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Impact of coronavirus disease 2019 on adults in Najaf city

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Abstract

Covid-19 emerged in late 2019 in Wuhan, China, spreading globally and declared a pandemic by the WHO in March 2020. It primarily spreads through respiratory droplets, leading to mild flu-like symptoms or severe respiratory distress. Governments worldwide implemented measures like lockdowns, mask mandates, and vaccination campaigns to control its spread and mitigate its impact.

Aim of Study: was to assess the relationship between the infectious disease covid-19 and the adults population, especially elderly.

Method: We conducted an close-ended questionnaire to gather insights into the impact of covid-19 on adults. The survey targeted mainly individuals aged 60 and above. Participants were asked to voluntarily respond to a series of questions regarding their age, gender, chronic health conditions, vaccination status, etc. The survey received a total of 192 responses.

Results: Most participants above or below the age of sixty showed a higher infection rate among males. Chronic diseases such as hypertension and diabetes were common, and 14.1% reported being smokers. Urban areas were the main location of infection, with more than half of them being infected once. Over half of them received the vaccine, resulting in a more moderate response after infection. Infections typically lasted for two weeks or less, with sensory loss such as smell and taste impairment and difficulties in movement. 76.6% followed preventive measures, and most of them sought treatment. 58.3% experienced weight loss, and 62.5% reported loss of appetite. Many of them used protective measures such as dietary supplements and antibiotics.

Keywords: Coronavirus; Adults; Najaf; Antibiotics

1. Introduction

Coronaviruses are a family of viruses that have an enveloped structure and consist of single-stranded RNA. These viruses are named after their appearance, which resembles a crown or corona. They have the ability to infect mammals, including humans, and typically cause mild infectious illnesses. However, there have been instances of severe outbreaks resulting from certain coronaviruses. For instance, the "severe acute respiratory syndrome" (SARS) virus caused a significant outbreak in mainland China in 2003, while the "Middle East Respiratory Syndrome" (MERS) virus led to outbreaks in the Kingdom of Saudi Arabia in 2012 and in South Korea in 2015 [1].

1.1. Epidemiology

In late December 2019, a novel coronavirus, 2019-nCoV, caused an outbreak of pneumonia spreading from Wuhan to the whole country of China, The virus spread quickly around the world causing a global pandemic [2]. As additional data

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and genetic examinations became accessible, the International Committee for Taxonomy of Viruses officially designated the virus as SARS-CoV-2. Concurrently, the World Health Organization coined the term COVID-19 for the disease induced by the virus [3]. This illness exhibits a broad range of clinical manifestations, ranging from symptom-free infections to severe cases progressing to acute respiratory distress syndrome (ARDS) and potential fatality. ARDS induces lung stiffness, leading to hypoxemia, and a significant number of patients face a heightened risk of death without proper ventilatory support [4].

Adults especially elderly individuals are more susceptible to this infection, as indicated by early findings from China, which revealed heightened severity and mortality rates among those aged 60 and above.

Similar patterns were observed in Europe, with reported mortality reaching up to 10% in adults aged 70 and above, compared to less than 1% in younger adults [5].

1.2. Pathophysiology

SARS-CoV-2 is an enveloped, single-stranded positive-sense RNA virus that belongs to the β-coronavirus genus. The structure of coronaviruses consists of four distinct proteins: Spike (S), membrane (M), envelope (E), and nucleocapsid (N). The viral genome RNA, which is approximately 26-32 kilobases in length, is protected by the nucleocapsid (N) protein. This nucleocapsid is surrounded by a double-layered membrane. The bilayer membrane contains the membrane (M), envelope (E), and Spike (S) proteins, which are distributed throughout [6] (Fig. 1.1). The Spike protein has two functional subunits: the S1 subunit, which binds to the host cell receptor, and the S2 subunit, which mediates the fusion of the viral and cellular membranes [7].

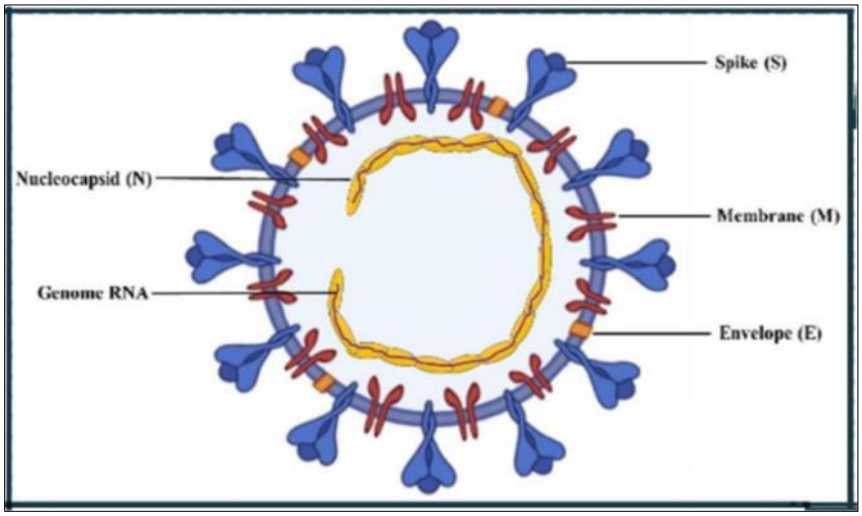

Figure 1 Schematic diagram of coronavirus particle [6]

The pathophysiology of the disease can be divided into a series of stages:

1.2.1. Viral Entry

Close contact with an infected person, whether it be through coughing, sneezing, or the release of respiratory droplets or aerosols, is the primary means by which the virus is transmitted from one individual to another. Inhalation through the nose or mouth allows these aerosols to enter the body, specifically the lungs [8].

