IJPSR (2023), Volume 14, Issue 8 (Research Article)

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 26 November 2022; received in revised form, 01 April 2023; accepted 27 May 2023; published 01 August 2023

A RETROSPECTIVE OBSERVATIONAL STUDY TO ASSESS THE CLINICAL MANIFESTATIONS AND FUNCTIONING STATUS AMONG COVID-19 SURVIVORS WITH AND WITHOUT POST-COVID SYNDROME

N. Senthil Kumar *, Deborah Rose, M. K. Amrutha, Samuel Babu, Naivin D. Almeda and R. Dileep

JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy, Komarapalayam - 638183, Tamil Nadu, India.

Keywords:

Post covid syndrome, Fatigue, Cough, Functioning status, Rehabilitation

Correspondence to Author:
Dr. N. Senthil Kumar

Principal,
JKKMMRF's Annai JKK Sampoorani Ammal College of Pharmacy,
Komarapalayam - 638183,
Tamil Nadu, India.

E-mail: debrose1998@gmail.com

ABSTRACT: Post-COVID syndrome is defined as COVID-19 associated illness that extends for more than three weeks from the onset of symptoms, and chronic COVID-19 is an illness that extends beyond 12 weeks from the onset of symptoms. An online survey was conducted where 400 Covid-19 infected, participated from various areas of India. Among 400, 58% (232) had complaints of persistence of Covid symptoms. The most common long-term clinical manifestations identified based on this study include fatigue, cough, shortness of breath, and myalgia. Patients who exhibit symptoms such as fatigue, cough, and shortness of breath early in their condition are more prone to developing post-COVID syndrome. The results show that long-term clinical manifestations after mild and moderate COVID-19 are common and lead to limitations of activities and participation. However, in most cases, they are not severe and do not lead to frequent or serious issues with quality of life or workability. Thus, early rehabilitation is needed during the acute phase of illness, including mobilization, psychological support, and respiratory rehabilitation.

INTRODUCTION: Chronic or long-haul COVID are the other names used to describe the sequel of COVID-19 [1, 2]. The pathophysiologic mechanisms of acute COVID-19 include direct viral toxicity, endothelial damage, and microvascular injury; immune system dysregulation and stimulation of a hyper-inflammatory state; hypercoagulability with *in-situ* thrombosis and macrothrombosis and maladaptation of the angiotensin-converting enzyme (ACE2) pathway 2 [3]. Disability-adjusted life years are increasing and the survivors experience long-lasting psychological, medical and economical consequences. The health consequences of COVID-19 remain urgent even despite vaccination efforts [4].

QUICK RESPONSE CODE

DOI: 10.13040/IJPSR.0975-8232.14(8).3972-77

This article can be accessed online on www.ijpsr.com

DOI link: http://doi.org/10.13040/IJPSR.0975-8232.14(8).3972-77

Persistent medical problems reported after acute COVID-19 can include a wide range of symptoms and are linked to residual inflammation during the convalescent phase, organ damage, non-specific effects from prolonged ventilation such as post-intensive care syndrome, prolonged hospitalization, social isolation, or impact on underlying medical conditions [5, 6]. The study's objective is to assess the participants with and without post covid syndrome based on CDC (Center for Disease Control and Prevention) guidelines. Understanding various clinical manifestations during covid and post covid period.

To assess the functioning status using Post Covid Functioning Status (PCFS) scale. The "Post-COVID-19 Functional Status (PCFS) Scale" was proposed by Klok and colleagues as a patient-reported outcome measure for measuring COVID-19 side effects and their impact on functional status. Before and after discharge from the hospital, the PCFS Scale can be used to measure functional status. The scale was designed to cover the

complete range of functional constraints, from 0 (no functional limitations) to 4 (severe functional limitations) and 5 (extreme functional limitations or death) [7].

MATERIALS AND METHODS:

Study Type: This is a Retrospective observational study

Study site: The study is conducted in various areas of India

Study duration: The study is conducted for 6 months

Study Population: 400

Data Collection: Data collection is done through online google forms.

The institutional ethics committee permission was taken to conduct this study (Date of approval 12/02/2022) (EC/PHARM.D/2022-06).

