

Impact of sense of coherence, psychological well-being, life satisfaction on immune system of geriatrics amidst Covid era: An Exploratory Study

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Abstract: Sense of coherence is defined as a personality trait that expresses an individual's global outlook on life (Antonovsky, A. 1987). Psychological Well-being refers to the simple notion of a person's welfare, happiness, advantages, interests, utility, and quality of life (Burris et al, 2009). Life satisfaction is the degree to which a person positively evaluates the overall quality of his or her life as a whole. In other words, how much the person likes the life he or she leads (Ruut Veenhoven, 1996). The immune system is a collection of billions of cells that travel through the bloodstream. They move in and out of tissues and organs, defending the body against foreign bodies (antigens), such as bacteria, viruses and cancerous cells (Saul McLeod, 2010). Aging refers to the inevitable, irreversible decline in organ function that occurs over time even in the absence of injury, illness, environmental risks, or poor lifestyle choices like unhealthy diet, lack of exercise, substance abuse (Richard W. Besdine, 2019). The current research adopts a correlational design to find relation between sense of coherence, psychological well-being, life satisfaction, and immune system in geriatrics and also to ascertain whether sense of coherence, psychological well-being, life satisfaction could impact immune system of geriatrics. A non-probability purposive sampling technique has been adopted for selection of samples where 102 samples were obtained out of which 44 are males and 58 are females. The findings of the study showed that sense of coherence shares a positive correlation with psychological well-being in geriatrics. It also showed that sense of coherence shares a positive correlation with life satisfaction in geriatrics. Also, it has been found that psychological well-being and life satisfaction shared a positive correlation in geriatrics. A positive correlation was also found between life satisfaction and immune system in geriatrics. From the results, it has been found that life satisfaction could impact immune system of geriatrics. The findings of the study suggest that young citizens, government should take measures for proper physical as well as psychological care of geriatrics as this would positively impact their mental state which in turn would strengthen their immune system and result in proper functioning of their bodies.

Keywords: Sense of coherence, psychological well-being, life satisfaction, immune system, ageing, correlational design, non-probability purposive sampling technique, geriatrics.

Introduction and Literature Review

Since its inception, the Covid 19 pandemic has created a toll on mental health of people besides physical health. Home quarantine life coupled with loss, bereavement, during Covid era led to various psychological problems among people. Also, lockdown has put their social lives at stake.

The worst sufferers among all age groups are elderly. Restricted lives because of pandemic resulted in various psychological problems like anxiety, depression, hypertension, panic disorder, appetite reduction, insomnia among them which have impacted their immune system adversely and made them prone to various diseases.

We all are very much aware of the fact that a positive mental health results in a good physical health. Hence, the aim of the present research is to determine the impact of positive psychological capital on the immune system of geriatrics. Through this study, necessary measures could be taken to promote positive psychological capital in geriatrics for proper functioning of their bodies.

Aging refers to the inevitable, irreversible decline in organ function that occurs over time even in the absence of injury, illness, environmental risks, or poor lifestyle choices like unhealthy diet, lack of exercise, substance abuse (Richard W. Besdine, 2019) [1]. Older people are perceived as dependent, fragile, and a burden to society in direct and indirect ways. Globalization, technological developments, transport and communication, urbanization, migration and changing gender norms have impacted lives of older people. On a biological level, various molecular and cellular damage accumulates during ageing. As a result of which physical and mental capacity decreases and give rise to various diseases. Old age is associated with various diseases and disorders like hearing loss, cataracts and refractive errors, back and neck pain and osteoarthritis, chronic obstructive pulmonary disease, diabetes, depression and dementia. Also, factors such as frailty, urinary incontinence, falls, delirium and pressure ulcers give rise to several complex health states known as geriatric syndromes. Other factors apart from biological ones such as retirement, relocation to more appropriate housing and the death of friends and partners share association with ageing. On the flip side, factors which play a crucial role in maintaining a healthy life among older people involve physical and social environments. These include eating a balanced diet, engaging in regular physical activity, and refraining from tobacco use. Also, physical and social environments which involve support like availability of safe and accessible public buildings, transport, and places that are easy to walk around play a significant role in maintaining a healthy life among geriatric people (World Health Organization, 2021) [2].

According to the research conducted by Yoon, D. P., & Lee, E. K. O. in 2006, on the impact of religiousness, spirituality, and social support on psychological well-being among older adults in rural areas, its results showed that through the application of hierarchical regression analyses it has been found that dimensions of spirituality, religiousness, social support, and psychological well-being

share significant association with each other. On the other hand, spirituality, religiousness, depression and social support share inverse relation with each other and positive relation with life satisfaction in older adults [3].

