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Understanding Longevity and Its Factors Among Different Age Groups

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ABSTRACT: Longevity is the ability to outlive the mean age of death. Longeity is the ability to outlive the mean age of death. This paper identify factors that affect longevity and explains the role of physical, mental and spiritual health in increasing longevity. Hence, to identify factors that affect the longevity of life. This paper identifies and explains the role of physical, mental, and spiritual health in increasing longevity. The hypothesis is that age groups influence the quality of physical, mental, and spiritual health in a non-linear manner and, in turn, longevity. The research design is a mixed-method approach. Data was collected through quantitative surveys. The respondents include 47 females and 63 males of Indian ethnicity, divided into age brackets of ten years and spread across 30 to 89 years. Good health peaks in the age bracket 60 to 69 years in all areas; physical, mental, and spiritual. The data shows a decline in physical and mental health over time (20 years) across all age groups. It shows spiritual health has a positive trend; it has increased over time (20 years) for all age groups.

Introduction

Longevity is the ability to outlive the mean age of death as defined by various sources.[1] World Data states that the mean lifespan in developed countries ranges between 80-85 years. Longevity has shown a positive trend from 1950 to 2020. Across these 70 years, females have always had a longer lifespan than males. The average life span is 73.4 years, and healthy life expectancy has increased from 58.3 to 68.7 in 2019.[2]

Longevity can also differ by geographical area. Hong Kong has an average lifespan of 85.29 years; ranking number 1; The Central African Republic has an average lifespan of 54.36 years; ranking 193, while India has an average lifespan of 69.6 years. Blue zones are five regions scattered all over the world that have the highest concentration of centenarians. These 'Blue zones' are located in Okinawa, Japan; Ikaria, Greece; Nicoya, Costa Rica; Sardinia, Italy; and Loma Linda, USA. Buettner, D. (2012). World Data also support this.[2]

Various factors affect longevity, and only approximately 25% comes from genetics. Environmental factors heavily influence the remaining 75%. These environmental factors can be segregated into physical, mental, and spiritual factors.[3] The practices followed by the centenarians (individuals who have lived 100 or more years) in the blue zones mentioned above have also been divided into these subcategories of health. Physical health can be defined as the body's functioning at standard levels, allowing biological processes like reproduction and respiration to run smoothly. Physical health includes nutrition, physical activity, medical healthcare, and rest. Mental health refers to emotional, psychological, and social well-being. It influences how we feel, think and act.[4] Spiritual health can be viewed as an individual's environmental connections. It includes connections with themself, social connections, connections with nature, and transcendental connections.[5]

Focus on physical health has led to medical advances in the last 500 years, with longevity increasing from ~25 years to ~75 years. In the previous 200 years, life expectancy has almost doubled to 80 years in the US. One reason for this exponential growth is advancements in public health. This includes understanding and control of infectious diseases the epidemiology, control of infectious diseases, and more abundant and cleaner access to water and food.[6] Historians presume the 'First Public Health Revolution' eliminated many deaths through sanitation and developed knowledge on nutrition, water treatment, and food inspection. Vaccines have also increased life expectancy by preventing 322 million illnesses, 21 million hospitalizations, and 732,000 premature deaths during 1994-2013, only in the United States. It has enhanced our understanding of genomics and immunology.[6]

Unlike physical health, mental health is relatively new and was coined as a medical phrase in the year 1946. In that year, a Mental Health Association was created in London. In the year 1948, mental health was defined by WHO as "mental hygiene refers to all the activities and techniques which encourage and maintain mental health. Mental health is a condition subject to fluctuations due to biological and social factors, which enables the individual to achieve a satisfactory synthesis of his own potentially conflicting, instinctive drives; to form and maintain harmonious relations with others, and to participate in constructive changes in his social and physical environment."[7] Some community outreach programs include laws and regulations which prevent substance abuse, reduce access to self-harm/suicide, create rehab sessions, etc. Some advances in this field have improved access to insurance covering mental health and substance abuse treatments, understanding the root of the problem through therapy rather than pills, and using digital means to track and treat mental illness. These developments are pivotal to longevity as some mental illnesses can

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reduce life span by 10-20 years. It reduces life span by 9-24 years through substance abuse, 9-20 years through bipolar disease, and 7-11 through recurrent depression.[7]

Spiritual health and religious beliefs have proven to provide believers with a sense of control, empathy, and coping with taxing situations. Longevity has increased by an average of 37% among dutiful participants of religion. Religion and spirituality have also reduced the risk of heart failure by 20% for those affected by the disease.[8]

This study aims to identify the various factors which impact longevity. It looks at longevity from three angles, physical, mental, and spiritual. This paper also identifies the relationship between these three aspects of health.

