RESEARCH ARTICLE

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Effect of COVID-19 on Quality of Life in Geriatric Population Using ICF: An Observational Study

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Abstract

Aim: The present study aimed to study the effect of COVID-19 on the quality of life in the geriatric population using ICF in and around Belagavi city. **Settings and Designs:** Observational study design was implemented in and around Belagavi city. SF-36 and ICF documentation were explained to the subjects and collected. **Subjects and Methods:** Sixty-five participants from the age group of 65 and above were taken based on the inclusion and exclusion criteria. Both SF-36 and ICF documentation was explained to them in regional language and collected from them. **Statistical Analysis Used:** Correlation was performed. Statistical significance was considered where the p-value (0.001) was kept as highly significant. **Results:** This study investigated the impact of COVID-19 on the elderly population (65+) using the International Classification of Functioning (ICF). Analysis of the SF-36 questionnaire revealed significant impairments in social functioning (56.25%), particularly community life, recreation, and spirituality (ICF codes d-910, d-920, d-930). Additionally, pain (54.3%) significantly affected all 20 ICF code sets, with d-415, d-430, and d-450 being the most impacted. General health also showed a 48% decline. These findings highlight the multifaceted negative impact of COVID-19 on the functioning of the elderly population.

Keywords: COVID-19, Geriatric Population, ICF Questionnaire, MMSE, Physical Activity, Quality of Life, SF-36

1. Introduction

On 31st December 2019, The WHO China country office was informed of pneumonia of unknown cause originating in the city of Wuhan in Hubei province, China. By January 7, 2020, the successful isolation of the novel coronavirus from the patient in Wuhan was done by the scientists[1].

Following this, a dramatic spread of COVID-19 cases was seen across the globe and has caused a greater number of fatalities than the previous Severe Acute Respiratory Syndrome (SARS) and Middle East respiratory syndrome combined[2].

It's important to note that the number of cases was reducing in China but had an exponential rise in other countries and a high fatality rate. By the second of March 2020, India had reported its first COVID-19 case in Delhi. Which had an exponential rise and about 29 cases had been reported by fifth March 2020. According to a study conducted by LiqGuan *et al*, this spread had a doubling rate of 1.8 days[3].

The coronavirus belongs to the beta genus, enclosed in a capsule having a diameter of 60-140 nm, with round or oval particles on the surface. This virus is sensitive to UV radiation or 56 degrees of heat for 30 mins, ether 75 peracetic acid which helps inactivate the virus. The mode of spread of the virus is usually through close contact.

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Table 1. Correlations among components of SFT

Components	Summery	Physical functioning	Role LIM due to physical health	Role LIM due to emotional problems	Energy\ fatigue	Emotional wellbeing	Social functioning	Pain	General health
Physical functioning	SP R-value	-							
	P-value	-							
Role lim due to physical health	SP R-value	0.7342	-						
	P-value	0.0001*	-						
Role lim due to emotional problems	SP R-value	0.5709	0.7585	-					
	P-value	0.0001*	0.0001*	-					
Energy\ fatigue	SP R-value	0.5858	0.4948	0.5986	-				
	P-value	0.0001*	0.0001*	0.0001*	-				
Emotional wellbeing	SP R-value	0.5858	0.6096	0.5789	0.6319	-			
	P-value	0.0001*	0.0001*	0.0001*	0.0001*	-			
Social functioning	SP R-value	0.3743	0.3575	0.4481	0.4639	0.3371	-		
	P-value	0.0032*	0.0050*	0.0003*	0.0002*	0.0001*	-		
Pain	SP R-value	0.6892	0.7820	0.6814	0.5723	0.7389	0.4930	-	
	P-value	0.0001*	0.0001*	0.0001*	0.0001*	0.0001*	0.0001*	-	
General health	SP R-value	0.5551	0.6646	0.5992	0.4539	0.6104	0.3899	0.7379	-
	P-value	0.0001*	0.0001*	0.0001*	0.0003*	0.0001*	0.0021*	0.0001*	-

*p<0.05 Spearman rank correlation method

Table 2. SF 36 components

Physical functioning	Role LIM due to physical health	Role LIM due to emotional problems	Energy\ fatigue	Emotional wellbeing	Social functioning	Pain	General Health
40.91666667	33.75	48.88	48.41666667	54.46666667	56.25	54.33333	48

Also, the possibility of Faeco-oral transmission cannot be excluded based on the existing data[4].

Of the growing number of cases of COVID-19 and to combat the same, a policy of isolation to disrupt the transmission amidst the lack of vaccination and proven medical therapies was done[5].