On the contrary, the results of the research conducted by AKINOLA, T.F. in 2016, on relationship between family support, psychological well-being and blood pressure control among elderly patients with hypertension attending geriatric care centre, a university college hospital of Ibadan, showed that blood pressure control of the elderly patients with hypertension did not get affected by good family support and psychological well-being. Also, it has been found that refractory error positively affected blood pressure control and BMI negatively affected blood pressure control of the elderly patients [4].

Also, in the research conducted by von Humboldt, S., Leal, I., & Pimenta, F. in 2015, on sense of coherence, sociodemographic, lifestyle, and health-related factors in Older Adults Subjective Well-being, its results showed that subjective well-being predicted by self-reported spirituality, sense of coherence, social support, living setting, household, perceived health, medication, in older adults out of which self-reported spirituality has shown strongest prediction [5].

On the contrary, research which was conducted by Jueng, R. N., Tsai, D. C., & Chen, I. J. in 2015, on sense of coherence among older adults in Taiwan who are residents of long-term care facilities upon which cross-sectional analysis was done, its results showed that older adults scored comparatively lower on sense of coherence than their counterparts hailing from western countries. Also, the result showed that in sense of coherence status among older adult who were LTCF residents, a significant role was played by environmental factors besides personal factors [6].

Again, the research which was conducted by Taghiabadi, M. et al. in 2017, on the association between death anxiety with spiritual experiences and life satisfaction in elderly people, its results showed that spiritual experiences and life satisfaction shared positive association significantly, spiritual experiences and death anxiety shared negative association significantly in elderly people. Also, the result showed that life satisfaction and death anxiety shared significant negative relation in elderly people [7].

Sense of coherence is defined as a personality trait that expresses an individual's global outlook on life (Antonovsky, A. 1987) [8]. The term sense of coherence was coined by Aaron Antonovsky who was a medical sociologist. He focused on a particular concept centering around the fact that why do people maintain positive attitude amidst difficult times the answer of which was later formed in terms of two concepts one is sense of coherence and the other is general resistance resources where sense of coherence signifies how people view and manage stressful situations and general resistance resources include elements like preventive health orientation, cultural capital, social support, self-esteem, money, intelligence (Ericksson and Lindstrom, 2007) [9]. This is also known as salutogenic concept where salutogenesis, is a theory which deals with the fact that how and why certain people stay healthy. (Friedman, 2002) [10].

It combines element like meaningfulness, comprehensibility and manageability which are present in a particular situation. The greater the person's understanding, integrating, handling, sensing abilities with regards to a particular situation, the greater is the person's ability to cope. A strong association has been found between high sense of coherence and positive health outcomes (Eriksson and Lindstrom, 2006) [9].

According to Eriksson and Mittelmark (2017) [10]:

- Meaningfulness signifies to what extent a person thinks that their lives have some emotional meaning. It is the motivational aspect of a person's life. It shows its effect when there are some challenges or problems in a person's life.
- Comprehensibility signifies understanding internal and external stimuli in a rational manner. It is the cognitive aspect of sense of coherence. It helps a person in perceiving things as ordered, structured, coherent, and clear.
- Manageability signifies ability of a person to manage all stimuli they feel like bombarding them by using all available resources. It is the behavioural aspect of sense of coherence. It helps a person in solving and coping with problems by investing their time and energy.

According to the research conducted by Zielinska-Wieczkowska, H., & Sas, K. in 2020, on the sense of coherence, self-perception of aging and the occurrence of depression among the participants of the university of the third age depending on socio-demographic factors, its results showed that higher sense of coherence and positive self-perception of aging are present more in elderly people who received better education and lesser sign of senile depression has been found in them [11].

Also, according to the research conducted by Tan, J. Y. et al. in 2021, on impact of sense of coherence, resilience and loneliness on quality of life amongst older adults in long-term care which was a correlational study that used the salutogenic model, its results showed that higher quality of life shared significant association with higher manageability and meaningfulness in sense of coherence, higher resilience, lower social loneliness, lower emotional loneliness and hearing impairments among older adults receiving long term care through the application of stepwise regression [12].

Moreover, the research conducted by Helvik, A. S., Engedal, K., & Selbaek, G. in 2014, on sense of coherence and quality of life in older in-hospital patients without cognitive impairment which was a 12-month follow-up study, its results showed that sense of coherence and quality of life shared association in older adults during hospital stay which was absent after one year of hospital stay [13].

Again, in the research conducted by Ciairano, S. et al. in 2008, on older people's sense of coherence to find its relationship with education, former occupation and living arrangements, its results showed that reality was perceived as more controllable, manageable and meaningful by senior citizens with a higher level of education and who had retired from jobs with a high level of responsibility. Also, it has been found that there was a decrement in perception that life's challenges are worth facing in older adults with greater age. Moreover, it has been found that living arrangements and education level had an interaction [14].

