expected to influence their physical, psychological, and social wellbeing [35]. The WHOQoL (WHO Quality of Life Assessment), is based on a multi-dimensional notion that includes elements namely physical and psychological health, social relationships, environment, and general overall quality of life [1]. Assessing QoL could increase awareness among people about their overall well-being, their commitment towards holistic health and could also assist the healthcare professionals to devise most suitable interventions for the population.

The present study was undertaken to assess the QoL as perceived by Indian adults during the pandemic. The study attempted to arrive at a cutoff for categorizing QoL for Indian population based on the obtained QoL scores. Besides this, the study also assessed perception about the factors that affect the QoL - mainly physical health, nutrition and particularly protein in the target population. To our knowledge, this is the first report that attempted to assess and arrive at cutoff for QoL among Indian adult population. Findings from such a study can help the health and wellness sector to devise strategies that will positively impact the quality of life of Indians during and beyond the present pandemic times.

2. MATERIALS AND METHODS

Study design and Sampling

The study design comprised of cross-sectional survey to assess quality of life of Indian adult population. The study population included adults in the age group of 30–50 years across India. To select representative sample with minimum sampling error, the size of the population of our target group in each city and zone was estimated. A stratified sample of 2750, with minimum sampling error of 3 to 4% was arrived to gauge the response at a city and zonal level. Purposive sampling was used to recruit the subjects in this survey based on their willingness to participate in the survey. Considering possibility of case rejections, a total of 2762 subjects both males and females between the age group of 30-50 years and socioeconomic class (SEC) A and B (Fig 1) from 8 cities viz. Delhi, Lucknow, Mumbai, Indore, Hyderabad, Chennai, Kolkata and Patna, representing 4 geographical zones- North, South, East and West were recruited in the study.

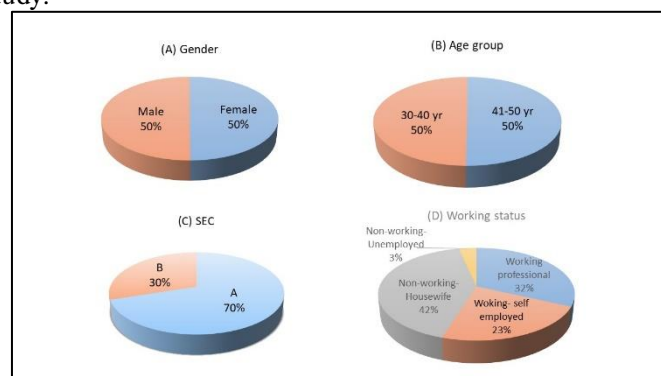


Fig. 1: Distribution of study population under categories. (A) Gender-wise; (B) based on age-group; (C) Socio economic class (SEC); and (D) based on the working status.

Study tool

The data were collected using the following 3 tools:

World Health Organization Quality of Life Questionnaire abbreviated version (WHOQoL-BREF) [36]: The WHOQoL-BREF is designed to measure a person's perception of their quality of life. The tool has been tested in multiple languages, cultural groups and disease populations and has shown good discriminant validity, content validity, internal consistency and test-retest reliability. WHOQoL-BREF questionnaire that comprised of 26 questions about the individual's perceptions of their health and well-being over the previous two weeks was self-administered. Of these 26 questions, two individual questions evaluated overall quality of life and satisfaction of the person with their own health and the remaining 24 questions focused on four domains viz. physical health, psychological, social relationships and environment. All the questions were rated on a 5- point Likert scale (5 being the highest score and 1 being the lowest) by the survey respondents. Higher scores in each of the domains corresponded to greater perceived QoL.

Permission to use the WHOQoL- BREF to conduct the survey and publish findings was obtained well in advance.

A structured questionnaire: Survey respondents were asked 4 key questions using a structured questionnaire, mainly focusing on their perception and awareness on impact of physical health, nutrition and protein rich nutrition on quality of life (Table 3).

24-hr diet recall: Dietary intakes of the survey respondents were analyzed using an app based nutrient calculator that uses 24-hr diet recall. This nutrient calculator has been developed by Nutricia International Pvt Ltd in association with Fitterfly Technologies Pvt. Ltd. The nutrient calculator recorded food intake in a 24-hr recall and analysed nutrient intake in comparison with the respective RDAs (Recommended Dietary Allowances). The RDAs for nutrients based on ICMR/NIN (2010) [37] and IOM values for the nutrients for which Indian RDAs are not established were used. The nutrient values of the foods in the database of this app were based on IFCT (Indian Food Composition Tables), NIN 2017 [38].