While the enforced lockdown helps to abate the rate of infection, it also results in negative effects by limiting participation in normal daily activities, physical activities, travel and many forms of exercise and recreational activities. Globally, the most important risk factors for disease morbidity are physical inactivity and poor mental health. This holds not only for the general population but has a major hand in the geriatric age group as well who are at a higher risk of COVID-19-induced mortality[6].

Table 3. Correlations among components of SFT

d240		d360		d420		d430		d435		d440		d445		d450		d455		d460	
Handling stress		Communication devices and techniques		transferring oneself		lifting and carrying objects		moving objects with lower extremities		fine hand use		hand and arm use		walking		moving around		moving around different locations	
C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
0.8	1.533333	0.833333	1.633333	1.133333	1.95	1.35	2.416667	1.35	2.25	1.083333	1.783333	1.033333	1.766667	1.166667	1.866667	1.483333	2.416667	1.65	2.433333

d465		d470		d475		d570		d630		d640		d910		d920		d930	
moving around using equipment		using transportation		driving		looking after one's health		preparing meals		doing housework		community life		recreational and leisure		religion and spirituality	
C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P	C	P
1.716667	2.816667	1.75	2.733333	1.866667	2.866667	1.55	2.266667	1.533333	2.366667	1.533333	2.4	1.516667	2.383333	1.666667	2.716666667	1.116667	1.966667

⋆ Spearman rank correlation method

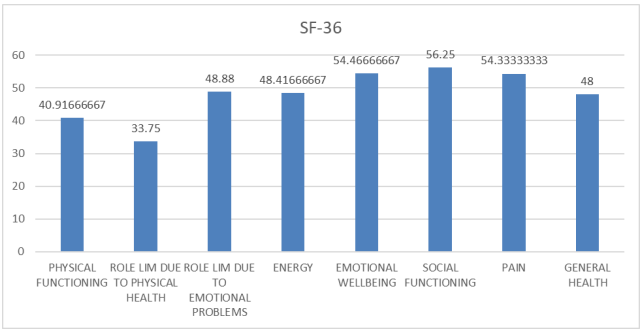

Figure 1. Correlations among components of SFT.

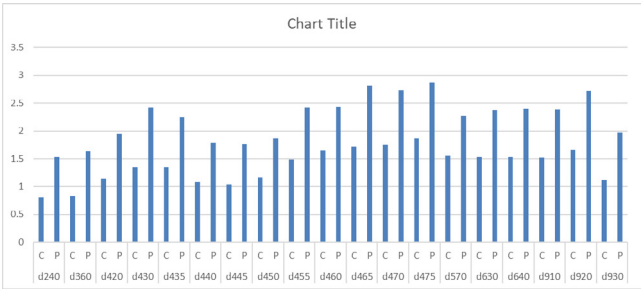

Figure 2. Correlations among components of SFT.

A study conducted by Robert Verity *et al.* concluded that fatality risk in COVID-19 increases with advancing age[7].

According to Janko Nikolich-Zugich *et al.*, older adults have a slower immune response which is uncoordinated and inefficient and are more likely to have pre-existing health conditions making them more susceptible to infections. Thus, the most important strategy for older adults is prevention. The major offshoot of the pandemic was the effect of isolation on the physical and mental health of all age groups. The geriatric age group was not very comfortable with the electronic media which led to the lack of socializing and hurt the health which in turn affected the quality of life of the individual[8].

According to the World Health Organization, Quality of Life (QOL) is an individual's view of their place in life about their objectives, expectations, standards, and concerns in the context of the culture and value systems in which they live. QOL is a broad range and is affected by the person's physical health, psychological state, personal beliefs, and social relationship to salient features of their environment.

Ageing brings with it a slew of psychological, social, and environmental risks. Frailty in elderly persons increases the risk of infection and reduces immune response in all types. Furthermore, the elderly have many

co-morbidities and are more likely to be hospitalized. During a pandemic, this increases the chances of catching the infection. In a side-by-side comparison, COVID-19 caused pneumonia in both young and elderly patients, according to Liu and colleagues[3] found that the risk of death and illness progression is three times higher in the older age group[9].

The ICF is a framework for the "description of health and health-related states", and it is a classification system that allows the coding of information about health-related states. The framework consists of two parts. The first, functioning and disability, refers both to neutral aspects of an individual's body functions and structures and activities and participation in life (functioning), as well as impairments, activity limitations/participation restrictions in these areas. Personal and environmental factors make up the second element of the ICF, contextual factors.