Similarly, the research which was conducted by Giglio, R. et al. in 2014, on sense of coherence and health of community dwelling older adults in Spain, its results showed that sense of coherence is determined by personal well-being, depression, and educational level in older adults. Association was found between lower sense of coherence and problems in all EQ-5D dimensions, and moderate to severe disability in older adults. Also, it has been found that sense of coherence, functional status, mental health status, personal wellbeing, and educational level shared relation with each other in older adults [15].

Psychological Well-being refers to the simple notion of a person's welfare, happiness, advantages, interests, utility, and quality of life (Burriss et al, 2009) [16].

There are two types of psychological well-being:

- Hedonic well being
- Eudaimonic well being

Hedonic well-being signifies happiness which consists subjective feelings. It basically includes positive emotions, subjective well-being, and happiness in it. Hedonic well-being has two components. One is affective one that signifies high positive affect and low negative affect and the other is cognitive one which refers satisfaction with life. (Carruthers & Hood, 2004) [17].

Eudaimonic well-being on the other hand signifies psychological well-being that involves purposeful aspect. Eudaimonic well-being adopts Self Determination Theory which proposed that autonomy and competence share relation with happiness (Keyes et al., 2002; Deci & Ryan, 2000) [17].

Carol Ryff (1989) has divided Eudaimonic well-being into six types of psychological well-being: [18]

- Autonomy – It indicates to what extent a person is independent and monitors his or her behavior independently.
- Environmental Mastery – It indicates to what extent a person can exert mastery over his or her environment.
- Personal Growth- It indicates to what extent a person strives to improve oneself by bringing modifications in one's behavior.
- Purpose in Life- It signifies to what extent a person is goal oriented and hold strong conviction about life.
- Self-Acceptance- It signifies to what extent a person can accept himself or herself like the way they are in their lives.
- Positive Relationship with Others- It signifies to what extent a person can maintain a good relationship with others and consists element such as reciprocal empathy, affection, and intimacy.

According to the research conducted by Phillips, D. R. et al. in 2008, on informal social support and older persons psychological well-being in Hong Kong, its result showed psychological well-being share relation with both objective and subjective measures of informal support and that psychological well-being was better predicted by subjective measures of informal support than objective measures of informal support. Also, it has been found that in case of older adults who lived alone, social network's impact on psychological well-being was higher for them than those who stayed with relatives or spouse. Result also showed that support was more for persons who lived in the old urban areas than did their counterparts in the new towns. Also, objective informal support persons were more for those who lived in public housing than those who lived in private housing [19].

Moreover, the research conducted by Steptoe, A., Deaton, A., & Stone, A. A. in 2015, on psychological wellbeing, health and ageing, its results showed that there is significant relevance of hedonic states, life satisfaction, eudemonic well-being with respect to health and quality of life of elderly people [20].

Again, the research which was conducted by Chan, A. et al. in 2021, on impacts of Covid-19 pandemic on psychological well-being of older chronic kidney disease patients, its results showed that Covid- 19 has proved to be a barrier for psychological well-being in older kidney disease patients [21].

Also, the research conducted by Reig-Ferrer, A. et al. in 2014, on a relaxation technique enhances psychological well-being and immune parameters in elderly people from a nursing home which was a randomized controlled study, its results showed that there has been an enhancement in psychological well-being and modulation of immune activity in a group of elderly people through the method. Moreover, at treatment's end it has been found that experimental and control groups differed significantly with regards to CD19, CD71, CD97, CD134, and CD137 lymphocyte subpopulations. Also, it has been found that at the three-month follow-up, there came a decrement in negative affect, psychological discomfort, and symptom perception in the treatment group, which resulted in increment of participants quality of life scores [22].

Similarly, the research conducted by Segerstrom, S. C. et al. in 2015, on repetitive thought dimensions, psychological well-being, and perceived growth in older adults which was a multilevel, prospective study, its results showed that psychological well-being are best predicted by repetitive thought dimensions and more positive valence. On the other hand, perceived growth are best predicted by more negative valence repetitive thought dimensions in older adults [23].

Life satisfaction is the degree to which a person positively evaluates the overall quality of his or her life as a whole. In other words, how much the person likes the life he or she leads (Ruut Veenhoven, 1996) [24].

It includes various factors like work, romantic relationships, relationships with family and friends, personal development, health and wellness, and others (Gilbert, 2009) [24].

Two important theories have played very crucial roles with regards to life satisfaction. These are:

- Bottom- Up Theories
- Top- Down Theories

Bottom-Up Theories: The central idea of bottom-up theories is many important spheres of life that determine life satisfaction. These spheres are work, relationships, family and friends, personal development, and health and fitness. Combination of these spheres result in life satisfaction (Heady, Veenhoven, & Wearing, 1991) [24].

Top-Down Theories: The central idea of top-down theories is life satisfaction exerts influence on work, relationships, family and friends, personal development, and health and fitness arenas of life (Heady, Veenhoven, & Wearing, 1991) [24].

