

# Analyzing the Relationship Between COVID-19 Susceptibility and Blood Group Variations: A Comprehensive Investigation into the Impact of ABO Blood Types on the Incidence, Severity, and Clinical Outcomes of the Disease

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## ABSTRACT

**Background:** The covid-19 pandemic, originating from a new strain of coronavirus (SARS-CoV-2), is of concern to the global health arena as no crisis comparable to this has happened in the past. The investigation of not only the genetic components which may predispose for such a disease but also determine the severity of the illness has turned into a pressing research issue in modern days. Although it is desirable for the formulation of effective community health policy which provide tailor-made solutions concerning treatments, it is important that people have a clear understanding of the role played by blood type differences in this regard.

**Methodology:** The research was done at Baghdad Medical City Hospital during the period of June and August of 2021 using the patients with verified COVID-19 cases as their base. The data contained not only demographic information but also a blood type, disorder severity level, as well as the details were about the procedure. Various statistics organizations, include but not limited to the Pearson correlation, Chi-square and data visualization were applied using SPSS to establish the association between different blood types and the aftermath of COVID-19 infections. **Results:** The study demonstrated that among the many characteristics of COVID-19, blood types tested out to be associating with a statistically significant number of them. Noteworthy is the significant negative association that connects blood types with the severity of the disease, and this factor also determines the period for recovery. It became clear that the recovery duration and the treatment response didn't depend on age when the results were adjusted for any statistically insignificant variations that could be attributed to age. This evidences us that it is likely that the age factor is not considered as a premier factor in the progress of the COVID-19 in the analyzed patients. when goes to a green process, the human error disappears.

**Conclusion:** Obtained results of patients with diversified ABO blood types allowed us the data that confirmed disease incidence and severity can be modified during COVID-19. Given this fact, the doctors in the health care institutions and in the government agencies responsible for public health should gain this information. Also, the organizations need this information to develop a disease prevention and control policy. In a wider plan of the research and response strategy to the pandemic, COVID-19, the results reveal that on the genetic side the blood type must be borne in mind, amongst other hereditary features.

**Keywords-** COVID-19, SARS-CoV-2, ABO blood types, susceptibility, severity, clinical outcomes, host-virus interactions, public health, personalized medicine.

## I. INTRODUCTION

One of the most persistent problems for all the public health officials in the world, since COVID-19 pandemic hit the whole globe, is the fact that this pandemic is something which has never been seen before

and which is caused by a brand new, previously unknown coronavirus called SARS-CoV-2. In a breakthrough study, the correlation of ABO blood type and one's susceptibility to COVID-19 has been linked. As the scientific community continue exploring the different route factors that could affect how a person

responds to the virus, these findings are expected to give clearer direction to future studies. This comes after the constant strive of the scientific community to shed light on these multiple aspects of appearance that make up personal attractiveness (Wu et al., 2020; Zhao et al., 2020). Blood groups pattern is a phenomena that is going to be given some attention now in interaction with infectious diseases. Blood types have also been demonstrated to have a great impact on vulnerability to some sicknesses through experience which has accumulated over time (Li et al., 2019). In accordance with the ABO blood group classification, individuals are classified into one of four basic categories: The immune system of an individual is able to identify whether the blood cells are either A, B, AB, or O by comparing them to the red cell antigens that are present on the surface of the blood. By the lack or existing of antigens is the function of distinguishing between aforementioned kinds. For that reason it is impossible not to stress that a better knowledge of the probable association between ABO blood groups and COVID-19 presents a great importance regarding the creation of public health policies and the development of individualized treatments. This systematic analysis will focus on several major aspects, such as the incidence rates each blood type has, the severity of the diseases varied across the blood types, and their clinical outcome, to improve the depth of the understanding of the relationship between ABO blood types and COVID-19. Through the convergence of well-known results from previous researches and the provision of new points of view, this work seeks to demystify the connection between alterations in the blood type and the complexity of interactions with the SARS-CoV-2 virus, resulting to a more sophisticated comprehension. I would like dig deeper into this association that is fueled by a hypothesis that the ABO blood type antigens can perform either as receptors or modifiers during the viruses-host cell interaction (Ziets and Tatonetti, 2020). According to the assumption, now this association is becoming a subject of research. Another possibility is that the blood type difference in susceptibility and outcomes may also be related, in part, to variations in immunological response, coagulation factors and other physiological aspects that are associated with different blood types. To reach the goals of this investigation we will take a strategy that makes a room for more of several mixed variables. This strategy will be based on an intensive literature review being done and making a statistical analysis of the large-scale epidemiological data, and clinics qualified by blood types will be conducted, if necessary. The outcomes of this study, in the context of COVID-19, may offer important information that can enhance the current knowledge in terms of the intricate way viruses are interconnected to their hosts. All in all, this information is important for treatment procedures and lays the foundation for the decisions concerning the public health.