The survey respondents were requested to visit the website (www.protinex.com) and click on the 'Immuno Nutrient calculator' to enter the demographic details and dietary intake (major and minor meals) of the previous day. The nutrient intake report was generated at the end, that mentioned the current intake against the RDA for each survey respondent.

Data collection procedure

The survey was conducted between May 2021 to June 2021. A global market research agency that abides by the MRSI and ESOMAR's Code of ethics was engaged in conducting the survey. All the respondents were first telephonically contacted to check their eligibility to participate in this survey. An informed consent form was taken from all the qualifying respondents and they were invited to participate in the survey. Post invitation, each respondent received links for the 3 survey tools viz. WHOQOL-BREF Questionnaire, Structured interview questionnaire and Nutrient Calculator via email for self-administration. Post completion of data collection, each completed survey was screened for quality checks by the market research team. 20% of these surveys were further back-checked at random by the senior resource to ensure responses to all the questions were received and there were no misses or lapses.

Data Analysis

The responses obtained for the 3 tools for each of the subjects were then manually entered in the Microsoft Excel sheet for further analysis.

WHOQoL-BREF: Conversion of Raw Scores to Transformed Scores

The raw scores of all the 26 questions that were obtained in the survey were further analyzed as per the guidance given in WHOQOL User Manual [39]. Explicit instructions for checking and cleaning data, and for computing domain scores given in this manual were followed.

- (i) To arrive at scores for each of the 4 domains, the mean of scores obtained for questions within each domain were calculated.
- (ii) The mean scores were then multiplied by 4 in order to make domain scores comparable with the scores used in the WHOQOL-100. This converted the scores to range between 4 and 20 to make it comparable with the WHOQOL-100 scoring.
- (iii) The converted scores for the 4 domains were added to give the transformed score for each respondent. Let us call this score s_i for the respondent i .

Thus, the raw scores obtained for each domain were converted to the transformed scores for each respondent.

Cut-off points for Quality of Life

The present study also intended to arrive at cut-off points to assess quality of life of Indian adults. In order to arrive at a cut-off point to categorize the scores obtained as "Good" or "Poor" QoL, the following steps were carried out.

1. Calculation of percentage mean score for QoL of adults in this study using the following formula. [40]:

$$\begin{aligned}
 \text{Percentage mean score} &= \frac{(\text{Actual score} - \text{Minimum possible score})}{(\text{Maximum possible score} - \text{Minimum possible score})} \\
 &= \frac{(\text{Actual score} - 16)}{(80 - 16)} \\
 &= \frac{(\text{Actual score} - 16)}{64}
 \end{aligned}$$

Where,

Actual score is a verage of the s_i score values obtained for all the respondents in the study, as explained in step above.

Minimum possible score is the score obtained if the perceived score is the least possible score for every domain in the questionnaire (i.e. 16). Maximum possible score is the score the perceived score is the highest possible score for every domain in the questionnaire (i.e. 80)

2. Arriving at the cutoff score for QoL for the adult population: The percent mean score was considered as the cuff-off point to categorize individual’s score as “Good QoL” or “Poor QoL”.

A participant’s score that was above or equal to the percent mean value was considered as indicating good quality of life. Conversely, a participant’s score below the percent mean value was considered as indicative of poor quality of life.

Data entry and analysis was done using Microsoft Excel version 2013. The results are expressed as mean values and standard deviation for QoL (gender-wise, city-wise, work status-wise, SEC-wise, age-group – wise) and as mean percentage for nutrient intake and the responses in structured questionnaire.

Two-sample t-test for the independent variables was performed at a confidence level of 99%.

3. RESULTS

The study included 50% each of males and females (Fig 1). Fifty percent of the population was aged 30-40 years and the remaining 50% was in the age group of 41-50 years. Regarding SEC, 70% of the population belonged to class A and the remaining 30 % was from class B.

The study also considered working and non-working people. The working category was further divided into working- employed and Working self-employed. The non-working population was divided into non- working- housewife and non-working unemployed. The percentage distribution can be seen in Fig 1.

4. QUALITY OF LIFE SCORES

The four domain scores viz physical health, psychological health, social relationships and environment denoted an individual’s perception of quality of life in the particular domain. Table 1 showcases the domain-wise means of transformed scores of the sample population. Each transformed score is out of minimum possible value of 4 and maximum possible value of 20 as described in the methodology.