Daniel Gilbert, professor of Harvard University highlighted crucial differences between happiness and life satisfaction despite having similarities.

Happiness is an immediate experience which focuses on present moment which is fleeting by nature. Life Satisfaction on the other hand is more persistent, stable than happiness. Happiness is a more transitory construct than life satisfaction. Life Satisfaction on the other hand, focuses more on cognitive and emotional judgement than happiness (Gilbert, 2009) [25].

According to the research conducted by Macia, E. et al. in 2015, on exploring life satisfaction among older adults in Dakar, its result showed greater life satisfaction in older adults with advancement in age and that the rate of satisfaction is more in older women than older men. Also, life satisfaction was mainly predicted by economic conditions in addition to good social relations [26].

Moreover, the research conducted by Hintikka, J. et al. in 2001, on religious attendance and life satisfaction in the general population of Finnish where the age range of the samples was between 18 to 74 years, its results showed that life satisfaction, social support, and religious attendance positively associated with each other. Moreover, independent positive association was found between religious attendance and the absence of severe life dissatisfaction through the application of multivariate logistic regression analysis. Also, it has been found that the association between religious attendance and life satisfaction was not mediated by social support through the application of hierarchical log linear modeling. In life satisfaction, no gender difference was found [27].

Again, the research which was conducted by Baba Gnanakumar, G. P., & Baby, M. K. John Pradeep Kumar in 2021, on life satisfaction of elderly people among old age homes in Bengaluru, its results showed that age, gender, occupation, and income does not create stress in elderly persons [28].

Also, according to the research conducted by Choudhary, A. in 2013, on a study of life satisfaction and health in old age, its results showed life satisfaction, physical health, and mental health have a significant relationship among each other through the application of Pearson product moment correlation [29].

Similarly, the research conducted by Shrestha et al. in 2019, on life satisfaction among senior citizens in a Kathmandu community of Nepal, its results showed life satisfaction, good economic status, ownership of property, having good family income, and having sufficient financial support share significant association [30].

The immune system is a collection of billions of cells that travel through the bloodstream. They move in and out of tissues and organs, defending the body against foreign bodies (antigens), such as bacteria, viruses and cancerous cells (Saul McLeod, 2010) [31]. The main function of immune system is being performed by white blood cells which is divided into two types- lymphocytes and phagocytes (Saul McLeod, 2010) [31].

Lymphocytes are divided into two parts: (Saul McLeod, 2010) [31]

- B Cells – To destroy the pathogens, production of antibodies is done which are released into the fluid surrounds the body's cells.
- T Cells – They lock the infected cells on entering of pathogens into it, multiply it, and destroy it in the end.

The pandemic has put mental health conditions of geriatric population at stake. Covid 19 has resulted in isolation, bereavement, fear among elderly people which in turn has given rise to various psychological problems such as delirium, agitation, anxiety, depression, stress, insomnia, reduction in appetite, helplessness, hopelessness, pessimism. Moreover, it has given rise to various psychophysiological disorders like hypertension, jitteriness, tremors, palpitations, chest discomfort, breathing problems in elderly people (Dr. Santanu Goswami, 2020) [32].

Stress shares an inverse relationship with immune system. When humans go through stressful situations, corticosteroid hormones deplete their immune systems and make their body more susceptible to various diseases such as asthma, cardiovascular disease, diabetes, headaches to name a few by making an individual develop unhealthy coping strategies like drinking and smoking (Saul McLeod, 2010) [31].

Maintaining proper diet, getting adequate sleep, drinking plenty of water, getting proper vaccine, taking less stress can actually strengthen our immune system which will help us fight against antigens (Katie McCallum, 2021) [33].

According to the research conducted by Majnaric, L. T. et al. in 2021 on low psychological resilience in older individuals to find its association with increased inflammation, oxidative stress and the presence of chronic medical conditions, its results showed that ageing diseases are developed with increased inflammation and oxidative stress in older people. Also, findings showed association between mental and physical medical conditions in older people [34].

Also, the research conducted by Scartoni, F. R. et al. in 2020, on physical exercise and immune system in the elderly which focused on its implications and importance in Covid 19 pandemic period, its results showed that physical activity positively impacted immune system's responses against viral respiratory infections and the intensity of its performance was on a moderate level. Also, it has been found that physical activity and anti-influenza benefits share association [35].

Moreover, the research conducted by Tsuboi, H. et al. in 2005, on depressive symptoms and life satisfaction in elderly women to see its association with natural killer cell number and cytotoxicity, its results showed that reduced NKCC shares significant association with high depressive symptoms and increased NK cell numbers and life satisfaction share significant association in elderly women [36].

Again, in the research conducted by Brown, S. L. et al. in 1995, on depressive symptoms in the elderly to find its association with total white blood cell count, its results showed that high depressive symptoms and higher white blood cell count share association in the elderly [37].

