ASSESSMENT OF DEPENDENCY-ASSOCIATED FINANCIAL BURDEN OF COVID-19 MORTALITIES

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ABSTRACT

Objective: The objective of this study was to find out interrelationship of economic burden and dependency profile of families with COVID-19 mortalities and to make related recommendations.

Methods: A mixed method research was conducted to understand the interwoven mechanisms of COVID-19 mortalities for the study of variables including level of education, type of family, and economic burden to guide and direct public health strategies among research vulnerable groups of population in the present and in the future.

Results: The dependency has been high in nuclear and joint family combined (160) as compared to three-generation family (21). The gender-wise distribution shows females having two children in family in higher numbers (46.0%) as compared to males in the same age group (35.5%). There is observed high number of COVID-19 mortalities among graduate and above (79) followed by literate up to higher secondary (60). Mean annual income has been highest in the COVID-19 mortalities for subgroup of a number of children being 4 (5.58%), followed by one child (3.79 lacs), no child (3.11 lacs), two children (2.95 lacs), three children (2.90 lacs), and five and more children (2.79 lacs).

Conclusion: Although there is observed intergroup difference in the gender vulnerabilities and varying threshold of dependencies including social, demographic, economic, and developmental areas, there is an appreciable public health need to achieve social gains and avert possible disparities of existence through intersectoral and envisioned strategic reform-based initiatives leading to gainful coexistence of deprived with other social masses to achieve the set target of social developmental goals as per international health actions.

Keywords: Burden assessment, COVID-19 mortalities, Dependency, Socioeconomic.

INTRODUCTION

The socioeconomic vulnerabilities of the individuals directly or indirectly affected by the death of earning family member or head of the family has adverse impact on the well-being of the family and poses multiple threats for survival, existence, and sustainability over extended periods of time [1,2]. These vulnerabilities also depend on the number of dependents in the family, which naturally puts economic stresses of unforeseen proportions and hence other requirements of the families also need to be addressed simultaneously. Despite care and support mechanism being in place, the COVID-19 affects standard of living, quality of life, and human developmental issues [3]. It is, hence, desirable to study interrelationship of socioeconomic profile of COVID-19 mortalities with the epidemiological and financial burden faced by the affected families as human-to-human transmission is evidenced [4-7]. Hence, this study has been conducted to assess the socioeconomic burden of families having COVID-19 mortalities as per dependency profile. Assessing the interrelationship between dependencies of families for any mortality has always been a challenge to families. These issues require multilevel proactive and reasoned initiatives for bringing about social cohesion, acceptability, and continuing support network strengthening for these families.

METHODS

A mixed method research was conducted at tertiary health-care facility of Central India to understand the interwoven mechanisms of economic burden of COVID-19 mortalities for the study variables including level of education, type of family, and economic burden. Its purpose is to guide and direct public health strategies among vulnerable groups of population. This study thus emphasized on analysis of datasets and focused group discussions for the assessment of relationship between economic burden of families having COVID-19 mortalities and their dependency profiles. The analyzed gaps of quantitative data were exclusively discussed among various technical experts, hospital managers, nursing support providers, and social workers cum counselors to arrive at a consensus analytical framework. The analyzed findings direct toward subsequent rehabilitative measures to be undertaken by support agencies including social welfare organizations. These quantitative parameters were analyzed in MS Excel sheet for statistical analysis and qualitative results were summarized through focused group discussion.

RESULTS

The maximum affected families have been nuclear families (92), followed by joint families (68) and three generation families (21). The highest burden of dependency is in the families having 2 children (71), which are followed by 1 child family (49). The dependency has been high in nuclear and joint family combined (160) as compared to three-generation family (21) (Table 1).

The gender-wise distribution shows females having two children in family in higher numbers (46.0%) as compared to males in the same age group (35.5%). Within-group study of gender-wise distribution of COVID-19 mortalities among males is found highest among male having 2 children (35.5%), followed by 1 child (31.3%), 3 child (14.4%), more than or equal to 5 children (11.0%), 4 children (5.0%), and no child (2.5%).Within-group study of gender-wise distribution of COVID-19 mortalities among females is observed highest among females having 2 children (46.0%), followed by 1 child (19.0%), 3 children (11.1%), more than or equal to 5 children (9.5%), no child (7.9%), and 4 children (6.34%) (Table 2).

Similarly, there is observed high number of COVID-19 mortalities among graduate and above (79), followed by literate up to higher secondary (60), literate up to middle (29), and illiterate (13) out of total COVID-19 mortalities analyzed herein (181) (Table 3).