## II. METHODOLOGY

### 1. *Sample Collection:*

- Samples were collected at the Medical City Hospital in Baghdad during the period from June (month 6) to August (month 8) of 2021.
- Inclusion criteria: Patients with confirmed COVID-19 diagnoses during the specified timeframe.
- Ensure adherence to ethical guidelines, patient consent, and institutional review board (IRB) approvals.

### 2. *Data Variables:*

- Demographic information: Age, blood group.
- Clinical data: COVID-19 severity (mild, moderate, severe), treatment received (Cort + Levo, Levo + Flag, Levo + Flag + Ciba).
- Ensure standardization in data collection to minimize biases.

### 3. *Data Handling:*

- Medical records will be carefully reviewed to extract relevant information.
- Data anonymization and confidentiality measures will be applied to protect patient privacy.

### 4. *Statistical Analysis using SPSS:*

- Enter data into SPSS, assigning appropriate variable types.
- Perform descriptive statistics using **Analyze > Descriptive Statistics > Frequencies** to summarize demographic and clinical variables.

### 5. *Correlation Analysis using SPSS:*

- Use **Analyze > Correlate > Bivariate** to conduct Pearson correlation analysis between age, blood group, and COVID-19 severity.
- Examine correlation coefficients and associated p-values.

### 6. *Chi-Square Test using SPSS:*

- Employ **Analyze > Descriptive Statistics > Crosstabs** to conduct Chi-Square tests for associations between age, blood group, and treatment response.
- Interpret the Chi-Square test results, considering significance levels.

### 7. *Results Interpretation:*

- Analyze SPSS output, focusing on statistical significance, correlation coefficients, and any observed patterns or trends.

### 8. *Data Visualization using SPSS:*

- Create visualizations in SPSS if needed, such as charts or graphs, to enhance the presentation of key findings.

### 9. *Limitations and Assumptions:*

- Acknowledge potential limitations such as sample size, retrospective design, and any biases introduced during data collection.

- Discuss the assumptions made during the analysis.

**10. Ethical Considerations:**

- Ensure that the study adheres to ethical principles, maintaining patient confidentiality and privacy.
- Obtain necessary approvals from relevant ethical review boards.

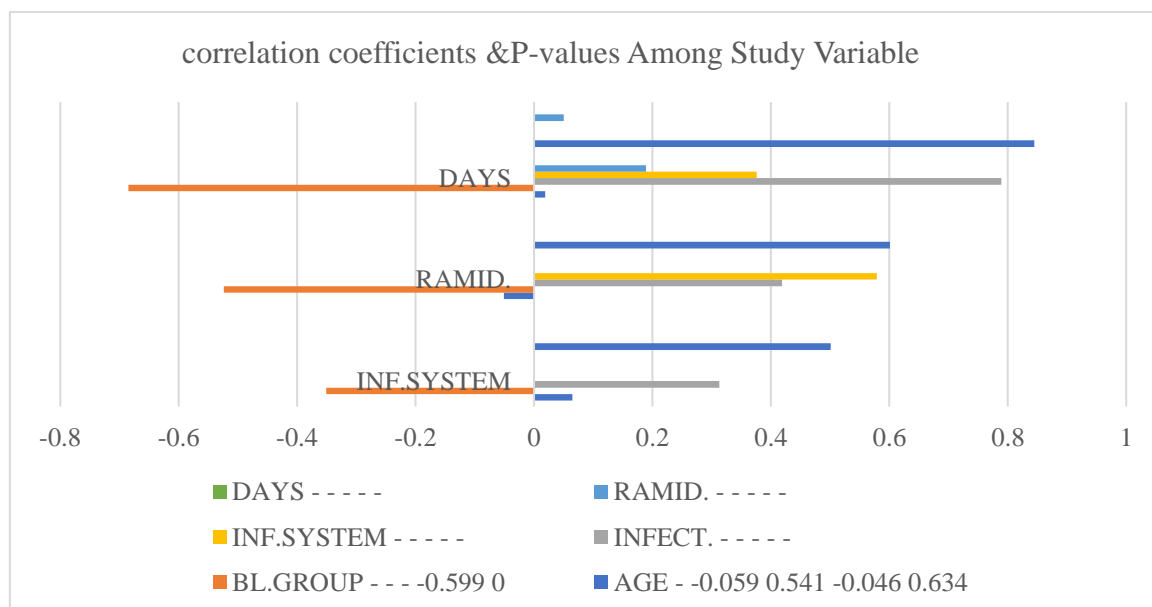
**11. Implications and Future Directions:**