1.2.2. Cellular Invasion

The virus undergoes a series of five steps in its life cycle: attachment, penetration, biosynthesis, maturation, and release. It attaches to host receptors, enters cells through endocytosis or membrane fusion, and releases its contents for replication in the nucleus. During the biosynthesis phase, viral mRNA is utilized to produce viral proteins. In the maturation stage, these proteins assemble into complete viral particles. Finally, the matured viruses are released from the host cells [7]. The cell surface receptor angiotensin-converting enzyme-2 (ACE2) plays a crucial role in facilitating the entry of SARS-CoV-2 into human cells. This entry process is initiated by the binding of ACE2 to the receptor-binding domain (RBD) found on the spike (S) protein of the virus [9]. The ACE2 receptor can be found in nearly all organs of the human body, but it exhibits a notably high level of expression on the surfaces of lung alveolar epithelial cells and

enterocytes in the small intestine. This specific distribution facilitates the virus's preferential accumulation in these particular organs [10].

1.2.3. Immune and Inflammatory Response

When the infection occurs, immune cells of the innate system, such as local macrophages and monocytes, react by releasing cytokines. These cytokines then initiate an adaptive immune response from T cells and B cells. In the majority of instances, this immune response effectively resolves the infection. However, in certain situations, an excessive production of cytokines, commonly referred to as a "cytokine storm," can occur, leading to sepsis and inflammation [11].

1.2.4. Lung Involvement

The susceptibility of lung cells to SARS-CoV-2 infection arises from the interaction between the virus's spike protein and the angiotensin-converting enzyme 2 (ACE-2) receptor, abundantly expressed on their surface. lung histopathology reveals interstitial inflammation, diffuse alveolar damage, and necrotizing bronchitis/bronchiolitis. The lungs, being the primary site of infection, exhibit various pathologies such as intra-alveolar edema, fibrin deposition, hyaline membrane formation, Type II pneumocyte proliferation, granulation tissue formation, and collagen deposition [12].

1.2.5. Blood Clotting

Patients with the infection face an increased susceptibility to the development of blood clots, which can obstruct blood vessels. The inflammatory response plays a crucial role in promoting blood clot formation by activating the endothelial cells that line the blood vessels. This activation triggers an excessive accumulation of platelets, initiation of the clotting process, and inhibition of the natural breakdown of clots. Additionally, the presence of ACE-2 receptors disrupts the delicate balance of essential systems involved in regulating blood clotting, such as the renin-angiotensin and **kinin systems**, thereby encouraging a tendency for clot formation. These changes primarily affect the small blood vessels in the lungs, leading to significant implications for respiratory function, particularly in patients with severe infectious conditions [13].

1.2.6. Multi-organ Effects

The alveolar epithelial type II cells in lung tissues, along with other tissues like the heart, endothelium, kidneys, and intestines, have a high concentration of ACE2 receptors. This presence of ACE2 receptors in various organs may contribute to the widespread effects of the viral disease on multiple organs [14]. The cytokine storm is provoked by the extensive replication of the virus inside the cell, causing cellular harm and the release of infectious particles. This leads to various extra-pulmonary effects such as brain inflammation, skin rashes, kidney and liver damage, eye inflammation, blood clotting, and loss of smell and taste [15].

1.3. Diagnosis

Due to the nonspecific nature of most symptoms, relying solely on them for diagnosis is inadequate as they can easily be mistaken for more prevalent conditions [10]. There have been many efforts how to make COVID‐19 diagnosis faster and more reliable. However, currently, real-time reverse transcription-polymerase chain reaction (RT-PCR) remains the most effective method for diagnosing COVID-19 [4]. It involves collecting samples from the upper respiratory system using nasopharyngeal and oropharyngeal swabs. These samples, along with tracheal aspirates or bronchoalveolar lavage (BAL), are then tested in a laboratory to identify the presence of the virus [16].

Viral testing, through reverse-transcription Polymerase Chain Reaction (RT-PCR), played a pivotal role in detecting SARS-CoV-2 for COVID-19 diagnosis. This method involves the conversion of viral RNA to complementary DNA (cDNA), amplification, and real-time detection. The process includes RNA extraction, reverse transcription, and cDNA amplification using qPCR apparatus. While RT-PCR offers advantages such as high sensitivity and accuracy, it comes with drawbacks like sensitivity to conditions and equipment costs [17].