The mean age of COVID-19 mortalities for various dependencies is found of no child subgroup (60 years), three children subgroup (59 years), two children subgroup (58 years), five or more children subgroup (57 years), four children subgroup (54 years), and one child subgroup (53 years). Similarly, mean annual income has been highest in the COVID-19 mortalities for subgroup of a number of children being 4 (5.58%), followed by one child (3.79 lacs), no child (3.11 lacs), two children (2.95 lacs), three children (2.90 lacs), and five and more children (2.79 lacs) (Table 4).

Table 1: Dependency profile and type of family of COVID-19 mortalities (n=181)

Number of children in a family	Type of family		
	Nuclear	Joint	Three generation
0	4	4	0
1	30	14	5
2	40	21	10
3	12	9	3
4	5	5	0
≥5	1	15	3

Table 2: Dependency according to gender-wise distribution of COVID-19 mortalities (n=181)

Number of children in a family	Male, n (%)	Female, n (%)	Total, n (%)
0	3 (2.5)	5 (7.9)	8 (4.4)
1	37 (31.3)	12 (19.0)	49 (27.07)
2	42 (35.5)	29 (46.0)	71 (39.22)
3	17 (14.4)	7 (11.1)	24 (13.25)
4	6 (5.0)	4 (6.34)	10 (5.5)
≥5	13 (11.0)	6 (9.5)	19 (10.49)

Table 3: Dependency profile and education of COVID-19 mortalities (n=181)

Number of children in a family	Education				Total
	Illiterate	Upto middle	Upto higher secondary	Graduate and above	
0	1	2	1	4	8
1	2	5	15	27	49
2	6	13	24	28	71
3	4	3	9	8	24
4	0	5	2	3	10
≥5	0	1	9	9	19

Table 4: Economic burden associated with COVID-19 mortalities versus dependency status (n=181)

Number of children in a family	Mean age	Mean annual income (INR in lacs)
0	60	3.11
1	53	3.79
2	58	2.95
3	59	2.90
4	54	5.58
≥5	57	2.79

DISCUSSION

The present study underlines the need for addressing economic burden across type of family-wise distribution in view of quantitative and qualitative assessment conducted herein. It summarizes various interactive and related factor associated with COVID-19 mortalities for demographic, economic, and vulnerability indicators. It is also conceptualized that there may have been a complex mix of multifactorial causation of disease through involvement of socioeconomic, behavioral, immunological, and genetic factors in varied proportions [8-10]. The high incidences of COVID-19 among Asian males than females are also attributed to higher expression of angiotensin-converting enzyme-2 receptors predominantly in the lungs. This may have probably been due to the unknown mechanism of the action of estrogen receptor for inhibiting either the viral entry or replication. It has also been noted that although the hospital admission pattern of male and female was almost similar, the mortality was much higher among males as compared to females across the various continents during the current ongoing pandemic of COVID-19. However, the risk profile of women being generally lesser than male for addictions, outdoor exposure, employment-related risk, and migration status also makes men more vulnerable to such droplet infections [1-4].

The baseline health status and behavioral risk factors have been studied in detail across ethnicity, socioeconomic deprivation, and education level. It, hence, underlines to ensure aggressive treatment of severe cases and special focus on at risk population by timely dissemination of technically enriched guidelines of prevention, treatment, control, and care [5]. An emphasis has been laid on exercising the need for investigation and mitigation of the factors leading to causation of disease by appropriate and comprehensive utilization of resources including workforce supported by established health-care system and coherent policy guidelines [11]. The fear perception interwoven with technical facts and announcements of global health agencies had initially stressed on addressing the key challenges including accelerating the availability of Personal Protective Equipment kits, testing facilities, and training of field work force to ensure that the global response to the pandemic is not blown to disproportionate extension and expansion. However, despite the best efforts for ensuring and adhering to international health regulation, the viral progression remained globally unchecked [12].

The fatality rate has been found to be 5% in a meta-analysis and the discharge rate of COVID-19 patients has been 52% with male preponderance as depicted by their 60% involvement for COVID-19 infection [10,13-16]. It has been a cause of anxiety and concern for remarkable difference of mortality among different races. There has been felt need of scientific understanding for the same by clinical expert, public health specialist, and the subject experts of biological sciences. However, it has been generally noted that the male gender, age more than 60 years age group, and various comorbid conditions, especially due to the presence or complications of non-communicable diseases, have been most affected. There is a need to study the phenomenon, incidence, prevalence, and control of COVID-19 by an expert team of superspecialty and specialties across spectrum of subject domain. The findings similar to another study [17] are found in Ecuador highlighting male preponderance for morbidity, which increases with age and other coexisting diseases [16,18,19].