Similarly, the research conducted by Rinaldi, J., & Chaves, M. in 2017, on ageing, immune system and life satisfaction, its results showed that in elderly people, T cells CD4/CD8 and age share negative correlation. Life satisfaction and age share positive correlation. Increase age of samples and decreased activity of CD4, CD3, CD45 share association in elderly people [38].

Research Questions:

- Is there a relationship between sense of coherence and psychological well-being in geriatrics?
- Is there a relationship between sense of coherence and life satisfaction in geriatrics?
- Is there a relationship between sense of coherence and immune system in geriatrics?
- Is there a relationship between psychological well-being and life satisfaction in geriatrics?
- Is there a relationship between psychological well-being and immune system in geriatrics?
- Is there a relationship between life satisfaction and immune system in geriatrics?
- Does sense of coherence impact immune system of geriatrics?

- Does psychological well-being impact immune system of geriatrics?
- Does life satisfaction impact immune system of geriatrics?

Research Objectives:

- To determine whether there is a relationship between sense of coherence and psychological well-being in geriatrics.
- To determine whether there is a relationship between sense of coherence and life satisfaction in geriatrics.
- To determine whether there is a relationship between sense of coherence and immune system in geriatrics.
- To determine whether there is a relationship between psychological well-being and life satisfaction in geriatrics.
- To determine whether there is a relationship between psychological well-being and immune system in geriatrics.
- To determine whether there is a relationship between life satisfaction and immune system in geriatrics.
- To determine whether sense of coherence impact immune system of geriatrics.
- To determine whether psychological well-being impact immune system of geriatrics.
- To determine whether life satisfaction impact immune system of geriatrics.

Hypothesis:

- **H1:** There will be a relationship between sense of coherence and psychological well-being in geriatrics.
- **H2:** There will be a relationship between sense of coherence and life satisfaction in geriatrics.
- **H3:** There will be a relationship between sense of coherence and immune system in geriatrics.
- **H4:** There will be a relationship between psychological well-being and life satisfaction in geriatrics.
- **H5:** There will be a relationship between psychological well-being and immune system in geriatrics.
- **H6:** There will be a relationship between life satisfaction and immune system in geriatrics.
- **H7:** Sense of coherence impacts immune system of geriatrics.
- **H8:** Psychological well-being impacts immune system of geriatrics.
- **H9:** Life satisfaction impacts immune system of geriatrics.

Methodology

Research Design:

The present study adopts a correlational design to determine if there is any relation between sense of coherence, psychological well-being, life satisfaction, and immune system in geriatrics and also to see whether sense of coherence, psychological well-being, life satisfaction could impact immune system of geriatrics.

Sample:

A non-probability purposive sampling method was used to select samples. During the data collection, 102 samples were obtained out of which 44 are males and 58 are females who fall within the age range of 65-80.

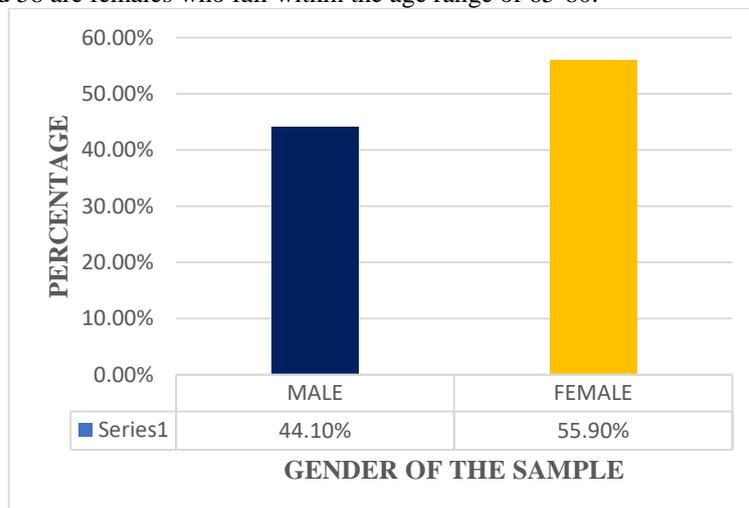


Figure 1: Bar graph showing the percentage of sample belonging to different genders. From the bar graph, it could be seen that 44.10% of the total sample are males and 55.9% of the total sample are females.