Table 1: Domain-wise QoL mean scores for the sample population.

| Domain | QoL Score |
|----------------------|-----------|
| Physical Health | 15.5 |
| Psychological Health | 14.7 |
| Social Relationships | 16.0 |
| Environment | 13.6 |

The QoL score for physical health obtained was 15.5 (Table 1). Our study population scored the highest in social relationships with a QoL score of 16 while environment related QoL score was the lowest. Overall, the mean scores for the 4 domains were comparable. The overall percentage mean QoL score for all 4 domains was computed to be 68.5. The QoL percent mean scores were compared between age groups, gender, work status and socio-economic groups (Table 2). The percent mean scores were significantly higher for men than women and for younger adults than older adults ($P < 0.01$). The work status and socio-economic status of the respondents have also shown to affect QoL significantly. Working adults had highly significant percent mean scores than non-working adults ($P < 0.01$), while SEC A scored significantly higher on percentage mean scores than SEC B ($P < 0.01$).

Table 2: Percent mean scores comparing different variables

| | Men | Women |
|-----------------------|------------------------------|-------------------------------|
| Gender | 69.61** ±10.7 | 67.43 ±10.4 |
| Age | 30-40 yr 69.25** ±10.3 | 41-50 yr 67.8 ±10.8 |
| Work-status | Working 69.16** ±10.6 | Non-working 67.75 ±10.6 |
| Socio-economic status | SEC-A 69.25** ±10.5 | SEC-B 66.84 ±10.7 |

Data are mean percent scores, Standard Deviation, Statistical analysis: 2-sample ‘t’ test, **Highly significant at p value <0.001 level (2-tailed).

To understand the above differences, facet scores under each domain were also analyzed. It was observed that only 19% women and 29% of men felt completely energized for doing their everyday tasks and activities. Only a bout 37% of respondents rated their physical environment as very healthy and extremely healthy. The percentage of people who felt very safe and extremely safe in daily life was lowest in Kolkata (30%) and highest in Mumbai and Delhi (62%). Only 31% of the respondents agreed and strongly agreed that they had enough money to meet their needs.

The mean percent score computed as 68.5 was considered as the cutoff QoL score for the population. Hence the Quality of Life Score was determined as a Good QoL, if an individual’s ‘Actual Percent Mean Score’ was greater than 68.5 and it was considered as a poor QoL, if an individual’s ‘Actual Percent Mean Score’ was less than 68.5. Considering the cut-off of 68.5, overall 46.2% of the sample population had a poor QoL. This implies approximately 1 in 2 subjects had a poor QoL. Comparison of QoL between age groups, gender, cities, work status and socio-economic groups revealed the following findings (Fig 2). The QoL scores for women were found to be lower than that of men as 50.4% of women had a poor QoL (Figure 2B). Higher percentage of the older age group had poor quality of life than the younger age group. Among the 8 selected cities, percentage of the subjects having good quality of life was highest in Mumbai, followed by Indore and Lucknow while percentage of subjects having poor quality of life was highest in Kolkata.

The working status and socio-economic status of people seem to influence the QoL, as good QoL was highest for working, followed by self-employed, housewives and then unemployed population. Higher percentage of SEC-A had good quality of life than SEC-B.