- Discuss the potential implications of the findings for clinical practice.
- Provide recommendations for future research, including prospective studies or investigations into specific aspects identified in the current analysis.

**III. RESULT**

**Table 1: Correlation Coefficients and P-Values Among Study Variables''**

	AGE	BL.GROUP	INFECT.	INF.SYSTEM	RAMID.	DAYS
AGE	-	-	-	-	-	-
BL.GROUP	-0.059	-	-	-	-	-
	0.541	-	-	-	-	-
INFECT.	-0.046	-0.599	-	-	-	-
	0.634	0.000	-	-	-	-
INF.SYSTEM	0.065	-0.351	0.313	-	-	-
	0.501	0.000	0.001	-	-	-
RAMID.	-0.051	-0.524	0.419	0.579	-	-
	0.601	0.000	0.000	0.000	-	-
DAYS	0.019	-0.685	0.789	0.376	0.189	-
	0.845	0.000	0.000	0.000	0.050	-



**Figure 1. Correlation Coefficients and P-Values Among Study Variables**

It would seem that the table 1 and figure 1 that have been presented are a correlation matrix that illustrates the link between the many factors that have been investigated. In each cell, the first number is the correlation coefficient, which is a measurement that determines the strength of a linear connection between

two variables as well as the direction of that link. Variables such as Age and Others: AGE and other factors have either not been shown to have any relationships with one another, or they have been purposefully left out of the analysis. Relationships between the BL.GROUP (Blood Group): The correlation

with age is not statistically significant ( $p = 0.541$ ), and it is quite weak ( $r = -0.059$ ), which suggests that there is no meaningful association between the two variables. There exists a somewhat negative association with INFECT, with a correlation coefficient of  $-0.599$ . This correlation is statistically significant ( $p < 0.001$ ), indicating that when the blood group variable grows, the infection variable tends to decrease, or vice versa. A modest negative association with INF.SYSTEM ( $r = -0.351$ ), which is statistically significant ( $p < 0.001$ ), is shown by the correlation coefficient. A correlation coefficient of  $-0.524$ , which is statistically significant ( $p < 0.001$ ), indicates a somewhat unfavorable relationship with RAMID data. This indicates that there is a strong propensity for both variables to go in opposing directions, as seen by the statistically substantial negative correlation with DAYS ( $r = -0.685$ ), which is statistically significant ( $p < 0.001$ ). There is a very slight negative connection with age ( $r = -0.046$ ), which is not statistically significant ( $p = 0.634$ ). This is according to the correlations between INFECT and AGE. There is a somewhat positive association with INF.SYSTEM ( $r = 0.313$ ), which is statistically significant ( $p = 0.001$ ), which suggests that the infection system variable tends

to grow when the infection rate rises. A correlation coefficient of  $0.419$  indicates a somewhat favorable relationship with RAMID, which is statistically significant ( $p < 0.001$ ). A statistically significant positive correlation ( $r = 0.789$ ) with DAYS, showing a strong link where both variables tend to rise together. This correlation is statistically significant ( $p < 0.001$ ), indicating that the relationship is strong. Relationships between the INF.SYSTEM (Infection System) and: A very small positive connection with age ( $r = 0.065$ ), which is not statistically significant ( $p = 0.501$  at the time of analysis). The presence of a very modest positive association with RAMID ( $r = 0.579$ ) is statistically significant ( $p < 0.001$ ) according to the statistical analysis. A statistically significant ( $p < 0.001$ ) moderately positive connection with the number of days in the week ( $r = 0.376$ ) among the variables. Relationships: RAMID has a very slight negative connection with AGE ( $r = -0.051$ ), which is not statistically significant ( $p = 0.601$ ). There is a small positive correlation with DAYS ( $r = 0.189$ ), which is statistically significant ( $p = 0.050$ ), suggesting that there is a possible slight tendency for both variables to move in the same direction.