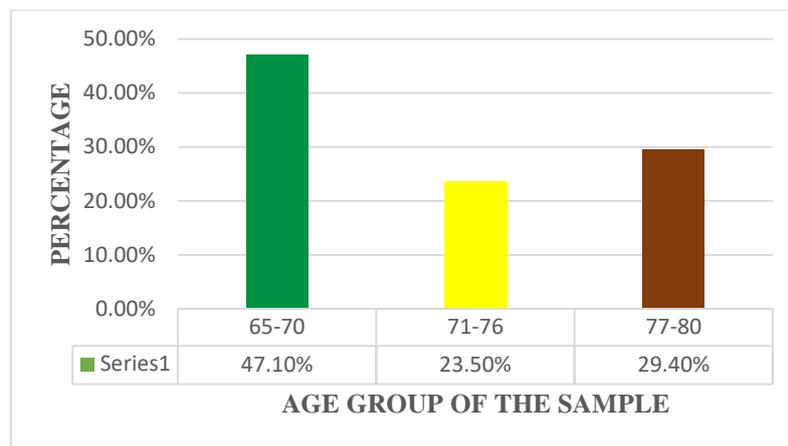


Figure 2: Bar graph showing the percentage of sample belonging to different age groups. From the bar graph, it could be seen that 47.1% of the total sample are within the age group of 65 to 70 years. 23.5% of the total sample are within the age group of 71 to 76 years. 29.4% of the total sample are within the age group of 77 to 80.

Tools Applied:

Following tools have been used for data collection:

Sense Of Coherence:

Developed by Antonovsky, the 13 item Sense of coherence scale has been used to assess how people maintain positivity in their lives by overcoming resistance. The responses are rated on a seven-point scale ranging from Never Happened to Always Happened [39].

Psychological Well Being Scale:

Developed by psychologist Carol D. Ryff, the 18 item Psychological Wellbeing (PWB) Scale has been used to assess wellbeing and happiness of the samples. The responses are rated on a six-point scale ranging from strongly disagree to strongly agree [40].

Life Satisfaction:

Life Satisfaction Questionnaire developed by Diener, E. et al. was designed to measure global cognitive judgments of one's life satisfaction. It consists of 5 items and the responses are rated on a seven-point scale ranging from Strongly Agree to Strongly Disagree [41].

Immune System:

Immune Status Questionnaire adapted from Wilod Versprille LJF et al. Development and validation of the Immune Status Questionnaire (ISQ) has been used as a tool to assess the perceived immune status of people. It consists of 7 items and the responses are rated on a seven-point scale ranging from Never to Always [42].

Procedure:

After selecting measures for the study, the researcher conducted the study by taking permission. Google forms have been used for this purpose. Rapport was established with the samples via email id which is being provided in the questionnaires itself. They were made aware that their participation in the study was purely voluntary and whatever doubts raised by the participants were all cleared by the researcher. They were assured of maintaining confidentiality through-out the study and were asked to sign the informed consent form. Next, the information schedule was administered. The researcher had put the instructions in the questionnaires itself. The participants took an average of 15 minutes to fill the information schedule and the questionnaires. The data collected was then coded, entered in SPSS and statistically analysed.

Statistical Analysis of Data:

After completion of data collection, the responses were scored using the data analysis software IBM SPSS version 22. Then the statistical treatments of the scores were done. Mean and Standard Deviation of sense of coherence, psychological well-being, life satisfaction and immune system were computed separately. Pearson Product Moment Correlation was computed to determine the relationship between sense of coherence, psychological well-being, life satisfaction and immune system in geriatrics. This was followed by computing Multiple Linear Regression to see whether sense of coherence, psychological well-being, life satisfaction could impact immune system of geriatrics.

Results and Discussions

The aim of this study was to assess whether sense of coherence, psychological well-being, life satisfaction could impact immune system in geriatrics. Categories were discovered in four main areas - sense of coherence, psychological well-being, life satisfaction, and immune system.

The obtained data of this study were analysed through Mean, Standard Deviation, Pearson product moment correlation, Multiple linear regression using the Statistical Package for Social Sciences (SPSS) version 22.0. Pearson product moment correlation was used to determine the relationship between sense of coherence, psychological well-being, life satisfaction, immune system in geriatrics. Multiple Linear Regression has been used to determine whether sense of coherence, psychological well-being, life satisfaction could impact immune system of geriatrics.

Table 1: Mean, standard deviation with respect to sense of coherence, psychological well-being, life satisfaction, immune system in geriatrics

VARIABLES	MALE (N=48)		FEMALE (N= 54)	
	Mean	SD	Mean	SD
Sense of Coherence	47.14	12.437	62.43	9.993
Psychological Well-Being	55.93	8.359	75.84	7.840
Life Satisfaction	44.18	6.528	39.37	7.414
Immune System	9.37	7.359	11.76	6.437

From Table 1, it could be seen that the mean values of males with respect to sense of coherence, psychological well-being, life satisfaction, and immune system are 47.14, 55.93, 44.18, and 9.37 respectively.

Also, it could be seen that the values of standard deviation of males with respect to sense of coherence, psychological well-being, life satisfaction, and immune system are 12.437, 8.359, 6.528, and 7.359 respectively.