Another method that is essential in diagnosing and managing COVID-19 is chest CT scan. This method provides valuable insights when PCR tests are inconclusive, as it helped detect COVID-19 pneumonia and facilitated early identification and isolation of infected individuals, aiding in effective disease control. However, testing challenges can hamper early diagnosis. To address this, some clinics in China adopted a dual approach during the peak of the pandemic, combining PCR tests and chest CT scans for suspected cases to improve testing capabilities and enhance early detection, which is crucial for disease control and transmission prevention [18]. A CT scan involves rotating an X-ray beam in a circular

motion around the body to capture multiple images, known as slices, of the chest and lungs. These images are then processed by a computer and displayed on a monitor [19].

A third method that used for the virus diagnosis is autopsy. This method involves collecting and testing postmortem specimens, such as nasal swabs, lung tissue, blood, and other organs, for the presence of SARS-CoV-2, the virus that causes the infection. Autopsy diagnosis may reveal the extent and mechanism of damage caused by the virus to various organs, especially the lungs, and the complications, such as thrombosis, inflammation, and multiorgan failure. Autopsy diagnosis also helped to predict severe and prolonged COVID-19 cases, particularly among high-risk people, such as those with chronic diseases or immunosuppression [20].

1.4. Clinical manifestations

Adults especially elderly people, demonstrated a greater tendency to display notable systemic inflammation, as well as damage to both pulmonary and extrapulmonary organs, leading to increased mortality rates [21]. Symptoms related to lower respiratory tract infection, such as fever, dry cough, and dyspnea, were observed in individuals affected by the SARS-CoV-2 virus. Alongside these respiratory manifestations, individuals also experienced other symptoms including headache, dizziness, generalized weakness, vomiting, and diarrhea [7].

1.5. Transmission of covid -19

Person-to-person transmission through respiratory droplets is the primary mode of infection spread. It is also possible for the virus to be transmitted through the fecal-oral route. The virus has been detected in sputum, pharyngeal swabs, and fecal samples, confirming its presence in these bodily fluids [22]. It has an incubation period of 1‑14 days, in most cases 3‑7 days [3].

1.6. Age, gender and weight as risk factors

The major risk factor for hospital admission is age as the elderly are more prone to requiring medical care, followed by male gender and having a body mass index greater than 40 kg/m2 etc. [23].

Age was an important factor in influencing the severity and outcomes of the disease. Older individuals have a higher susceptibility to experiencing severe illness when infected with the virus. This is primarily due to age-related health conditions, which contribute to the increased mortality rates observed in the elderly population. Additionally, the proportion of immunocompromised individuals within a population is closely linked to the age distribution [24].

In terms of gender characteristics, males faced a heightened risk of mortality compared to females. This could be attributed to a higher incidence of chronic comorbidities like cardiovascular diseases, hypertension, and lung diseases, which contributed to their increased vulnerability. Furthermore, the greater prevalence of smoking among males further amplified their mortality rate [25].

Weight also played a role in the outcomes of the infection, A 2021 UK study led by Min Gao et al. found a link between higher BMI in individuals aged 60+ and increased risk of severe COVID-19 outcomes, including hospitalization, ICU admission, and death. The association is more pronounced when combined with type 2 diabetes, hypertension, and cardiovascular disease [26].

1.7. Laboratory diagnosis

It involves analyzing various specimen types to detect the presence of the SARS-CoV-2 virus. Common upper respiratory specimens, such as nasopharyngeal swabs, are frequently used for testing. Lower respiratory specimens, such as sputum, provide samples from the lower airways. Blood specimens can also be analyzed, typically through serological tests that detect antibodies produced against the virus. Fecal specimens are collected to detect the presence of the virus in the gastrointestinal tract. The primary laboratory testing techniques employed for COVID-19 diagnosis include nucleic acid amplification tests (NAATs), such as real-time polymerase chain reaction (RT-PCR), which detect the genetic material of the virus. NAATs are considered the gold standard for diagnosing active COVID-19 infections. Another testing method is antigen detection, which identifies viral proteins in respiratory samples. Antibody detection assays detect the presence of antibodies produced by the immune system in response to SARS-CoV-2 infection **[27]**.

1.8. Management

The main goal of therapeutic management for nonhospitalized patients is to prevent the advancement to severe illness, hospitalization, or death. Other objectives may include speeding up symptom recovery, achieving viral clearance, and

minimizing long-term complications. However, there is a lack of extensive data on how therapy specifically affects these secondary goals [28].

The treatment includes antiviral drugs or specific therapy and supportive management of complications, including advanced organ support, if required [29]. (Specific therapies directly target the virus, addressing the underlying cause (e.g., antiviral drugs, monoclonal antibodies), while non-specific therapies have a broader impact, managing symptoms or complications without directly targeting the virus (e.g., glucocorticoids like dexamethasone, which reduce inflammation).