Study Criteria:

Inclusion Criteria:

- People infected with Covid-19 disease.
- With and without the persistence of symptoms after covid-19 infection.
- People who are vaccinated.
- Pregnant women.

Exclusion Criteria:

- People who are not willing to participate in the study.
- Age less than 18 years.

Study Procedure:

Questionnaire: An Online based survey was done with a help of a questionnaire form created with the help of the WHO Case Report Form (CRF) for Post COVID condition (Post COVID-19 CRF) and Post Covid Functioning Status (PCFS) scale send through social platforms.

Participants and Data Collection: The study is organized through an online google form. The link which proceeds to the questionnaire is prepared and shared through various social media like WhatsApp, email, Telegram, *etc*., and the email id of the participants after informing the objectives and confidentiality to the participants. Informed consent is obtained from the individuals who marked the Yes option for the section detailing the consent. 400 participants Covid infected participants responded to the google form.

Data Entry: The data was properly coded and entered in Microsoft Excel.

RESULTS:

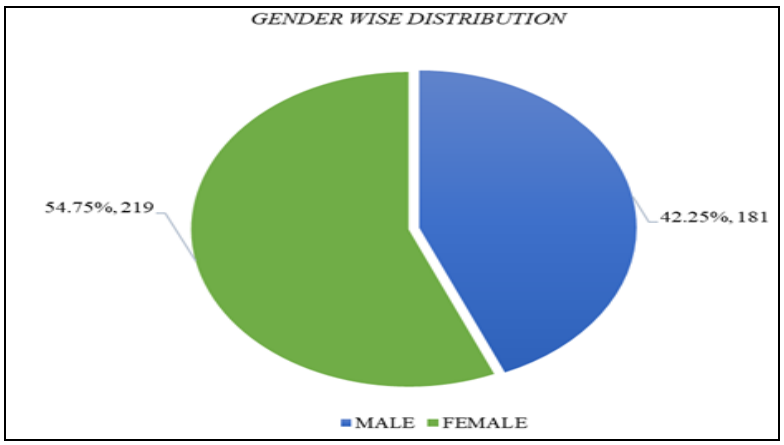

FIG. 1: GENDER-WISE DISTRIBUTION (N=400)

TABLE 1: AGE-CATEGORY-WISE DISTRIBUTION (N=400)

Age Category (In Years)	Number of Participants (N=400)	Percentage (%)	Mean ± SD
18-33	267	66.75%	31.2 ± 12.0
34-49	91	22.75%	
50-65	35	8.75%	
Above 65	7	1.75%	

TABLE 2: OCCUPATION STATUS-BASED DISTRIBUTION N=400)

Occupational Status	Number of Participants (N=400)	Percentage (%)
Student	135	33.75%
Employed	188	47%
Unemployed	10	2.5%
Housewife	49	12.25%
Skilled worker	18	4.5%

TABLE 3: METHODS USED FOR DIAGNOSIS OF COVID INFECTION (N=400)

Methods Used for Diagnosis	Number of Participants (N=400)	Percentage (%)
PCR test	200	50%
Antigen test	178	45%
Antibody test	8	2%
Spirometry or chest radiology	14	4%

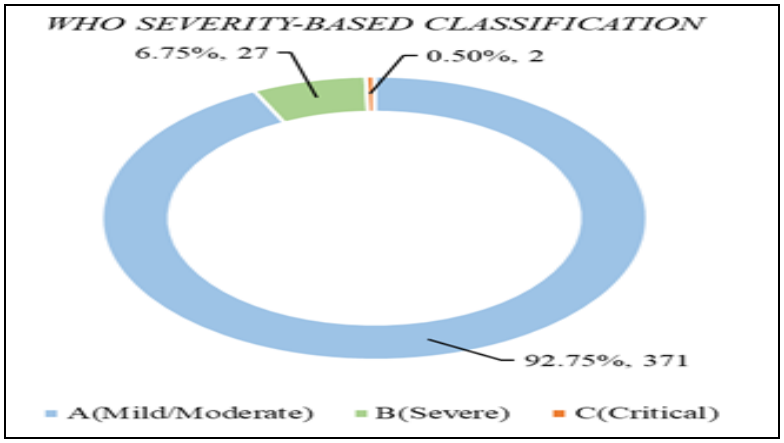

FIG. 2: WHO SEVERITY-BASED CLASSIFICATION (N=400)