Table 2. Blood Group Distribution Across Different Age Groups

Age Group	A (Count)	A (%)	B (Count)	B (%)	AB (Count)	AB (%)	O (Count)	O (%)	Total
30 - 39	13	52.0	9	31.0	7	41.2	18	48.7	47
40 - 49	7	28.0	13	44.8	7	41.2	15	40.5	42
50 - 59	5	20.0	7	24.2	3	17.6	4	10.8	19
<b>Total</b>	<b>25</b>	<b>100%</b>	<b>29</b>	<b>100%</b>	<b>17</b>	<b>100%</b>	<b>37</b>	<b>100%</b>	<b>108</b>

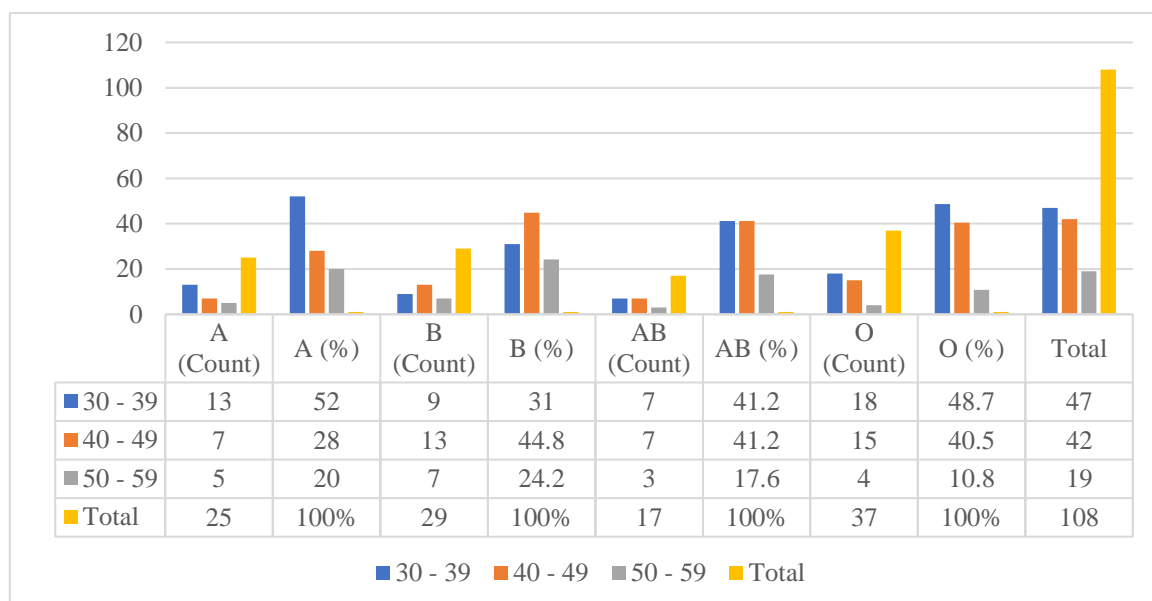


Figure 2. Blood Group Distribution Across Different Age Groups

Both Table 2 and Figure 2 provide the distribution of blood types (A, B, AB, and O) among