Choice of drugs depends on the phase of the infection In the viral replication phase, Monoclonal antibodies reduce symptoms but vary in effectiveness against variants. Remdesivir shortens recovery time but impact on mortality is unclear. Baricitinib reduces mortality and recovery time. Inhaled budesonide decreases urgent care needs but favipiravir's effectiveness is inconclusive. Molnupiravir reduces hospitalization risk but is contraindicated during pregnancy and requires contraception afterward. Repurposed drugs lack evidence. In the inflammatory phase, glucocorticoids like dexamethasone decrease mortality in moderate to severe cases. IL-6 inhibitors, like tocilizumab, reduce mortality in severe cases, but sarilumab and siltuximab need further investigation for efficacy [30].

Oxygen therapy maintains respiratory parameters, but its scale varies based on hypoxia severity. Fluid therapy is restricted unless signs of hypoperfusion or shock are present. Antibiotics aren't routine for COVID-19 unless bacterial co-infection is suspected, then broad-spectrum options like Piperacillin/Tazobactam may be used. Anticoagulation, crucial for COVID-19's hyperinflammatory response, involves Heparin thromboprophylaxis, especially in hospitalized patients, with dalteparin 5000 given daily, adjusted for renal function, and intensified in ICU patients. Active bleeding or severe thrombocytopenia are contraindications [31]. Regarding vit C and D, both high-dose vitamin C and vitamin D supplementation may have benefits in managing COVID-19, but more research is needed for conclusive evidence on their effectiveness and safety [32].

Aim of study

This study aimed to gain insights into the virus's impact on the adults especially elderly people, with a focus on demographic factors, chronic diseases, vaccination status, and post-infection complications.

2. Methods

2.1. Study design

In this study we adopted descriptive observational cross-sectional study design, employing a close-ended questionnaire as a main tool.

2.2. Subjects and sampling strategy

The survey was conducted in Al-najaf province, for a month, during October 2023, gathered responses from 192 people infected with Covid-19. The survey, which targeted adults especially elderly, explored crucial aspects such as (age, sex, location, infections number, duration of disease, severity, duration of therapy, hospitalization, weight changes, complications, chronic disease, and adherence).

2.3. Statistical Analysis

The survey data was analyzed using Excel version 16.0 released 2016. The analysis included determining the frequencies and percentages of variables as simple statistical tools to express the findings.

3. Results

3.1. Impact of age on covid-19

Responses were gathered from 192 adults. the age distribution of the infected individuals is as follows: 34.9% under 60, 28.6% between 60-64, 13% between 65-70, 14.1% between 70-75, and 9.4% over 75.

Table 1 Percentages and frequencies of cases by age

Age (years)	Frequency	Percent
60 – 64	55	28.6
65 – 70	25	13
70 – 75	27	14.1
< 60	**67**	**34.9**
> 75	18	9.4
Total	192	100

3.2. Impact of gender on covid-19

The gender distribution among the infected individuals is as follows: 55.7% are male, while 44.3% are female.

Table 2 Percentages and frequencies of cases by gender

Gender	Frequency	Percent
Male	107	55.7
Female	85	44.3
Total	192	100

3.3. Impact of chronic comorbidities on covid-19 severity

Prevalence of chronic diseases: 51.6% hypertension, 40.1% diabetes, 17.2% heart problems, 6.8% respiratory diseases, 21.9% no chronic diseases, 8.3% immune-related diseases, 3.1% brain problems, 2.1% Parkinson's disease,

Table 3 Prevalence of Chronic comorbidities Among infected Individuals

Chronic Condition	Frequency	Percent
Most common comorbidities:		
Hypertension	99	51.6
Diabetes	77	40.1
Heart problems	33	17.2
Less common comorbidities:		
Immune-related diseases (such as rheumatoid arthritis)	16	8.3
Respiratory diseases	13	6.8
Brain problems	6	3.1
Parkinson's disease	4	2.1
Epilepsy	0	0
Other	15	7.8
No chronic diseases	42	21.9

3.4. Impact of Smoking on covid-19 severity

Is the person a smoker?

In this survey, 14.1% were smokers, while 85.9% were non-smokers.

Table 4 Smoking Trends Among the Surveyed Population

Smoking status	Frequency	Percent
Yes	27	14.1
No	165	85.9
Total	192	100

3.5. Impact of type of residence area (environment) on covid-19

What type of area (rural, agricultural or industrial) does the person live in?

The majority of Surveyed people, 81.3%, lived in urban areas. A smaller portion, 18.2%, resided near agricultural regions, while a mere 0.5% were situated near industrial areas.

Table 5 Percentages and frequencies of cases by type of residence area

Type of area	Frequency	Percent
City	156	81.3
Near agricultural areas	35	18.2
Near Industrial Areas	1	0.5
Total	192	100

3.6. Frequency of covid-19 Infection (Number of times of infection)

The frequency of infections among individuals is as follows: 82.3% reported being infected once, 12.5% experienced two infections, and 5.2% had multiple infections.