Methods

Aim of the study:

The study aims to identify different factors of health that affect longevity.

Research Design:

It is a quantitative study. The independent variable of the research is age groups. The dependent variables are the ranking of physical, mental, and spiritual health.

Hypothesis:

Null hypothesis- Age groups do not influence the quality of physical, mental, and spiritual health rankings.

The alternative hypothesis is- Age groups influence the quality of physical, mental, and spiritual health rankings.

Consent and Ethical Issues:

While collecting quantitative data from the questionnaire, all respondents provided consent. Their names and respective responses will not be disclosed. Boundaries were established before the interview itself, and permission for recording before it began.

Sample:

The sample size of the research is 110. It includes 47 females and 63 males. The age range for the survey is 30 to 89 years old. They all belong to middle to upper middle-income backgrounds from the South Asian region. - Table 1 shows the frequency count for the number of respondents in each age band. The modal class is 40<=49, and class 80<=89 has the least number of respondents.

Table 1: Number of respondents in each age band.

Age bands	Count of Age Band
30<=39	11
40<=49	36
50<=59	12
60<=69	19
70<=79	29
80<=89	3
Grand Total	110

Table 2: Number of Males and Females - Table 2 shows the frequency count for the number of males and females. There are 47 females and 63 males.

Row Labels	Count of 3. Gender
Female	47
Male	63
Grand Total	110

Scales used/tools used/instruments used:

The questionnaire was made using google forms. It was a quantitative survey that included questions with rankings and ratings. For example, "Rate your physical health on a scale of 1-7, 1 being the lowest and 7 being the highest."

Results and Discussion

In the present study, descriptive and inferential statistics were carried out to analyze the data.

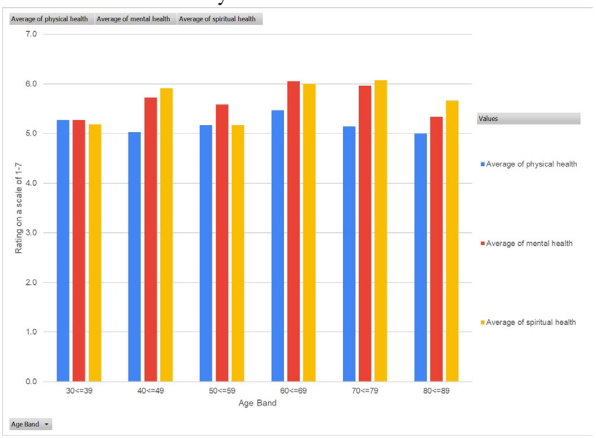

Figure 1: Graphical representation of the average scores of physical, mental, and spiritual health across different age groups (N= 110)

Figure 1 displays the current nature of physical, mental, and spiritual health across different age groups. Respondents have rated each category of their health on a scale of 1-7, 1 being the lowest and 7 the highest. Physical health seems to oscillate among different age groups. The age group, 30-39 has an average physical health rating of 5.3 out of 7. However, there is a decline in ratings from 5.3 to 5.0, then 5.2. It reaches its peak in the age group 60-69 with a rating of 5.5. It then declines again, getting a reading of 5.0 in the age group of 80-89 years old. This decline in physical health in the 40s can be due to a higher workload, more stress and responsibilities, and a shift in priorities with a lower priority to physical health. During the 60s physical health might have become a priority again, causing an increase. Eventually, another decline could be due to chronic illnesses and old age. Mental health seems to have higher average ratings than physical health. The ratings increase, peak, and then decline, beginning from 5.3, reaching its peak rating of 6.1 in the age group of 60-69 and declining to 5.3 again in the age group of 80-89. This increase in the 60s and 70s can be due to a balanced perspective on goals, priorities, and clarity in one's life. It declines again in the 80s, which can be due to geriatric social isolation, loss of purpose, and illnesses. Spiritual health follows a similar pattern to physical health. It has two turning points, 50-59 and 80-89 years old. It has a mean rating of 5.2, which rises to 5.9 in 40-49 and again falls to 5.2. It then increases to 6.1 in 70-79 years old and again falls to 5.7 in the age group of 80-89. The main dipping points for all aspects of health are 50-59 and 80-89 years old. The first dipping point can be because most families are now empty nesters, anxious about retirement and financial security, and personal health and wellness. The second dipping point can be because of end-of-life issues.