From Table 1, it could be seen that the mean values of females with respect to sense of coherence, psychological well-being, life satisfaction, and immune system are 62.43, 75.84, 39.37, and 11.76 respectively.

Also, it could be seen that the values of standard deviation of females with respect to sense of coherence, psychological well-being, life satisfaction, and immune system are 9.993, 7.840, 7.414, and 6.437 respectively.

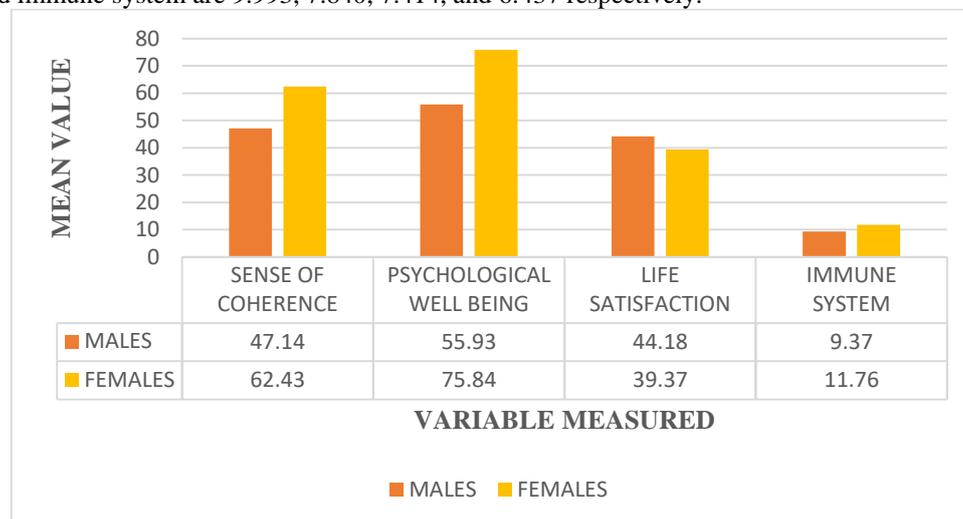


Figure 3: Bar graph showing the mean values of males and females with respect to sense of coherence, psychological well-being, life satisfaction, and immune system. From the bar graph, it could be seen that the mean values of males and females with respect to sense of coherence are 47.14 and 62.43 respectively. The mean values of males and females with respect to psychological well-being are 55.93 and 75.84 respectively. The mean values of males and females with respect to life satisfaction are 44.18 and 39.37 respectively. The mean values of males and females with respect to immune system are 9.37 and 11.76 respectively.

Table 2: Correlation matrix with respect to sense of coherence, psychological well-being, life satisfaction, immune system in geriatrics

Variables	Sense of Coherence	Psychological Well-Being	Life Satisfaction	Immune System
Sense of Coherence	1	.239*	.303**	-.130
Psychological Well-Being	.239*	1	.294**	.121
Life Satisfaction	.303**	.294**	1	.404**
Immune System	-.130	.121	.404**	1

p* < 0.05 levels of significance

p** < 0.01 levels of significance

From Table 2, it could be seen that sense of coherence and psychological well-being share a positive correlation (r = .239, p < 0.05). Thus, null hypothesis is rejected and hypothesis H1 is accepted.

According to the research conducted by Sethia, Sankul & Kanth, Vandana on well-being and depression in elderly to determine the effect of sense of coherence and social support on well-being and depression in 2021, its results showed that sense of coherence, social support share a positive relation with psychological well-being and negative relation with depression in elderly [43]. Another study conducted by Nezamdoust Sedehi, M. et al. on the relationship between hope and sense of coherence with psychosocial well-being among older people to determine the mediating role of attitude toward death in 2018, its results showed that sense of coherence resulted in psychological well-being when fear of death and escape acceptance played a mediating role among older people [44]. From Table 2, it could be seen that sense of coherence shares a positive correlation with life satisfaction ($r = .303, p < 0.01$). **Thus, null hypothesis is rejected and hypothesis H2 is accepted.**

According to the research conducted by Dezutter, J. et al. on sense of coherence, depressive feelings and life satisfaction in older persons where role of integrity and despair were given a closer look in 2013, its results showed that sense of coherence and well-being shared a significant positive relation in elderly people where lesser depressive symptoms and higher life satisfaction were found in elderly people with a strong sense of coherence [45]. Another study conducted by Wiesmann, U., & Hannich, H. J. on the contribution of resistance resources and sense of coherence to life satisfaction in older age in 2013, its results showed that life satisfaction was significantly predicted by sense of coherence and resistance resources in older age [46].