Table 6 percent. And freq. of cases by no. of times of infection

No. of times of infection	Frequency	Percent
Once	158	82.3
Twice	24	12.5
More than that	10	5.2
Total	192	100

3.7. Vaccination Status: did the person take the vaccine?

Regarding vaccination status, 54.2% of the individuals reported having received the vaccine, while 45.8% indicated they had not.

Table 7 Percentages and number of cases by vaccination Status

Vaccination Status	Frequency	Percent
Yes	104	54.2
No	88	45.8
Total	192	100

3.8. Vaccination Timing (Was the vaccine taken before or after the infection?)

In terms of the timing of vaccine administration, 10.4% reported receiving the vaccine before infection, 43.75% after infection, and 45.83% indicated that they did not take the vaccine.

Table 8 Percentages and frequencies of cases by timing of vaccination

Vaccination timing	Frequency	Percent
Before infection	20	10.4
After infection	84	43.75
Didn't take the vaccine	88	45.83
Total	192	100

3.9. Impact of vaccination on covid-19 severity

In terms of the infection outcomes after taking the vaccine, 9.9% experienced a more severe infection, 13.5% reported a milder infection, 30.73% were not infected after taking the vaccine, and 45.83% did not take the vaccine.

Table 9 Percent. And freq. of cases by outcomes after vaccination

Post-vaccination severity	Frequency	Percent
More Severe	19	9.9
Milder	26	13.5
Not Infected After Vaccination	59	30.73
Did Not Take the Vaccine	88	45.83
Total	192	100

3.10. Duration of covid-19 infection

The infection durations varied among participants, with 7.3% reporting infections lasting five days or less, 17.7% lasting one week, 40.6% lasting two weeks, and 34.4% lasting three weeks or more.

Table 10 Percentages and frequencies of cases by duration of infection

Duration of infection	Frequency	Percent
Five days or less	14	7.3
One week	34	17.7
Two weeks	78	40.6
Three weeks or more	66	34.4
Total	192	100

3.11. Home vs. Hospital Stay (Where did the person spend the infection period?)

The results revealed that 78.13% of individuals stayed at home as it was the appropriate setting for their condition, while 21.88% required hospitalization due to more severe infection.

Table 11 Percent. And freq. of cases by location during infection

Location during infection	Frequency	Percent
At home	150	78.13
Hospital	42	21.88
Total	192	100

3.12. Impact of covid-19 on duration of hospitalization

A small percentage (8.81%) had a hospital stay of one to four days, while the majority (77.72%) did not require hospitalization. A few individuals had stays of one week (3.6%), two weeks (5.18%), or three weeks or more (4.15%).

Table 12 Percent. And freq. of cases by duration of hospitalization

Duration of hospitalization	Frequency	Percent
One to four days	17	8.81
Condition did not require hospitalization	150	77.72
One week	7	3.6
Two weeks	10	5.18
Three weeks or more	8	4.15
Total	192	100

3.13. Severity of covid-19

Infection severity showed variation among participants, with 76.56% experiencing symptoms resembling the flu, 15.63% requiring hospitalization due to the severity of their cases, and 7.81% enduring highly severe infections necessitating prolonged stays at the hospital.

Table 13 Percentages and frequencies of cases by severity of infection

Severity of infection	Frequency	Percent
Normal	147	76.56
Severe	30	15.63
Very severe	15	7.81
Total	192	100

3.14. Complications of covid-19

Common complications include loss of taste and smell (46.9%), difficulty in movement and fatigue (40%), dry cough (32.3%), and decreased appetite (62.5%). Less frequent complications include excessive sensitivity, hair loss, kidney damage, blood clotting, heart failure, and death.

Table 14 Percent. And freq. of cases by complications after infection

Complications after infection	Frequency	Percent
More common complications:		
Change in appetite (decrease)	120	62.5
Loss of taste and smell	90	46.9
Difficulty in movement and feeling tired	78	40
Dry cough	62	32.3
Less common complications:		
Excessive sensitivity	28	14.6
Death	28	14.6
Difficulty remembering	25	13

Hair loss	23	12
Blood clotting	23	12
Kidney damage	17	8.9
Change in appetite (increase)	16	8.3
Heart failure	10	5.2
No complications	33	17.2

3.15. Preventive measures

Preventive measures during infection: 23.4% took no measures, while 76.6% of participants say there was isolation and that safety protocols were implemented.

Table 15 Percent. And freq. of cases by preventive measures

Preventive Measure	Frequency	Percent
No preventive measures taken	45	23.4
The infected person was isolated and safety measures were taken	147	76.6
Total	192	100

3.16. Treatment compliance

In terms of treatment compliance, 71.88% of individuals responded that they complied fully or partially with the treatment, 11.5% experienced difficulties in adhering to the treatment, resulting in low compliance. A small percentage, 4.1%, did not comply with the treatment. 12.5% Didn't require management.