This pandemic affects physical health as well as social relationships and in turn, hampers the QOL. Based on the existing data the study has not been performed in India. We intend to study the impact of the current pandemic on the QOL of the geriatric population

2. Material and Methods

2.1 Method of Collection of Data

- Source of data: In and around Belagavi city
- Study design: A cross-sectional study
- Study type: Observational study
- Duration of study: 3 months
- Sample size: $n= (0.1)^2(1.96)^2\times0.5\times (1-0.5)/ (0.1)^2\approx65$
- The sample size of 65 participants for a 95% confidence level with a margin of error of 10%.
- Sampling design: Non-probability sampling.
- Sampling technique: Convenience sampling.

2.2 Inclusion Criteria

- Individuals ≥ 65 years of age.
- MMSE Score 23 and above.

2.3 Exclusion Criteria

- Individuals diagnosed with psychiatric disease on medication.

2.4 Outcome Measurement

SF- 36: SF- 36 is a questionnaire with 36 items which measures 8 multi-item variables: Physical functioning (10 items), social functioning (2 items), role limitations due to physical problems (4 items), role limitations due to emotional problems (3 items), mental health (5 items), energy and vitality (4 items), pain (2 items) and general perception of health (5 items). An unskilled single item that measures the health of the respondents over the past year.

ICF coding: ICF Domain: d= activity limitation and participation restriction.

ICF questionnaire includes questions related to quality of life which will help to assess the activity limitation and participation restriction. There are 20 core sets which include handling stress and other psychological demands, using communication devices and techniques, maintaining a body position, transferring oneself, lifting and carrying objects, moving objects with the lower extremity, fine hand use, hand and arm use, walking, moving around, moving around in different locations, moving around using equipment's, using transportation, driving, looking after one's health, doing housework, community life, recreation and leisure, religion and spirituality. All the core sets include two components which are performance (P), and capacity (C) which are graded as per the ICF grading ranging from 0-9.

2.5 Procedure

Approval for the study was obtained from the institutional ethical committee. The purpose of the study was explained and written informed consent was obtained from all the subjects. All the subjects were recruited based on inclusion and exclusion criteria. The subjects were provided with the SF-36 questionnaire which consists of 8 multi-item variables. The subject was also provided with another questionnaire in which they had to rate their activity limitation and participation restriction. The questionnaire had 20 components with a 7-point scale ranging from "no difficulty" to "not applicable". This information would help to analyse the level of activity limitation and participation restriction faced by the geriatric population during the pandemic under social isolation. Both the questionnaire was collected from the subjects and data was correlated at the end.

3. Results

The present study aims to find the effect of COVID-19 on the geriatric population using ICF as a tool. The elderly population aged 65 and above were included in the study.

A total of 65 participants were included in the study.

The major hampered component of the SF-36 post-analysis of the data shown in Figure 1 was found to be social functioning having a percentage value of 56.25%, which was the highest of all. This in turn, was related to the ICF codes d-910 (community life), d-920 (recreation and leisure), and d-930 (religion and spirituality), out of which d-910 had the highest t-value of -0.31.

On subsequent analysis, it was found that the pain component of SF-36 was affected by about 54.3% which in turn hampered all the 20 code sets of the ICF significantly. D-415, d-430, d-450 were the most affected ones (Table 2).

There was a 48% variation in the general health of the geriatric population as per the result analysis of this SF-36 component (Table 3).

3.1 Statistical Analysis

Statistical analysis for the present study was done using the statistic software SPSS version 23.0 2015 to verify the results obtained. For this purpose, data was entered into an Excel spreadsheet, tabulated and subjected to statistical analysis. various statistical measures such as mean, standard deviation, and Spearman rank correlation test were utilized for this purpose for all the available scores in all the participants.

Nominal data of the participants like demographic data, i.e. name, age, occupation was analysed using a t-test.

3.2 Co-Relational Analysis

For correlation analysis, Spearman ranks co-relation was used There is variable one (components of SF-36) and variable two (ICF). With a p-value of less than 0.05, a positive and highly statistically significant correlation was found between SF-36 and ICF components. As a result, the ICF core set components listed below can be used to measure and document QOL in this study. d-240, d-360, d-415, d-420, d-430, d-435, d-440, d-445, d-450, d-455, d-460, d-465, d-470, d-475, d-570, d-630, d-640, d-910, d-920, d-930.

4. Discussion

The present cross-sectional study was done to assess the Effect of Covid 19 on QOL in the geriatric population using ICF as a tool.