From Table 2, it could be seen that psychological well-being shares a positive correlation with life satisfaction ($r = .294, p < 0.01$). **Thus, null hypothesis is rejected and hypothesis H4 is accepted.**

According to the research conducted by Muzafar Hussain Kawa et al. on a study of mental health and life satisfaction among aged people in 2017, its results showed that mental health and life satisfaction correlated positively among aged people [47]. Another study conducted by Melendez, J. C. et al. on psychological and physical dimensions explaining life satisfaction among the elderly which was a structural model examination in 2009, its results showed that psychological well-being dimensions, life satisfaction, and physical conditions shared significant positive relation with each other among the elderly and that psychological well-being was the major predictor of life satisfaction [48].

From Table 2, it could be seen that life satisfaction and immune system share a positive correlation with each other ($r = .404, p < 0.01$). **Thus, null hypothesis is rejected and hypothesis H6 is accepted.**

According to the research conducted by Moreno-Agostino, D., Abad, F. J., & Caballero, F. F. on evidence on the bidirectional relationship between health and life satisfaction in older adults in 2021, its results showed that life satisfaction is better predicted by health in older adults [49]. According to the research conducted by Gana, K. et al. on relationship between life satisfaction and physical health in older adults which was a longitudinal test of cross-lagged and simultaneous effects in 2013, its results showed that subsequent levels of life dissatisfaction is significantly predicted by poor health [50].

From the above table, it could be seen that there is no correlation between sense of coherence and immune system ($r = -.130, p > 0.05$). **Thus, null hypothesis is accepted and hypothesis H3 is rejected.** It could be also seen that there is no correlation between psychological well-being and immune system ($r = .121, p > 0.05$). **Thus, null hypothesis is accepted and hypothesis H5 is rejected.**

Table 3: Regression Table

Model	R	R Square	Adjusted R Square	Standard error of the estimate
1	0.404 ^a	0.163	0.137	5.978

Predictors: Sense of Coherence, Psychological Well-Being, Life Satisfaction

Dependent Variable: Immune System

From Table 3, it is seen that the values of R, R Square, Adjusted R Square, and Standard error of estimate are 0.404, 0.163, 0.137, and 5.978 respectively.

- R value is 0.404 indicates low correlation between independent and dependent variable.
- R squared value is 0.163 which indicates that it is not effective to determine the relationship between independent and dependent variable.
- Value of Adjusted R squared is 0.137 which is far away from 0.163 which is value R squared. Hence, generalization of results is not possible.

Table 4: ANOVA TABLE

Model	Sum of Squares	Df	Mean Square	F	Sig
1 Regression	682.544	3	227.515	6.367	.001 ^b
Residual	3501.808	98	35.733		

Total	4184.353	101
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Predictors: Sense of Coherence, Psychological Well-Being, Life Satisfaction

Dependent Variable: Immune System

From the Table 4, it is seen that value of Regression, Residual, and Total are 682.544, 3501.808, and 4184.353 respectively. Value of F Ratio is 6.367.

- Here, P value or Sig value is .001 which is less than 0.05. Hence, the result is significant.
- Value of F Ratio is 6.367 which indicates that good prediction of the variables could be done after taking inaccuracies present in the model into consideration.

Table 5: Coefficient Table

Independent Variables	B	T	p
Sense of coherence	-.007	-.103	.918
Psychological Well- Being	.005	.060	.952
Life Satisfaction	-.346	-3.776	.000

Dependent Variable: Immune System

As per the results of Table 5, it has been found that life satisfaction has an impact on immune system in elderly people during Covid era ($p < 0.05$). **Thus, null hypothesis is rejected and hypothesis H9 is accepted.**

According to the research conducted by Barak, Y. in 2006, on the immune system and happiness, its results showed that when negative affective styles are predominant in individuals, it results in poor immune responses and make individuals more prone to illness than positive affective styles [51]. Another study conducted on life satisfaction and feeling in control as indicators of successful aging to predict mortality in old age by Wiest, M., Schuz, B., & Worm, S. in 2012, its results showed that mortality was significantly predicted by life satisfaction and control beliefs interaction in old age [52].

From Table 5, it could be seen that sense of coherence didn't have any impact on immune system in elderly people during Covid era ($p > 0.05$). **Thus, null hypothesis is accepted and hypothesis H7 is rejected.** Also, it could be seen that psychological well-being didn't have any impact on immune system in elderly people during Covid era ($p > 0.05$). **Thus, null hypothesis is accepted and hypothesis H8 is rejected.**

Limitations of this study focused around the fact that the age group of geriatrics in the research was limited till 80 years. Hence, those who are above 80 years, this study would not fit for them. Also, data has been collected only from residents of West Bengal which might create problem in generalizing the findings.

The quantitative findings of the study might be relevant for development of positive interventions centering around physical and psychological well-being of geriatrics. This would result in proper immune functioning, reduction of stress level, reduction of physical disability, proper cardiac functioning, reduction of mental disorder, increased longevity of life in geriatrics (Elaine, M., 2015) [53]

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Conflict of Interest:

The author declared no conflict of interests.

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