Table 16 Percent. And freq. of cases by compliance with treatment

Treatment Compliance	Frequency	Percent
Full or partial compliance	138	71.88
Low compliance	22	11.5
Didn't comply with treatment	8	4.17
No management required	24	12.5
Total	192	100

3.17. Impact of covid-19 on weight

Weight changes during and after the infection: 58.3% experienced weight loss, 38.5% observed no change, and 3.2% reported weight gain.

Table 17 Percentages and frequencies of cases by change in weight

Change in weight	Frequency	Percent
Yes, weight loss	112	58.3
No	74	38.5
Yes, weight gain	6	3.2
Total	192	100

3.18. Type of covid-19 management

During the infection, the types of treatment utilized were as follows: multivitamin immune boosters (66.7%), antibiotics (41.7%), antiviral drugs (20.8%), anti- inflammatory drugs (20.8%), vitamin C (45.8%), vitamin D (20.8%), oxygen (37.5%), anticoagulants (16.7%), and 12.5% did not require any treatment.

Table 18 Percent. And freq. of cases by type of management

Type of management	Frequency	Percent
Most common management options		
Multivitamin immune boosters	128	66.7
Vitamin C	88	45.8
Antibiotics	80	41.7
Oxygen	72	37.5
Less common management options		
Antiviral drugs	40	20.8
Anti-inflammatory drugs	40	20.8
Vitamin D	40	20.8
Anticoagulants	32	16.7
No management required	24	12.5

3.19. Duration of management (treatment)

16.7% of the participants say they completed the treatment within five days, while 33.3% say they underwent treatment for five to ten days. Additionally, 8.3% say they received a two-week treatment, and 29.2% required treatment for a longer duration. Notably, 12.5% say they did not require any treatment.

Table 19 Percentages and frequencies of cases by duration of treatment

Treatment duration	Frequency	Percent
Only five days	32	16.7
Five to ten days	64	33.3
Two weeks	16	8.3
More than two weeks	56	29.2
No treatment required	24	12.5
Total	192	100

4. Discussion

4.1. Impact of age on covid-19

The collected data reveals that individuals impacted by the virus cover various age groups. 28.6% are aged 60-64, 13% are 65-70, 14.1% are 70-75, 34.9% are below 60 years old, and 9.4% are older than 75 (Table 3.1). The data shows that the impact of the virus varies across age groups.

Older age, even among "healthy" older individuals with fewer risk factors, remained an independent contributor to the increased mortality associated with COVID-19. Although other factors partially accounted for the higher death rates among older adults, their advanced age alone posed a significant risk for COVID-19-related fatalities [33].

4.2. Impact of gender on covid-19

The gender distribution among individuals impacted by the virus shows that 55.7% are male, while 44.3% are female (Table 3.2). This indicates that both genders are affected, with a slightly higher percentage of males impacted. Men's reduced infection-fighting capacity stems from occupational exposure, lifestyle differences, and immune response variations. Factors like higher ACE 2 receptor expression and lifestyle choices (smoking, alcohol consumption) exacerbate this. In contrast, females generally exhibit greater infection resistance, possibly due to sex hormones like estrogen, bolstering immune response and protection [34]

4.3. Impact of chronic comorbidities on covid-19 severity

A substantial portion (21.9%) had no chronic diseases, indicating that a significant number of individuals without pre-existing health conditions were

impacted. This challenges the idea that the virus only affects individuals with underlying health issues. The prevalence of hypertension (51.6%), diabetes (40.1%), and heart problems (17.2%) highlights the potential risk for individuals with these conditions (Table 3.3). According to three studies [35,36,37] other comorbidities can

worsen the outcome of the infection and develop severe symptoms are chronic lung diseases such as COPD, kidney diseases, malignancies, and HIV. These comorbidities can increase the risk of developing severe complications such as acute respiratory distress syndrome (ARDS) and pneumonia, which can lead to death.

4.4. Impact of Smoking on covid-19 severity

A minority (14.1%) of Individuals impacted by the virus are smokers, while the majority (85.9%) are non-smokers (Table 3.4). This indicates that contracting the infection and experiencing its symptoms does not distinguish between smokers and non-smokers. However, chronic smokers are at increased risk of experiencing severe complications from the infection, as smoking can lead to conditions such as chronic bronchitis, emphysema, cardiovascular problems, hypertension, diabetes, and weakened immune function. These health issues exacerbate the severity of the infection and worsen prognosis [38].

4.5. Impact of type of residence area (environment) on covid-19

The distribution of the Infected individuals based on their location reveals that the majority, 81.3%, reside in urban areas, while a smaller percentage, 18.2%, are in proximity to agricultural areas. Only a minimal portion, 0.5%, is near industrial areas (Table 3.5).

The data shows more cases in urban areas, due to high population density and social interactions. Urban areas, like big cities, have more social, economic, and innovative activities, but also more diseases, crime, and pollution. These factors increase the infection risk and pressure on health care systems [39].