SF-36 and the ICF-based questionnaires were the tools used to assess the QOL in the geriatric population

Peek MK *et al.* conducted a study on the reliability and validity of SF-36 in older Mexican Americans on 800 respondents which had a mean age of 70 years, proved to be of utmost importance and great relevance was established. SF-36 gives a clear picture of the QOL in the set population[10].

20 codes from one domain of the ICF were chosen to form a questionnaire to know the status of QOL in the geriatric population during the pandemic along with the SF-36. This was intended towards assessing the impact of the pandemic and to co-relate the various components of the SF 36 to the ICF code sets.

Alejandro *et al.* carried out a study to study the impact of COVID-19 on the psychological well-being and physical activities of older adults during the nationwide lockdown in Spain and concluded that a considerable amount of physical activity will lead to a better physical and mental well-being of geriatric population[11].

The geriatric age group is already predisposed to several physical as well as emotional limitations due to ageing, the current pandemic burdens the same with the lack of physical activities as well as social interactions as the age group of the society had to stay home-bound. The major offshoot of this pandemic hence was reduced physical activity and immobilization.

According to a study conducted by Dittmer DK on complications of immobilization and bed rest, the study highlighted that reduced physical activity or bed rest leads to complications that can be better off when prevented, rather than treated taking into consideration the present pandemic scenario which led to the demand to assess the QOL of the geriatric population[12].

The ICF is a framework for the description of health and health-related states and it's a classification system that allows coding of information about the health-related states. It explains what function and disability mean in the context of the biopsychosocial model of the ICF. It describes how the ICF and its code sets can be applied. It is a framework for comprehensively describing a person's functioning profile that in turn helps in better understanding the person's specific needs. It is a

framework for international standards to measure health and disability at both individual and population levels. The 20 code sets chosen from one domain of the ICF i.e., d-activity limitation and participation restriction were chosen based on how the current pandemic affects those variables in the geriatric age group.

Also, the study was intended to know the correlation between the SF-36 and the ICF codes. The performance and capacity variables of the ICF code were compared with the respective components of the SF-36 using the Spearman rank correlation method.

Physical functioning is the first component of the eight components of the SF-36, on data analysis it was found that this component of the QOL was hampered by 40% which had a significant impact on the geriatric population. Simultaneously when the respective ICF codes d-415 (maintaining body position), d-420 (transferring oneself), d-430 (lifting and carrying objects), d-440 (fine hand use), d-450 (walking), d-470 (using transportation) were compared, it showed strong relevance and co-relation with the SF-36 physical functioning component. The results show that using transportation was the least affected with a t-value of -5.20 and walking was maximally affected among the above-mentioned code sets having a t-value of -0.33.

In a similar pattern, all the eight components of the SF-36 were co-related with the ICF codes, role limitation due to emotional problems had a change in QOL by about 33.75% which had a significant correlation with the code set d-430 (lifting and carrying objects), d-435 (moving objects with lower extremities), d-630 (preparing meals), d-640 (doing housework), out of which d-430 and d-435 were the most affected having a t-value of -2.99 and -3.6 respectively.

The ICF code sets d-240 (handling stress and other psychological demands), d-570 (looking after one's health), d-910 (community life), d-920 (recreation and leisure), d-930 (religion and spirituality) coincided with SF-36 component of role limitation due to emotional problems which were affected by about 48.88%, the t-value for d-920 was -0.6395 was the highest and considered to be the most affected amongst the lot.

The questions related to the codes d-420 (handling stress and other psychological demands), and d-570 (looking after one's health) were relevant to the emotional well-being component of the SF-36. This was amongst the majorly affected components of the SF-36, having a percentage value of 54.46%, the respective codes had a t-score of -2.9942 and -0.95 respectively and were the most affected among all.

In the present study, 60 participants from the geriatric population were recruited, based on the inclusion criteria and were explained the questionnaires and in about 15 minutes the data was collected from each of them.

Although SF-36 could assess the extent to which the QOL has been affected. The ICF questionnaires could be related to the same components, questions regarding the same were chosen and could explain better based on the capacity and performance of the specific activities and better results can be extracted from the same.

5. Conclusion

The study concluded that amidst the pandemic social confinement had a significant decrease in the physical activity component of the QOL. In turn, it drastically hampered the QOL in the geriatric population. The extent of the effect on QOL was successfully documented with SF-36 and showed a strong correlation with the ICF code sets.

Further studies can be performed including geographical variance. It can also be performed similarly by taking into consideration any age group and using the ICF documentation form to choose appropriate codes as a tool for assessing QoL.

In this study only activity limitation and participation restriction were taken into consideration, further studies can be considered by including other components of ICF like environmental and contextual factors which may also have a significant effect on the geriatric population during a pandemic.

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