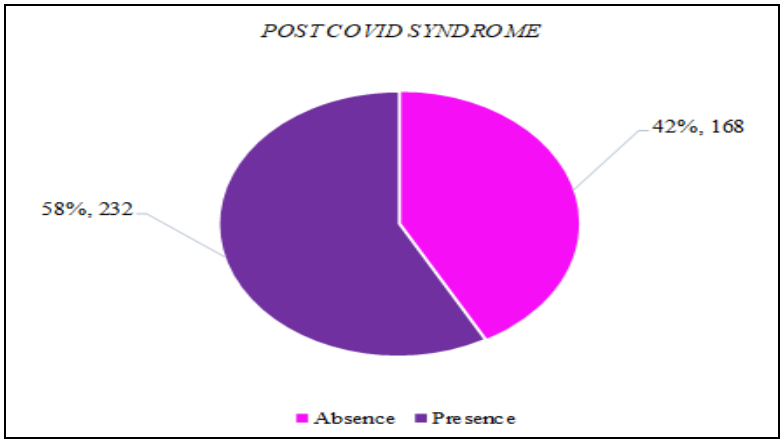

FIG. 3: CLASSIFICATION OF PARTICIPANTS WITH AND WITHOUT POST-COVID SYNDROME (N=400)

TABLE 4: CLINICAL MANIFESTATIONS EXPERIENCED DURING AND AFTER COVID-19 INFECTION (N=400)

Clinical Manifestations	During Covid-19	After Covid-19
General (Fatigue, Fever, Chills, Cold)	373(93%)	169(42%)
Ear/Nose/Throat (Anosmia and Ageusia)	239(60%)	23(6%)
Psychological (Depression/Anxiety)	102(25.5%)	50(13%)
Gastrointestinal (Anorexia, Diarrhea)	150(37.5%)	49(12%)
Musculoskeletal (Myalgia, Arthralgia, Pedal Edema)	198(49.5%)	86(22%)
Neurological (Headache, Sleep disturbances, Vertigo)	242(60.5%)	80(20%)
Respiratory (Dyspnea, Cough)	247(62%)	110(27.5%)
Cardiovascular system (Chest pain)	38(9.5%)	27(7%)
Dermatological (Rashes)	6(1.5%)	9(2%)
New onset Hypertension	6(1.5%)	6(1.5%)
New onset Diabetes Mellitus	5(1.2%)	7(1.8%)

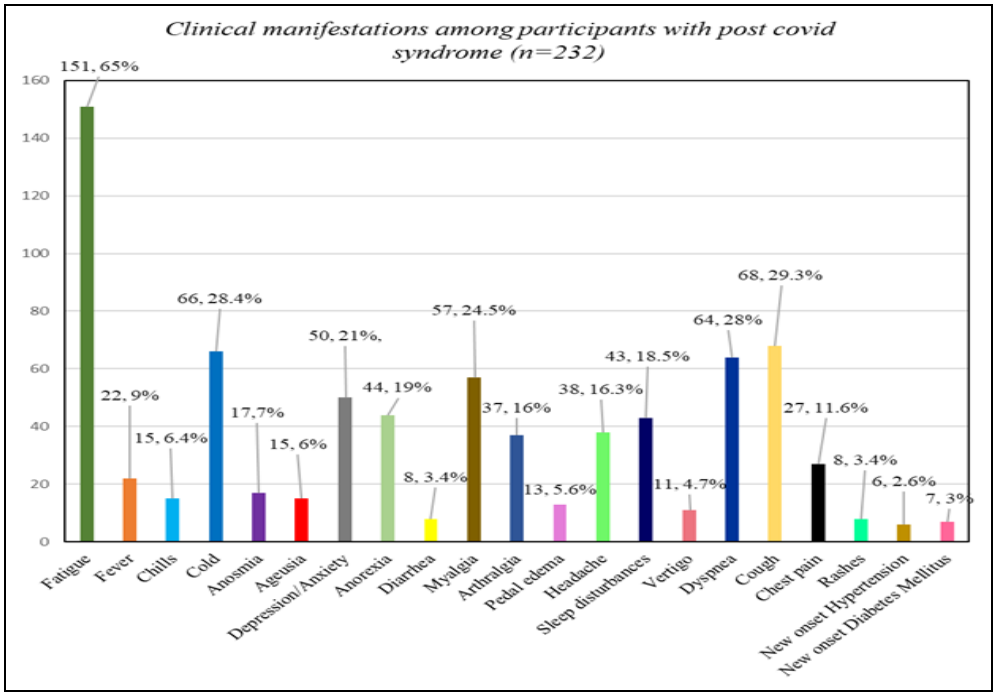

FIG. 4: CLINICAL MANIFESTATIONS AMONG PARTICIPANTS WITH POST-COVID SYNDROME (n=232)