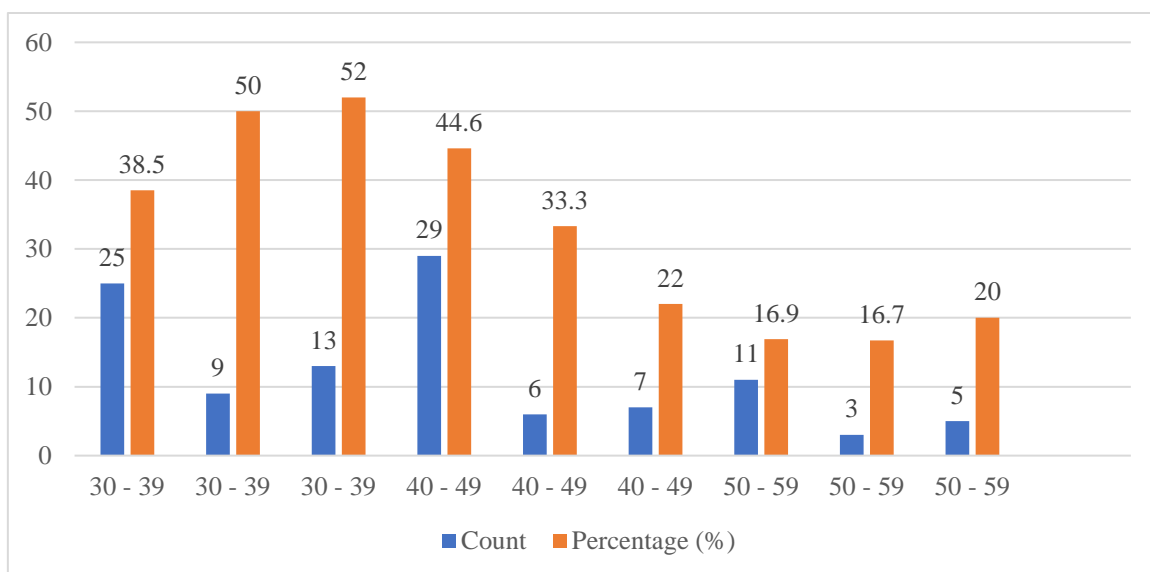
three age groups: 30–39 years old, 40–49 years old, and 50–59 years old. Additionally, the table and figure

include information about the count and percentage of persons who belong to each blood group for each age group. Blood range O is the most common among those aged 30 to 39, followed by Blood Groups A, B, and AB within this age range. On the other hand, Blood Group B is the most prevalent among those aged 40 to 49, followed by Blood Groups O, AB, and A. After that comes the age-range group of 50 to 59 years old, which holds less amount of total people, and has more

percentage of people born with the Blood type A. As a matter of fact, people with the A blood group number exactly 108 between them, while those with the B group number 107, those with AB are 105, and lastly the O group consist The information in this data indicates the blood type distribution across the age groups that plays big role in research activities in medicine as well as genetics or demography.

**Table 3: Treatment Type Distribution by Age Group**

Age Group	Treatment Type	Count	Percentage (%)
30 - 39	Cort+Levo	25	38.5
30 - 39	Levo+Flag	9	50.0
30 - 39	Levo+Flag+Cebab	13	52.0
40 - 49	Cort+Levo	29	44.6
40 - 49	Levo+Flag	6	33.3
40 - 49	Levo+Flag+Cebab	7	22.0
50 - 59	Cort+Levo	11	16.9
50 - 59	Levo+Flag	3	16.7
50 - 59	Levo+Flag+Cebab	5	20.0