4.6. Frequency of covid-19 Infection

The collected data Indicates that the majority (82.3%) of individuals were infected once, with a smaller percentage experiencing multiple infections, including 12.5% with two infections and 5.2% reporting more than two infections (Table 3.6). There is a lower risk of reinfection after a prior infection, and primary infection provides some protection against reinfection, reducing the risk of symptomatic infection and severe illness. However, the duration of protection from reinfection and the exact timing of subsequent infections are still uncertain. Reinfection does not contribute to an additional risk of hospitalization, ICU admission, or death [40,41].

4.7. Vaccination status and 4.8. timing of vaccination: (Was the vaccine taken and when?)

The data indicates that 54.2% of respondents took the vaccine, while 45.8% didn't take it (Table 3.7). Among those vaccinated, 10.4% received the vaccine before infection, while 43.75% took it after infection (Table 3.8). This suggests there was a notable level of acceptance and willingness to be vaccinated among the surveyed population. According to a US study (Malik et al., 2020), 67% of participants would accept a COVID-19 vaccine. The study highlighted demographic and geographic factors influencing acceptance: gender (males more accepting), age (older adults more accepting), race (Asians more accepting), education (higher education more accepting), employment (employed or retired more accepting), and influenza vaccine history (low uptake among certain groups) [54].

4.9 Impact of vaccination on covid-19 severity

A third (30.73%) weren't infected post-vaccination, while nearly half (45.83%) were unvaccinated. Some (9.9%) experienced more severe infections after vaccination, and others (13.5%) had milder cases, suggesting varied immune responses or breakthrough infections. However, a significant number had milder infections after vaccination (Table 3.9). A study conducted in India focusing on healthcare workers found that the vaccine greatly reduces disease severity, hospitalization, and mortality rates [42].

4.10 Duration of covid-19 infection

The results shows varied durations of virus infection among respondents: 7.3% for five days or less, 17.7% for one week, 40.6% for two weeks, and 34.4% for three weeks or more (Table 3.10). A study conducted in Italy found that as the duration of SARS-CoV-2 positivity increased, so did the likelihood of persistent COVID-19 symptoms. This suggests that longer viral infections may lead to prolonged inflammation and symptoms, contributing to their chronicization beyond the acute phase of the infection [43].

4.11 Location during infection

The majority of Infected individuals spent the infection period at home (78.13%), with only 21.88% requiring hospitalization (Table 3.11). This could imply that the majority of cases were mild or asymptomatic, or that there was a lack of hospital capacity or access for some patients. However, this result may not be representative of the whole population. According to the CDC COVID Data Tracker, the percentage of the hospitalizations in the US was 4.5%, which is lower than 21.88 % [44].

4.12 Impact of covid-19 on duration of hospitalization

The majority of cases didn't require hospitalization, suggesting that a significant portion of infections in this population could be managed outside of healthcare facilities. Among those who did need hospitalization, most had shorter stays, with only a small percentage needing prolonged care (Table 3.12).

Duration of hospital stay is significantly affected by age, severity, and comorbidities [45].

4.13 Severity of covid-19

Severity of infection correlates with hospitalization duration. Majority with mild symptoms (76.56%) didn't need hospitalization, while severe and very severe cases often did (Table 3.13). A 2021 study in China revealed that a significant portion of COVID-19 cases experienced severe (17.84%) or critical (4.9%) symptoms, with men, older individuals, and those with underlying health issues being at higher risk. Symptoms like cough, dyspnea, fatigue, fever, and gastrointestinal issues were linked to severe illness [46].

4.14 Complications of covid-19

Decreased appetite (62.5%), Loss of taste and smell (46.9%) and dry cough (32.3%) are common. Other issues include excessive sensitivity (14.6%), hair loss (12%), kidney damage (8.9%), blood clotting (12%), heart failure (5.2%), and death (14.6%), showing the virus's diverse impact. Difficulties in remembering (13%) and movement fatigue (40.0%) are also prevalent (Table 3.14). According to a previous study, most of the complications are often tied to expression of ACE2 on tissues and organs, the receptor 2019-nCoV uses for cell entry. This interaction not only aids viral infection but also disrupts the renin-angiotensin system (RAS), crucial for blood pressure and inflammation regulation. Imbalances in this system can trigger hypertension, cardiac issues, and respiratory distress syndrome [47]. As for decreased appetite, this is a common symptom of the infectious disease and can be caused by factors such as changes in taste and smell, feeling unwell, or gastrointestinal issues. In a 2022 study, patients experienced a significant decrease in appetite during the acute phase. This led to a 70% reduction in food intake and an average weight loss of 8%. Although most patients returned to normal eating habits after leaving the hospital, they only regained half of the weight they had lost. As a result, 41% of cases experienced persistent malnutrition. Patients with pre-existing conditions like obesity or diabetes also experienced additional weight loss during hospitalization and recovery. [48].

4.15 Impact of preventive measures on covid-19

the data Indicates that a significant portion (76.6%) of individuals took preventive measures by isolating the infected person from the rest of the family and following safety measures (Table 3.15). Implementing preventive measures for older people, who are clearly more at risk, could disrupt the lives of younger people who are less affected by the infection. According to a 2021 study conducted in Italy investigating the acceptance of such measures, 50% of the participants opposed shopping hours for the elderly. 35% favored activation programs for seniors during the pandemic.