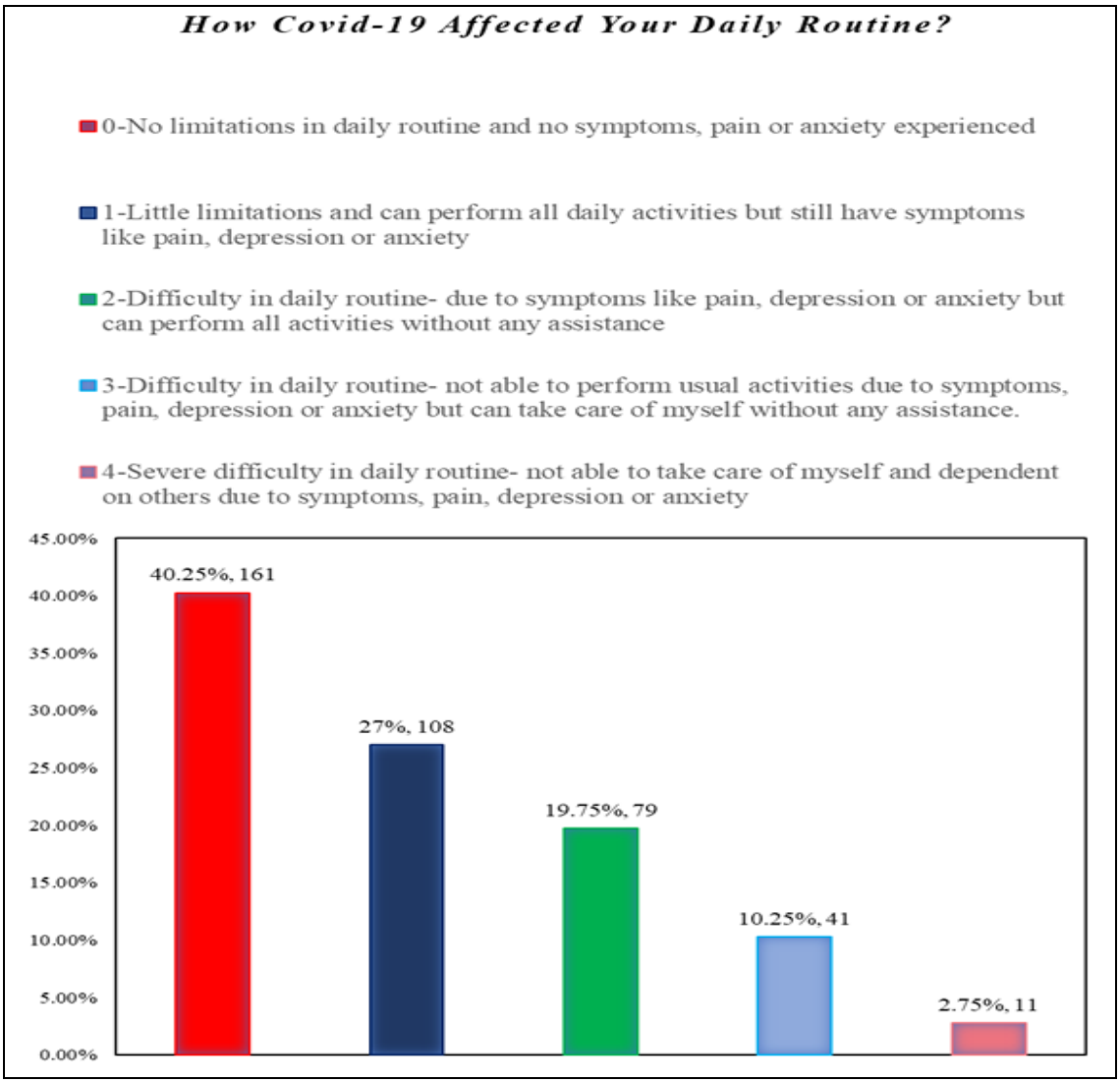

FIG. 5: CLASSIFICATION BASED ON POST-COVID FUNCTIONING STATUS SCALE (N=400)

