



Looking into the Health and Longevity of Scholars in Mathematics, Physics and Chemistry: The Case of China

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Abstract. This paper produced lifespan of scholars of three disciplines with Chinese as a whole and Average lifespan of scholars of three disciplines by geographic location. Subsequently, through the interview results with 4 mathematics scholars, the ways they manage to maintain health are ascertained, on the basis of which the reasons for their sustained health are provided. This paper concludes the mathematics scholars' suggestions to stay healthy as: (1) more brain activities and more reflections; (2) more exercise; (3) be optimistic; (4) be happy; (5) smoke less.

Keywords: Healthy life style · Scholar health · health interview

1 Introduction

By analyzing and referring to the reality, the biographies of scholars in mathematics, physics and chemistry mentioned on the official websites of the second-level colleges of mathematics, physics and chemistry in China have entered the statistical analysis with information on the year of birth and death for the sake of calculating lifespan, and the place of ancestry/birth for regional factor analysis. A total of 520 scholars, i.e. 177 in mathematics, 153 in physics and 190 in chemistry, have been initially involved, and among which 9 in mathematics, 6 in physics, and 4 in chemistry were excluded due to their incidental death, contributing to the final sample consisting of 501 scholars in total as shown in Table 1. The data include scholars' names, year of birth, year of death, ancestry/place of birth, age, whether they were members of the Chinese Academy of Sciences, reasons for death, teaching institutions, the year of major contributions for mathematicians only, and interdisciplinary research directions for chemists only, the results of Descriptive statistics analyse as shown in Table 2, Fig. 1 and Table 3.

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Table 1. Table of scholars with or without academician titles in the three disciplines selected [1]

	Mathematician	Physicist	Chemist
Academician	30	87	114
Others	138	60	72
Total	168	147	186

Table 2. Quantile table of lifespan of scholars of three disciplines and the nation as a whole

Life quantile	Mathematician	Physicist	Chemist	nation as a whole [2]
Min	38.00	46.00	45.00	0.00
10% quantile	60.00	65.20	68.00	58.59
25% quantile	72.75	75.50	76.00	70.18
Median	82.50	84.00	85.00	78.58
75% quartile	88.00	91.00	91.00	85.17
90% quartile	93.30	97.00	95.00	90.17
Max	108.00	101.00	101.00	105.00

2 Descriptive Statistics Analysis

3 Interviews with Scholars on the Approach to Maintaining Health and Investigation

Altogether four professors in Mathematics or Statistics received the interview, where they responded to the following two questions, and based on which their views and opinions towards the longevity of mathematicians were obtained. The permission for using the content of the interview was granted by the academic committee of the university: [5–9].

1. Professor, as the old saying goes, “Mathematics leads to good health and longevity”, mathematicians usually live a longer life than the general public, and how do you feel about the longevity of mathematicians?
2. Professor, what are the good habits that you usually practice to live a long and healthy life?

The transcript of the interview is as follows:

“Rigorous thinking, functioning of the brain, which are very important, and to be happy, ... , also counts for much ... my tight schedule doesn’t allow me to figure it out (health), and I’m not too old, So I have no idea about the test (results), but there

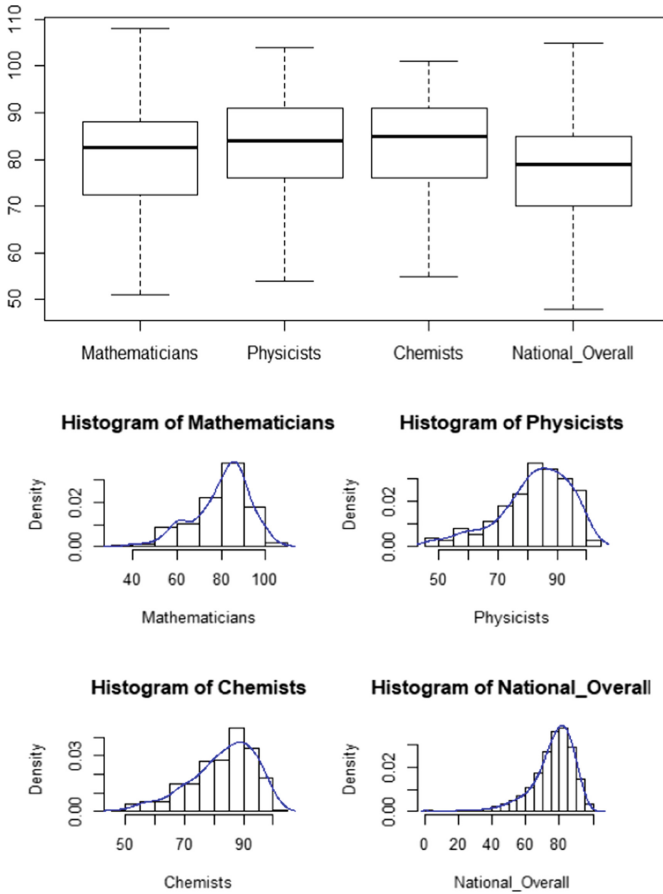


Fig. 1. Lifespan box line diagram of scholars of three disciplines drawn by R3.6.3 [3] & Histogram of frequency distribution and probability density function of scholars of three disciplines and the nation as a whole

is always one thing I agree with, learning is progress, work is happiness, tolerance is health, satisfaction is happiness.”