It is not well understood but observed fact that mortality among women has been 50% of that among men with most affected age group being 19–50 years of age. In some developing countries, the death was very high among COVID-19 infected individual with comorbidities than those without comorbidities [10,15,20]. Those having lesser access to hospital facility, living in poverty, and not using preventive measures had greater vulnerability. Occupational group specific mortality is also to be explored [21].

The family income has been assessed to be inversely proportional to number of COVID-19 cases as evidenced by observed COVID-19 confirmed cases and COVID-19 deaths against the criteria of income, poverty, and total population in various geographic zones by studying spatial distribution of variance [22]. It has been noted that the most vulnerable communication included old aged male with chronic non-communicable diseases while their prognosis worsened if they had breathlessness, consciousness levels changes, or skin manifestations [8,10,15,16,20,23-26].

There has been emphasis on international health regulation across the globe coupled with national, regional, and local preventive measures, namely, social distancing, lockdowns, use of mask, sanitization, and restrictions. Low oxygen saturation has been observed in 50% of COVID-19 infection in Iran, whereas it had been 36% in China and 65% in the United States. Although low oxygen saturation is not directly and significantly related to any of the common non-communicable diseases such as hepatic neurological dysfunction, carcinoma, and immunological deficiencies, these diseases have been predictors of mortality as these contribute to deteriorate the health case scenario of COVID-positive person, if complication arises [26].

A retrospective cohort study conducted in Sweden has assessed hazard ratio of adult mortalities against age, gender, civil status, education, individual net income, country of birth, and country of residence [27]. It has been inferred therein that the load of morbid conditions essentially fall on the deprived population including but not limited to immigrants, socially disadvantage peoples, and other varied demographic risk factors [28,29]. The variance in observance of complications, hospitalization, intensive care needs, and the reasons for regional differences in incidence of Covid19 infections have not yet been understood well [30]. The role of Vitamin D level, white blood cell antigen haplotypes, and Angiotensin-Converting Enzyme (ACE) receptors has been studied, but not yet been proven to be the explanation of the same. The community response and country response have been emphasized to be comprehensive, collective, collaborative, documented, smooth, and fast [31].

The qualitative group discussion informed that majority of patients in the age group of 30–40 years got complications primarily. Thereafter, there were some post-pneumonitis mortalities. Thus, pneumonia was the major reason for mortality among that group of COVID-19-positive cases [32,33]. It is also opined based on the discussions held that even the patients who had come out of mortality threats as per their improved clinical conditions suddenly slipped into the complications as they were continuously seen as expressing apprehension for the ultimate outcome toward their health. The younger age group persons were relatively more affected by severe infection due to the cytokine storm and its sequelae thereafter. This had added to the peak rise of mortalities among moderately sick patients as well. There has been great emphasis on SpO_2 level monitoring, however, it has also been noted that the patients with higher respiratory rate were severely affected, and therefore, respiratory rate was a significant factor for the assessment of prognosis of the patients [34,35]. While analyzing the blood sugar levels, it has been generally observed that the hyperglycemia was commonly seen in non-diabetic COVID-19 positives, whereas it was extremely raised among known diabetics.

The study is important since it has focused on the assessment of overall economic burden on the families of deceased. It is also important because it shows light on yet unaddressed issue of economic burden. However, the incidence of disease, especially during pandemic times, is dependent on individual risk factors, population risk factors, and strength of the health-care facility for testing, isolation, home quarantine, contact tracing, diagnostics, treatment cum follow-up, and vaccination [16,36,37]. It has been observed almost everywhere in developed and developing countries alike that the health-care system could not bear the sudden surge of morbidities and mortalities despite different level of resources, facilities, and economic strengths [38].

A larger data-based study across geographical areas of country may be further beneficial for arriving at conclusive causal inference.

CONCLUSION

Addressing social inequities and their root causes require careful observance and thereafter conclusive resultant public health initiative cum action for ensuring adherence and compliance of norms, regulations, and principles related to dissolving the dependency-associated economic challenges of COVID-19 mortalities. It is, hence, desirable to address the agenda of family health care and continued support for gainful amalgamation of thus economically deprived families into social fabric of community in the larger interest of comprehensive family well-being and socioeconomic development.

AUTHORS' CONTRIBUTIONS

AK and GG studied and carried out the research work. AK, GG, RG, and RSM reviewed, studied and wrote the manuscript, and participated in qualitative study. MK collected data, analyzed quantitative data, and arranged qualitative study.

CONFLICTS OF INTEREST

The authors declared that they have no conflicts of interest.

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