DISCUSSION: A total of 400 participated, including 181 (45.25%) males and 219 (54.75%) females as shown in **Fig. 1. Table 1** shows mean age of 31.2 ± 12.0 years and includes 267 (66.75%) in the category 18-33 years, 91 (22.75%) in the category 34-49 years, 35 (8.75%) in the category 50-65 years and 7 (1.75%) in the category above 65 years. **Table 2** shows a majority of participants 188 (47%) are employed and 135 (33.75%) are students in the survey. Various methods were used for the diagnosis of Covid-19 and including 200 (50%) PCR tests, 178 (45%) Antigen tests, 8 (2%) Antibody tests and 14 (4%) confirmed by Spirometry or chest radiology shown in **Table 3.**

Fig. 2 shows WHO severity-based classification according to the supportive measures received and includes 371 (92.75%) Category A (Mild/ Moderate) who did not receive oxygen therapy, 27 (6.75%) Category B (Severe) who received oxygen therapy and 2 (0.5%) Category C (Critical) who received ventilator administration. In a similar study done by Anjana, *et al*. 109 (70.8%) were reported as Category A, 43 (29.2%) were reported as Category B and Two patients had significant symptoms reported as Category C[8].

Fig. 3 shows the persistence of symptoms beyond 4 weeks after infection was present in 232(58%) participants and was absent in 168(42%) participants 400. For defining post-COVID-19 symptom persistence, Centers for Disease Control and Prevention (CDC) guidelines were used. A similar study done by Lemhofer *et al.* Sums up the number of symptoms, 226 participants (61.9%) of the total sample reported long-term symptoms [9]. In all, 38.1% of cases did not report any long-term symptoms. Another study was done by Mahmud R, *et al.* involving 355 patients; the incidence of post-COVID-19 syndrome was 46%.

Table 4 shows that the most common symptoms present during and after Covid 19 infection among 400 subjects are General -373(93%), 169(42%); Respiratory -247(62%), 110(27.5%); Musculoskel *et al* -198(49.5%), 86(22%) respectively. **Fig. 4** shows the most common clinical manifestations experienced after covid-19 infection was fatigue 151(65%), Cough 68(29%) followed by Cold 66(28.4%) and Dyspnoea 64(27%). A study done by Binu Areekal *et al.* showed similar results where the most common manifestations identified were fatigue in 109 (32.5%) of 355 participants [10]. A study done by Mahmud R *et al.* shows similar results where persistent cough (8.5%) and post-exertional dyspnoea (7%) among 355 participants [11]. Both psychological and neurological manifestations were common, with depression and anxiety in 50(21%) and sleep disturbances found in 43(18%). The most common clinical manifestation related to musculoskeletal was Muscle pain 57(24%). The most common post-COVID manifestations in the cohort study done by Shivdas Naik were myalgia (134, 10.9%) [12].

Fig. 5 shows that among 400 participants, 161(40.25%) had no limitations in the daily routine and no symptoms, pain, or anxiety experienced, 108(27%) had Little limitations and can perform all the daily activities but still had symptoms like pain, depression or anxiety, 79(19.75%) had limitations in daily routine due to symptoms like pain, depression or anxiety but can perform all activities without any assistance, 41(10.25%) had difficulty in daily routine-not able to perform usual activities due to symptoms like pain, depression or anxiety but take care without any assistance and 11 (2.75%) had severe difficulty in daily routine- Not able to take care and dependent on others due to symptoms like pain, depression or anxiety.

CONCLUSION: Patients with COVID-19 require long-term monitoring and management of their post-COVID symptoms, even after recovering. The most common long-term clinical manifestations identified based on this study include fatigue, cough, cold, dyspnoea, and myalgia. The results show that long-term clinical manifestations after mild and moderate COVID-19 are common and lead to limitations in activities and participation.