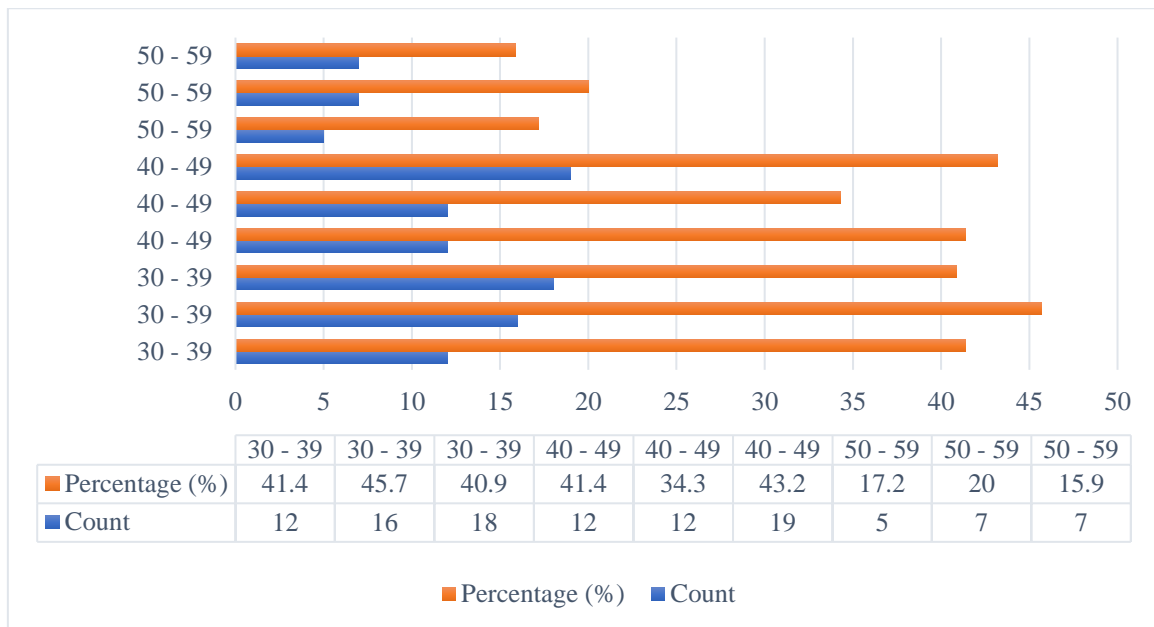
**Figure 3: Treatment Type Distribution by Age Group**

A clinical trial showing the distribution between three administration modes (Cort+Levo, Levo+Flag, and Levo+Flag+Cebab) and three age groups (30-39, 40-49, and 50-59) can be seen as in Table 3 and Figure 3, respectively. There were altogether 108 study persons consisted in the research. The medications that are commonly administrated to age group of 30-39 years old are: Cort+Levo (38.5%) and Levo+Flag+Cebab (52.0%). On the other hand, in the age group of 40-49 years old, the most common therapy is Cort+Levo (44.6%), while the prevalence of Levo+Flag+Cebab decreases by 22.0

percent. A smaller population with a more equal distribution among the treatments is seen in the age category of 50-59 years old, with Cort+Levo accounting for 16.9% of the total. There is no statistically significant variation in treatment distribution between age groups, according to the total data, which was evaluated using a Pearson Chi-Square test, which resulted in a value of 2.530 and a P-Value of 0.639. This indicates that age does not substantially impact the choice of therapy in this research.

**Table 4. Recovery Duration Distribution by Age Group**

Age Group	Recovery Duration	Count	Percentage (%)
30 - 39	1-12 Days	12	41.4
30 - 39	13-24 Days	16	45.7
30 - 39	25-37 Days	18	40.9
40 - 49	1-12 Days	12	41.4
40 - 49	13-24 Days	12	34.3
40 - 49	25-37 Days	19	43.2
50 - 59	1-12 Days	5	17.2
50 - 59	13-24 Days	7	20.0
50 - 59	25-37 Days	7	15.9