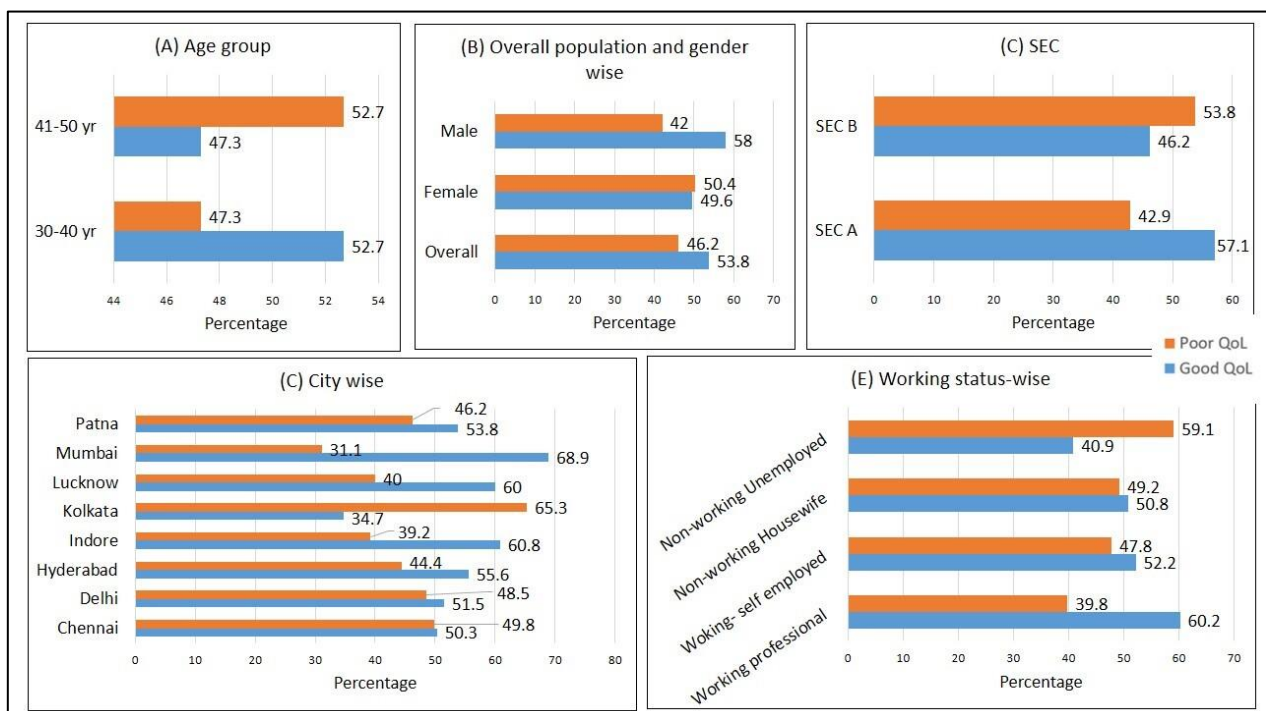


Fig 2: Quality of Life scores obtained based on: (A) Age-group; (B) Gender and for overall population; (C) Socio-economic class (SEC); (D) City and; (E) Working status

From the additional questions asked as part of the structured questionnaire, it was found that majority of people agreed (39.6%) and strongly agreed (31%) to having become more conscious about health and nutrition in the past one year (Table 3). 99% of the population agreed that physical health and staying active are important for a good Quality of life (Table 3).

Almost all (99%) respondents agreed that nutrition plays an important role in having a good QoL while 98% of the study population was of opinion that a protein-rich nutrition is important for a good Quality of Life. However, when it comes to taking protein-rich diet, only 9% of the respondents fulfilled the RDA (Recommended Dietary Allowance) for protein. The analysis of Nutrient Calculator data showed a huge gap between required protein intake and current consumption that certainly requires attention from the healthcare professionals, nutritionists and consumers themselves. Similar trend has been seen for the 10 micronutrients that are important for immune function and overall health (Table 4).

Table 3: Responses obtained for the structured questionnaire used

| Key question | Count | Percentage (%) |
|---|-------|----------------|
| 1. Rate your level of agreement with the statement: "I have become more conscious about health and nutrition over the last 1 year | | |
| Strongly Agree | 863 | 31.2 |
| Agree | 1094 | 39.6 |
| Neither Agree nor Disagree | 215 | 7.8 |
| Disagree | 427 | 15.5 |
| Strongly Disagree | 163 | 5.9 |
| 2. Do you think physical health and staying active are important for a good Quality of Life? | | |
| No | 18 | 0.7 |
| Yes | 2744 | 99.3 |
| 3. Do you think Nutrition is important for a good Quality of Life? | | |
| No | 17 | 0.6 |
| Yes | 2745 | 99.4 |
| 4. Do you think a protein-rich Nutrition is important for a good Quality of Life? | | |
| No | 62 | 2.2 |
| Yes | 2700 | 97.8 |

Table 4: Percent population that met their RDA for the key nutrients

| RDA | Protein | Vit A | Vit C | Iron | Vit E | Vit D | Copper | B12 | Zinc | Vit B6 | Folic Acid |
|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|------------|
| Not Met | 90.9% | 98.3% | 87.7% | 95.2% | 99.8% | 99.5% | 90.2% | 98.0% | 99.1% | 93.30% | 75.00% |
| Met | 9.1% | 1.7% | 12.3% | 4.8% | 0.2% | 0.5% | 9.8% | 2.0% | 0.9% | 6.70% | 25.00% |
| Total | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

5. DISCUSSION

Quality of life represents an aspect of health that is different from generally measured traditional methods, such as X rays, blood tests, and evaluating other clinical parameters. These traditional methods which are fairly objective in nature have tended to dominate within health care. However, measurement of QoL incorporates the subjective views of a person and can provide information that can supplement the traditional assessment methods. Hence, QoL and wellbeing have been emphasized as goals across all stages of life by several researchers. In the current pandemic scenario where health and lifestyle of people have been negatively impacted, assessing QoL becomes imperative to take necessary steps towards improving QoL of the population. In order to understand the QoL among Indian population, we derived a cut-off point for the QoL score, based on the available references. Since cut-off values for WHOQoL-BREF scores have not been defined by WHO, many researchers have derived a cut-off using various methods, suitable for different target groups [40, 41, 42].