However, in most cases, they are not severe and do not lead to frequent or serious issues with the quality of life or workability. A complete rehabilitation program for a great population in post-COVID conditions is required. Early rehabilitation is needed during the acute phase of the illness. It must be personalized particularly for patients with comorbidities, advanced age, obesity, multiple diseases and complications of single or multiple organs.

Rehabilitation programs include mobilization and psychological support to restore fitness and reduce anxiety and depression. The respiratory rehabilitation program includes respiratory muscle training, coughing exercises, stretching exercises, and home exercises comprising 2 sessions per week for 6 weeks, once a day for 10 minutes. Digital health interventions-telehealth can help provide self-monitoring tools, exercise protocols, and psychological support.

ACKNOWLEDGEMENT: Nothing to disclosure.

CONFLICTS OF INTEREST: The author declares no conflicts of interest.

REFERENCES:

1. Shah W, Hillman T, Playford ED and Hishmeh L: Managing the long-term effects of covid-19: summary of NICE, SIGN and RCGP rapid guideline. British Medical Journal 2021; 372: 136.
2. Greenhalgh T, Knight MA, Court C, Buxton M and Husain L: Management of post-acute covid-19 in primary care. British Medical Journal 2020; 370: 3026.
3. Fernandez-de-Las-Penas C, Palacios-Cena D and Gomez-Mayordomo Cuadrado ML: Florencio: Defining post-COVID symptoms (post-acute COVID, long COVID, persistent post-COVID): An integrative classification. Int J of Environmental Research Public Health 2021; 18: 2621.
4. Destin Groff, Ashley Sun and Anna E. Ssentongo: Short-term and Long-term Rates of Postacute Sequelae of SARS-CoV-2 Infection-A Systematic. Journal of the American Medical Association 2021; 4: 2128568.
5. Callard F and Perego E: How and why patients made long covid. Social Science & Medicine 2021; 268: 113426.
6. Cunningham JW, Vaduganathan M, Claggett BL, Jering KS, Bhatt AS and Rosenthal N: Clinical outcomes in young US adults hospitalized with COVID-19. Journal of the American Medical Association 2021; 181; 379–381.
7. Klok FA, Boon GJAM, Barco S, Endres M, Geelhoed JJM and Knauss S: The Post-COVID-19 Functional Status (PCFS) Scale: a tool to measure functional status over time after COVID-19. European Respiratory Journal 2020; 56(1): 2001494.
8. Anjana NKN, Annie TT, Siba S, Meenu MS, Chintha S and Anish TSN: Manifestations and risk factors of the post-COVID syndrome among COVID-19 patients presented with minimal symptoms - A study from Kerala, India. Journal of Family Medicine and Primary Care 2021; 10: 4023-4029.
9. Lemhöfer C, Sturm C and Loudovici-Krug D: The impact of Post-COVID-Syndrome on functioning – results from a community survey in patients after mild and moderate SARS-CoV-2-infections in Germany. Journal of Occupational Medicine and Toxicology 2021; 16: 45.
10. Areekal B, Sukumaran ST, Andrews AM, Nanu SP, Madhavan I, Veepanattu P, Parambath NR and Solomon JP: Persistence of Symptoms after Acute COVID-19 Infection- An Experience from a Tertiary Care Centre in South India. Journal of Clinical and Diagnostic Research 2021; 15: 05-08.
11. Mahmud R, Rahman MM, Rassel MA, Monayem FB, Sayeed SKJB, Islam MS and Islam MM: Post-COVID-19 syndrome among symptomatic COVID-19 patients: A prospective cohort study in a tertiary care center of Bangladesh. PLoS One 2021; 16: 0249644.
12. Shivdas Naik, Soumendra Nath Haldar, Manish Soneja, Netto George Mundadan, Prerna Garg and Ankit Mittal: Post COVID-19 sequelae: A prospective observational study from Northern India. Drug Discoveries & Therapeutics 2021; 15: 1881-7831.

How to cite this article:
Hussain M and Srinivas GD: A retrospective observational study to assess the clinical manifestations and functioning status among Covid-19 survivors with and without post-covid syndrome. Int J Pharm Sci & Res 2023; 14(8): 3972-77. doi: 10.13040/IJPSR.0975-8232.14(8).3972-77.