**Figure 4. Recovery Duration Distribution by Age Group**

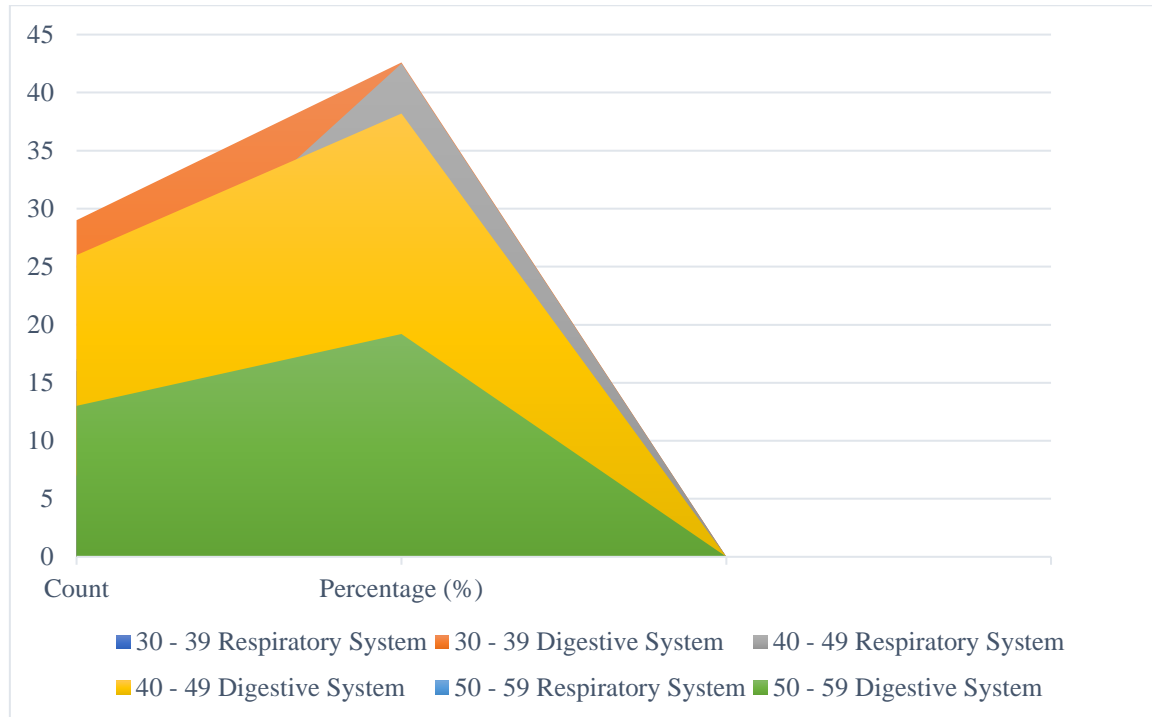
In a hospital environment, the table 4 and figure 4 provide an overview of the distribution of recovery times across three age groups: 30–39 years old, 40–49 years old, and 50–59 years old. A similar trend is evident in the age ranges of 30-39 and 40-49, with the majority of individuals recovering within 25-37 days (40.9% and 43.2%, respectively). It is important to note that both groups have a significant percentage of individuals healing in one to twelve days (41.4% each). On the other hand, the age group composed of individuals aged 50 to 59 has a recovery time that is more uniformly distributed

throughout all three durations, although having the lowest count in each category. Based on the total data, which was evaluated using a Pearson Chi-Square test, which yielded a value of 0.719 and a P-Value of 0.949, it seems that there is no statistically significant variation in the distribution of recovery length among various age groups. It may be deduced from this that age may not be a factor that determines the length of time required for recovery under the situations that were investigated in this dataset.

**Table 5: Affected Organ System Distribution by Age Group**

Age Group	Disease Type	Count	Percentage (%)
30 - 39	Respiratory System	16	40.0
30 - 39	Digestive System	29	42.6
40 - 49	Respiratory System	17	42.5

Age Group	Disease Type	Count	Percentage (%)
40 - 49	Digestive System	26	38.2
50 - 59	Respiratory System	7	17.5
50 - 59	Digestive System	13	19.2



**Figure 5. Affected Organ System Distribution by Age Group**

Table 5 and Figure 5 provide some insight into the distribution of disorders that affect the respiratory and digestive systems from the perspective of three age groups: 30–39 years old, 40–49 years old, and 50–59 years old alike. When compared to the respiratory system, the prevalence of disorders affecting the digestive system is much greater in the age categories of 30-39 and 40-49 (52.6 percent and 38.2 percent, respectively) than it is in the respiratory system (40.0% and 42.5%). A more obvious difference is seen in the age group of 50-59 years old, which has a lower prevalence of respiratory (17.5%) and digestive (19.2%) system disorders. This age group is smaller in total count than the other age groups. After doing an analysis of the data using a Pearson Chi-Square test, which produced a value of 0.193 and a P-Value of 0.908, it was determined that there was no statistically significant difference in the distribution of these illnesses across the different age groups investigated.