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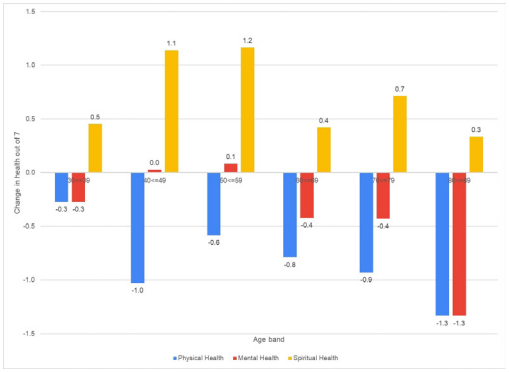

Figure 2: Graphical representation showing the changes in physical, mental, and spiritual health in the period of 20 years. (N= 110)

The values above the bars in figure 2 depict the mean change in health over 20 years. This was done for all age groups and types of health. These scores were calculated by measuring their average health ratings of 20 years ago and subtracting them from their average health ratings currently. Physical health has shown a dip across all age groups, potentially indicating that it is a source of concern and anxiety. The highest drops are from the age groups 40-49 and 80-89 years old, with -1.0 and -1.3, respectively. The age group, 40-49, could show a significant dip in physical health because of added workplace pressure, more responsibilities, and a struggle to find a work-life balance. The second age group shows the highest drop; this could be because of chronic illnesses, geriatric social isolation, etc. Mental health also indicates a decline in most age bands except for no change in 40-49 and an increase of 0.1 in the age group of 50-59. This indicates that the sample has historically not proactively prioritized mental health. Unlike these two factors discussed previously, spiritual health increases in all categories. It starts from 0.5, peaks at 1.2 in 50-59, and reduces to 0.3 80-89. This shows that the building of connections between oneself and their environment increases throughout one lifespan. It also shows that most connections are built between 30-59 years old.

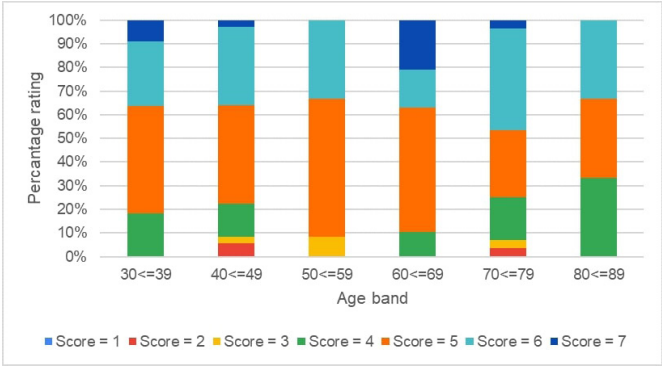

Figure 3: Graphical representation depicting the spread of physical health ratings across age groups. (N= 110)

Figure 3 shows the spread of physical health across age groups. Most age groups have ratings of 4 or above, implying most age groups have average physical health. In the age band 70-79, 45% of the ratings are either 6 or 7. This age band has the highest percentage of 6 or 7 ratings. The age band of 60-69 has given a score of 7 for physical health, which is the highest among the age bands. This survey went out to individuals belonging to the middle and upper-middle income brackets. At 60, this population is well-settled financially and is seeing a shift in priorities. They are typically retired with more time on their hands and are aware of the importance of physical health in having a healthy old age and extending their life span.

Given that they have more time, they may be exercising more. This is something that can be explicitly tested in additional research. Physical exercise is the only way to slow down aging and preserve health.[9] Hence, this could be why the majority of the respondents belonging to the age group of 60<=69 scored 7 and had a score of 7 as they are starting to understand the importance of looking after their physical health.

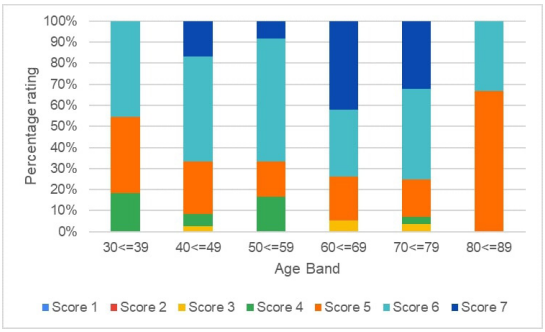

Figure 4: This graph shows us the spread of mental health ratings across age groups.

Figure 4 shows us the spread of mental health. Most age groups have a rating of 6s and 7s, accounting for approximately 50% of the total ratings, suggesting that focus on mental health has increased in the current times.

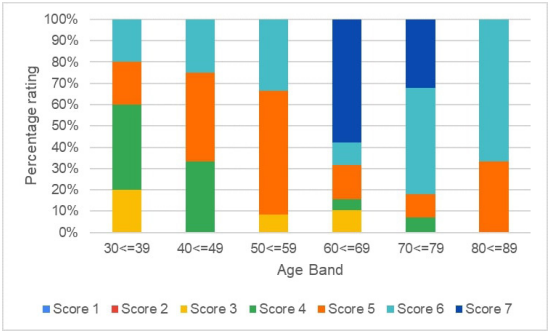

Figure 5: Graphical representation shows the spread of spiritual health ratings across age groups.