40% were neutral on age-based allocation of medical resources, with a 50-50 split among the rest. 1% avoided the elderly, while over 50% kept the same contact as before the pandemic [49].

4.16 Treatment compliance

Regarding treatment compliance, the majority (71.88%) fully or partially adhered to the prescribed treatment, while a smaller percentage had low compliance (11.5%), and a very small percentage did not comply with the treatment (4.1%) (Table 3.16). These findings underscore the varying levels of treatment adherence among respondents. Regarding the reason for non-adherence to treatment in general, a 2020 Italian study found that geographic barriers notably affect pharmacological therapy adherence among older adults with (CVDs), resulting in heightened use of healthcare services like hospitalizations and emergency room visits, as well as increased mortality rates [50].

4.17 Impact of covid-19 on weight

Data shows that 58.3% of individuals experienced weight loss during or after infection, while 38.5% saw no change, and 3.2% reported weight gain (Table 3.17). According to an article by Ada's Medical Knowledge Team (2023), Infection-induced weight loss can result from factors like decreased appetite, digestive issues, rapid metabolism, and stress. Loss of taste and smell can further impact eating habits, while constipation can affect appetite and digestion. Severity of the infection and overall health determine the extent of weight loss. While some experienced weight gain during lockdowns [51].

4.18 Type of covid-19 management (treatment)

Most respondents (66.7%) used multivitamin immune boosters, highlighting a widespread belief in immune system support. Antibiotics (41.7%) were utilized, likely for bacterial co-infections or precaution. Antivirals and anti-inflammatories (20.8% each) were employed for severe cases. Vitamin C (45.8%) was popular for immune support. Additionally, Vitamin D (20.8%) and oxygen therapy (37.5%) were utilized, indicating the need for respiratory support in some cases. Anticoagulants (16.7%) were administered in some cases, and only a small portion (12.5%) required no management (Table 3.18)

According to a 2021 study conducted by researchers from the University of Nebraska Medical Center and the Creighton University School of Medicine in the USA, Anti-inflammatory agents like steroids and tocilizumab countered the infection by blocking cytokines. Tocilizumab played a role in treating severe pneumonia cases, while dexamethasone saved hypoxic patients. Anticoagulation prevented clots and complications in severe cases, with prophylactic LMWH being best for non-bleeding patients. Antivirals like remdesivir and oseltamivir blocked viral replication, although their impact on mortality remained unclear, necessitating further research to assess their value. Antibiotics treated bacterial co-infections such as pneumonia but did not target the virus itself. Vitamin C's antioxidant properties prompted investigation for COVID-19 management, but the available data was inconclusive, while vitamin D deficiency was associated with an increased risk of infection [52].

4.19 Impact of covid-19 severity on duration of treatment

Treatment durations ranged widely: 16.7% for five days, 33.3% for five to ten days, 8.3% for two weeks, and 29.2% for over two weeks. Notably, 12.5% required no treatment, indicating either mild symptoms or effective prevention (Table 3.19). According to a 2020 Indian study, the duration of treatment for COVID-19 appears to be well-defined and consistent across various antiviral drugs. The study outlines specific dosage regimens for several medications, including IFN-α, lopinavir/ritonavir, ribavirin, chloroquine phosphate, and arbidol, with a common recommendation of not exceeding 10 days for each treatment course [53]

5 Conclusion

The results provided an understanding of the impact of the infection on the health and well-being of the infected adult people especially elderly.

The study found that the majority of the infected persons were older than 60 years, male, and had chronic diseases such as hypertension and diabetes, which are known risk factors for severe infection outcomes.

Most of the infected persons lived in urban areas, were infected only once, and did not take the vaccine before infection.

The study also revealed that the infection after taking the vaccine was more severe for a small proportion of the respondents, while most of them reported milder symptoms or no infection, suggesting that the vaccine may have some protective effect against the infection, but it is not 100% effective and may vary by individual factors.

The study showed that the Infection can have a significant and lasting impact on the health of the infected persons since the duration of virus infection was longer than two weeks for most of the respondents, and many of them required hospitalization and experienced severe or very severe symptoms.

The most common complications after infection were loss of taste and smell, difficulty in movement and feeling tired, dry cough, and excessive sensitivity. Some of the respondents also reported kidney damage, blood clotting, heart failure, and death. These complications affected the quality of life and well- being of the infected persons and their families, as well as the health system and the economy.

The study also found that preventive measures, treatment compliance, and immune boosters may helped reduce the transmission and severity of the infection.

It is imperative to adapt in public health strategies to effectively respond to potential future health crises that may affect adults especially elderly population.

Compliance with ethical standards

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Statement of ethical approval

Personal consent was obtained from the patients who participated in the study.

Statement of informed consent

"Informed consent was obtained from all individual participants included in the study."

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