– Liu Dezhi, Professor (Grade II), Hebei University of Geosciences

“rather indifferent to fame and fortune, because the dedication to the study of mathematics, and they also do not have much pursuit of other things, so then it is still good for their health, because in addition to the academic research in their mind, there is no other major pressure. I think the most fundamental stuff is exercise, but not go too far

Table 3. Average lifespan of scholars of three disciplines by geographic location^c[4]

Rank	Mathematician	Physicist	Chemist
1	Northwest China 91 ^a	North China (87.07)	Northeast China 86 ^b
2	East China (82.34)	South China (84.33)	Southwest China (85.46)
3	North China (79.35)	East China (82.60)	South China (83.93)
4	South China (77.70)	Central China (81.00)	North China (83.75)
5	Southwest China (77.38)	Southwest China (79.20)	East China (82.83)

a. There is only one mathematics scholar in the northwest region, Mr. Duan Xuefu (91).

b. There is only one chemist in Northeast China, Mr. Nie Hengrui (86).

c. East China: Shandong, Jiangsu, Anhui, Zhejiang, Fujian, Shanghai; South China: Guangdong, Guangxi, Hainan; Central China: Hubei, Hunan, Henan, Jiangxi; North China: Beijing, Tianjin, Hebei, Shanxi, Inner Mongolia; Northwest China: Ningxia, Xinjiang, Qinghai, Shaanxi, Gansu; Southwest China: Sichuan, Yunnan, Guizhou, Tibet, Chongqing.

on it. I recommend taking brisk walking, swimming, something like that, and smoking less.”

– Ni Mingfang, professor at the People’s Liberation Army Army Engineering University

“I personally believe that mathematics works like gymnastics for the mind ... Engaged in teaching and researching mathematics would constantly promote your brain activity ... Keep thinking, it is the trick. So I think health is linked to your constant thinking ... Which is also true for some lifestyle habits, like exercise, diet, and rest ... Mathematics is the basis of thinking ... It is necessary to think constantly ... The cheerfulness of personality, one’s generosity, also falls into this category? First of all, try to be generous, in addition to following a scientific pattern of diet and living ... Also keep exercising, do not eat junk food... Willing to learn, willing to read, I think reading also makes people open-minded, like the constant pursuit of the unknown ...”

–Fu Jun, Professor, Jilin Normal University.

“... (mentor) live to 98 years old with an active mind, this is indeed because of his self-discipline ... He takes a walk every day as a routine, and as self-disciplined as he is, the more meat he have, the longer he walks. Maybe this is also a way of exercising brain, and beyond that, then I think, early to bed and early to rise, does good for you (students) and then more exercise, more brainstorming, do not play games all day long, just lying there playing games and linger to the phone, this is not a healthy Life style, isn’t it?”

–Feng Hong, associate professor at Dalian University of Technology.

The interview results reflect that more brain activities and more reflections are the key reasons for mathematicians to achieve longevity. Taking more exercises and maintaining a healthy diet are the factors generally agreed by the professors as contributors to health, and willingness to study and read along with playing less mobile games are their requirements for students to act as a healthy learner.

4 Summary of Reasons for Longevity

4.1 Capability in Sentimental Management

According to the World Health Organization, more than ninety percent of diseases are related to sentiment, while uplifting and healthy sentiments are positively correlated with longer life expectancy. In the long course of life, many things are beyond our choices. Although it is impossible to decide on everything we experience, we can decide on what kind of sentiment we take on, and being good at controlling and managing our sentiments can help us find an easy exit in a complex world and obtain happiness. Reading galvanizes our brains, opens up our horizons, improves our intellect, warns us of lessons from the past, and helps us become relatively mood-free, enabling us to deal with the unexpected rationally and flexibly, stay calm in the face of troubles, and combat against negative sentiments.