Figure 5 shows us the spread of spiritual health. Spiritual health shows the most varied results. The best spiritual health belongs to ages above 60. After the 60s, there was a massive increase, with most ratings belonging to 6s and 7s.

Table 4: Summary of independent T-test Analysis assuming unequal variance between 30-60 years and 60-90 years respondents on the variable of physical health (N= 60 responses for 30-60 and 51 responses for 60-90)

Source	30-60 years		60-90 years		t	P
	M	V	M	V		
Physical health	5.10	1.02	5.29	1.08	-0.926	0.356

Note. *p > .05

Table 4 depicts that 30-60 years (5.10, V=1.02) and 60-90(M= 5.29, SD= 1.08) did not differ significantly on ratings of physical health, t(108)= -0.926, p= n.s.

This means that the null hypothesis is true, and the alternative is rejected. Physical health is not influenced by age group. However, a study by the National Library of Medicine states that metabolic disorders and other chronic diseases become more prominent in older ages. They have concluded that physical health worsens as age increases in adult and geriatric groups.[10]

Table 5: Summary of independent T-test Analysis assuming unequal variance between 30-60 years and 60-90 years respondents on the variable of mental health (N=60 responses for 30-60 and 51 responses for 60-90)

Source	30-60 years		60-90 years		t	p
	M	V	M	V		
Mental health	5.61	0.794	6.02	0.854	-2.33	0.021

Note. *p < .05

Table 5 depicts that 30-60 years (5.61, V=0.794) and 60-90(M= 6.02, SD= 0.853) did differ significantly on ratings of physical health, t(108)= -2.33, p= significant. This means that the null hypothesis is rejected, mental health is affected by age, and the age group 60-90 years have better mental health. A study by The Indian Express states that men in their 20s; suffering from anxiety and depression were more likely to develop chronic illnesses with a 72% risk elevation. While men in their 60s were least likely to develop chronic illnesses with an 8% risk decrease.[11]

Table 6: Summary of T-test Analysis assuming unequal variance between 30-60 years and 60-90 years respondents on the variable of spiritual health (N=60 responses for 30-60 and 51 responses for 60-90)

Source	30-60 years		60-90 years		t	p
	M	V	M	V		
Spiritual health	5.63	0.893	6.02	1.19	-1.98	0.0503

Note. *p ~ .05

Table 6 depicts that 30-60 years (5.63, V=0.893) and 60-90(M= 6.02, SD= 1.19) did differ significantly on ratings of spiritual health, t(108)= -1.98, p= significant.

This means that the null hypothesis is rejected, and spiritual health is affected by age.

This implies that spiritual health is also dependent on age group. These results corroborate the data in Figure 1; physical health dips, peaks, and drops again—however, mental and spiritual health show an increasing trend as age increases.

Table 7: Summary of correlation between different categories of health

y	x	r factor	P- Value
physical	mental	0.30	0.00175
physical	spiritual	0.28	0.003128
mental	spiritual	0.46	0.00001

Note: Positive correlation, p<0.05

The table shows a significant positive relationship between physical and mental health. r(108) = .30, p < .05; there is a significant positive relationship between physical and spiritual health. r(108) = .28, p < .05, and there is a significant positive relationship between spiritual and mental health. r(108) = .46, p < .05.

There is a weak correlation between the physical and mental health of the r factor of 0.30. Similarly, physical and spiritual health has a connection of 0.28. This shows that while the two are connected, they both have to get distinct and specific attention. While they are slightly dependent on each other and can help improve each other, fixing one cannot automatically mean complete improvement of the other. There is a moderate correlation between the spiritual and mental health of the r factor of 0.46. This means that as mental health increases, spiritual health also shows an increase or vice versa. Hence, these factors need distinct and specific but related attention for individual and collective improvement in health and overall longevity. The report on the Connection between Mental and Physical Health by the Canadian Mental Health Association supports this.[12]

Conclusion

To conclude, the three aspects of health show a notable trend across age groups. Physical health vacillates as age increases, dipping, peaking, and then dropping again. Mental health has a bell-shaped trend, and spiritual health shows a relatively positive trend as age increases. The results for physical health are not statistically significant due to a smaller sample size; however, physical health does deteriorate with age. Physical and mental health have received lesser focus and attention than spiritual health over time by respondents.

Given that these three factors are only moderately correlated, there needs to be increased, separate and specific actions to improve all-around health. The treatments for improving physical, mental, and spiritual health must be category-specific and reinforce other categories. This ensures that apart from localized category-specific improvements, overall longevity can be improved.

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