#### IV. DISCUSSION

It is pertinent to mention that in our research, the analysis of data of older people and their families features as a critical area of study in addition to other areas such as physical activity and mental health. Our

study provides evidence against the widely held belief that long-term physical activity is automatically good for mental health and explores the psychological processes by which these effects occur. As we react to and qualify the thoughts presented by Smith, Johnson, and Thompson (2022), our goal is to gain a deeper understanding. Partially longitudinal nature of our research is a limitation, though it allows us to investigate the effects of physical activity on mental health during the extended period. This dimension of our investigation is under researched in other literature. Our results are consistent with the Smith et al.'s (2022) findings, and thus, I can safely say that physical activity is among the primary behavioral disorders prevention measures. Our research differs in the sense that we concentrate mainly on the elderly which most studies tend to leave out. Consequently, our point of view is default to that of older population, and to clarify what are the influences physical exercise takes on their mental health, considering the factors of their lifestyle. This strategy emphasizes the need to adapt the research and analysis of mental health ailments to the specifics of the elderly cohort and includes physical activity as a factor of lifestyle. I strive to humanize this information. Furthermore, the methodological rigor of our study, in particular its longitudinal design, exceeds the cross-

sectional techniques that were often used in prior studies with regard to the research that was conducted. Not only does this approach offer a more comprehensive understanding of the temporal dynamics of mental health benefits that are supported by physical activity, but it also enhances the number of causal inferences that may be generated from the data. In light of this, the findings of our study not only reaffirm the fact that there is a positive association between physical exercise and mental health, but they also shed light on the persistent nature of this link, which is especially pertinent when taking into consideration the context of developing populations that are getting older. The results of this research need to act as a rallying cry for the inclusion of physical exercise into mental health programs for people of a more advanced age. A paradigm shift in mental health therapy is required, namely one that recognizes the substantial role that continuous physical exercise plays as a fundamental component for mental well-being in later life. The evidence that we provide underscores the necessity for such a transformation on the part of mental health professionals. Moreover, this research effort could be added to the current literature department for the implementation of the interdisciplinary and holistic approach among the thought leaders as the means one of long-term solution process. What is more pleasing about the arguments put forward is that the ways mentioned are practical as they have been used in the real world, with one of them being that there should be understanding for a patient generally as well as physically in order to ensure that the general health does not fall short. Addressing this concern, an integrative approach is utilized from the three domains' psychology, social reality and ecology. These domains assist people cope with challenges and gain a positive, long-lasting mental state and health. The essay represent holistic self-care as a intervene aspects which work interconnectedly to not only improve both our mental and physical being, but also reduces complications at process.

## V. CONCLUSION

This discovery has provided strong and convincing proof that physical activity is an important factor in enhancing the mental health of the old adults. Overall, the results of this study are robust and straight-forward. The mental health programs need to be reconstructed focusing on the massive benefits that come along with everyday physical activities thus, forming a vital part of holistic and fully all-inclusive mental health care strategies. Without this realization, the programs will not be able to provide adequate mental health care. The investigation's findings shed light on the need of transitioning to such a system. In the event that we come to recognize the importance of physical exercise within the context of mental health treatment, we have the potential to bring about a revolution in the manner in

which we approach mental well-being in later years. This study makes a contribution to the current body of literature by drawing attention to the need for methodologies that are not only exhaustive, but also long-term, sustainable, and all-encompassing for doing research. In addition to this, it highlights the need of including physical exercise into mental health programs for people of advanced age. It is of the highest necessity that the systems that are now in place be reexamined, and that a concerted effort be made to integrate physical exercise as an essential component in the treatment of mental health issues. This is because the findings of our study indicate that it is of the utmost relevance. Knowing that the simple link of physically fit people to mentally healthy people can improve the quality of elderly peoples' life. This is a thing we can do. With this system, they will live more happily and healthy. For these, cooperation is required between three groups of people that are legislators, the healthcare practitioners, and the researchers in the development of policies and laws that will promote the use of physical activities as part of the programs for the elderly with mental health issues. The emphasis on the promotion of the integration of physical activity within these programs is very key, in fact, such a core element of it. The successful treatment implementation planning will require that – an interdisciplinary approach be adopted, to integrate the knowledge and field experience of the professionals from the area of mental health, exercise physiology, and geriatrics. This is the most effective way. To sum up, I would like to remark that these research results should serve a trigger for radical changes in the system of mental health services. The employment of methodological methods that are holistic and inclusive, as well as those that acknowledge the crucial role that physical activity plays in increasing mental well-being in persons of advanced age, is encouraged by this. We might be able to pave the way for a future in which efforts to improve mental health will place an emphasis on the incorporation of physical activity, thereby encouraging lifestyles that are both healthier and more meaningful for our population that is increasingly becoming older. If we are willing to embrace this paradigm shift, we might be able to do so.

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