Our results of QoL decreasing with age are in accordance with some findings from the past [13, 43], whereas in some cases the QoL was seen to improve with age especially beyond 45 yr [44].

The employment status of an individual is believed to be related to self-esteem and an unemployment status negatively affects the self-esteem of an individual [45]. This was clearly reflected in the QoL scores obtained in our study, where least QoL score was obtained by the nonworking unemployed category.

SEC measures, like education and income, influence an individual's QoL as they have been found to influence one's life opportunities

[46, 47], which could justify the higher scores seen in SEC A compared to SEC B in our study (Fig 2). People with low socioeconomic status have shown to have a high odd ratio score for poor self-rated health and more frequent depressive symptoms [48].

Women scored lower on QoL compared to Men. The reason behind this could be a low level of physical activity among women due to personal and environmental factors that create poor conditions for physical activity [49, 50]. Such gender-oriented scores need attention from concerned authorities to look into how this gap can be bridged and plan strategies accordingly.

The domain scores viz. physical and psychological health, social relationships and environment were reported to be comparable. We found that the population scored highest for social relationships and least for environment. This was not the case especially during the initial phase of the pandemic and lockdown, where social distancing was observed to have a measurable negative impact on social relationships [51]. Our study was conducted over a year after the pandemic was announced. The reason for a higher score in social relationship could be due to people getting used to the new-normal of working from home and it has resulted in better creativity, lesser stress levels and better work-life balance [52, 53].

Overall, the domain score for physical health were not as low as anticipated given the country-wide lockdown scenario. It was observed that participating in physical activities resulted in a better QOL score for the physical health domain [54].

Various studies have analyzed the positive effects of practicing being physical active on specific domains of QoL like physical health and psychological health. [55, 56]. Hence, being physically active during the pandemic is recommended irrespective of age or gender. This not only positively affects the psychology, but also improves the immunity of an individual [57].

Talking about immunity, protein plays a significant role here. Several studies have shown deficiency of protein to impair immunity and increase susceptibility to infections [58, 59, 60].

Protein also plays an important role in maintaining lean body mass. Retaining the lean mass is also crucial for metabolic health. The benefits of a adequate protein intake go beyond good immunity and physical health. Lean mass has a positive relationship between reducing risk of diseases such as obesity, cardiovascular disease, insulin resistance, diabetes and osteoporosis [61].

Our study reported that majority of the subjects were not meeting their requirements for protein and micronutrients necessary for a good immunity and overall health. (Table 4). These findings suggest low intake of foods rich in protein and micronutrients such as pulses, flesh foods, milk, fruits, vegetables, nuts and oilseeds. Similar findings have been documented in a report published by NIN in 2016 and a recent study on dietary diversity in urban adults [62]. This certainly requires attention from the healthcare professionals, nutritionists and consumers themselves.

Studies like ours which assess QoL and identify people's perceptions and practices about the factors that influence the same would contribute in bringing a awareness among masses and take necessary actions. The findings from such a study can help the health and wellness sector to devise strategies that will positively impact the quality of life of Indians during and beyond the present pandemic times [63].

6. CONCLUSION

The Pandemic seems to have impacted the QoL among Indian population considerably, as seen from available literature. In our study, the overall domain scores for the 4 domains viz. were comparable. However, nearly half of the respondents (46.2%) had poor QoL. Gender, age, socio-economic and work status have shown to significantly influence quality of life. In spite of the consumers agreeing to the fact that nutrition and particularly protein are necessary to have an improved QoL, their intakes were regrettably lesser than the requirement. The nutrition gap between the current intake and requirement needs attention not only from the healthcare and wellness sector but also from the consumers themselves and one way to bridge this gap is by improving the awareness among consumers. Our study is one of its kind and has brought about some insightful facts on the scenario of quality of life and the factors that could have affected the same among the Indian adult population.

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