The most important thing to extend one's lifespan is to adhere to good habits and maintain an uplifting attitude toward life, as people who live a longer life would be able to manage their sentimental stability and remain in a good mentality, preventing extreme sentimental fluctuations and situations out of the original plan. Typically, anxiety, tension, and even anger will cause significant physical damage, leading to endocrine disorders and autonomic dysfunction internally, which is detrimental to the liver and heart and also renders blood pressure, and to hair loss, skin atrophy, slow movement and other adverse effects externally. Therefore, it is necessary to keep oneself relaxed, make frequent communications with others, and maintain an optimistic and uplifting attitude towards life. Cultivating the mind through reading, engaging in physical and mental activities, reflecting on the existence, and maintaining a peaceful and calm mindset will promote our physical health and prevent chronic diseases, thereby realizing for us the ultimate goal of health and longevity.

4.2 Regular Physical Exercises

To achieve longevity, reading and exercise are equally essential. Senior intellectuals live a life of extreme self-discipline, always sparing a margin for exercise in a tight schedule, as they believe that physical fitness is an indispensable requirement for the normal operation of daily business. Studies have shown that adhering to moderate exercise helps to enhance the multi-faceted capabilities of human body, promote metabolism and improve the immune system. Physical exercise of a certain intensity will promote blood circulation throughout the body and enhance the functions of the internal organs, especially the heart, lungs and gastrointestinal tract, and improve the metabolic capacity of muscle cells and bone cells, making the muscle fibers grow thicker, more solid and robust, well-proportioned and forceful. Meanwhile, it will also explicit the bone and bone nodes, prevent osteoporosis, and consequently contribute to the firm connection of muscles and ligaments and strengthen the solidity of bones. Taking exercises on a reasonable basis also leads to thicker cartilage on the joint surfaces, and increases the compressibility and contact area, while nutritional hypertrophy of connective tissue and intercellular matrix provides additional volume to the muscle ligaments. These changes

allow for improved stability and flexibility of the joints, enabling them to better meet the demands of sports and reduce the incidence of injuries from exercise.

Regular physical exercises will improve the nutritional status of the heart muscle and the elasticity of the blood vessels, increase the heart's per minute discharge, enhance the heart's capacity to transport oxygen, optimize the excitability of the vagus nerve, dilate the small peripheral arteries, slow down the heart rate, lower the blood pressure, improve the regulation of cardiovascular functions, and improve the prevention of coronary heart disease. People who practice aerobic exercise regularly will also build up their lung capacity, cleanse their internal systems, gain superior immunity, boost their immune function and prevent various diseases. A strong and healthy physical condition is the foundation for the rest of activities in life and is the key to longevity.

Healthy diet.

There is a long-standing saying in China that "Food is the paramount necessity of the people", but here refers to a diet regulated by rules rather than excessive consumption of food. According to a constellation of theories in traditional Chinese medicine, "diet helps to maintain health", which justifies a reasonable diet, attention to dietary taboos, and moderate food intake as a way to improve health and extend lifespan. The purpose of maintaining health through diet is to replenish the essence, correct the imbalance of yin and yang of the internal organs, resist aging and extend lifespan. A regular healthy diet may extend the lifespan of human beings to a certain extent, while some people may ignore the important details of diet, refuse to hold regular meals, eat and drink excessively, and regularly consume stimulating food with low nutritional value and difficult to digest. This may lead to abdominal suffering and distension, causing indigestion and other problems, which will invariably influence the functioning of liver and digestive system. While people who are attentive to their health management not only follow a regular diet to intake sufficient nutrition, but also have prior knowledge of the properties of food, its nutrients and absorption rate. At the same time a proper proportion of meat and vegetables will ensure the provision of all kinds of nutrients and thus improve the immune system.

Human health is also dependent on intestinal health. In the post-epidemic era, concerns about disease detection and prevention generally grow, and risk prediction for potential diseases is gradually becoming a popular demand. Data from the White Paper on Medical Care for Urban Population shows that many diseases such as high blood lipids and diabetes have become a serious threat to the national health of China. In recent years, with the in-depth study of gut microorganisms, researchers have found that gut microorganisms are closely related to the above-mentioned diseases, but the available research results have not been translated into practical applications yet. Nevertheless, a regular healthy diet indeed help individuals to maintain health and sheds light on how to achieve longevity.

4.3 Well-Balanced Work and Rest

As The Inner Canon of Huangdi states, "Work at sunrise, rest at sunset", maintaining a healthy and constructive balance between work and rest is closely related to longevity and health. Every living creature should respect and conform to the circadian rhythm of its own body just as human should follow the internal rules of the body in order to live

a long and healthy life. For those who enjoy longevity, a healthy work and rest pattern also plays a major role in their longevity. Following the study of periodic rhythms of human life activities, modern science has found certain rules and termed them biological clocks, which refer to the rhythm of periodic changes of various physiological activities of the human body. The sudden disturbance of the operation of the human biological clock is a major cause of disease, from which, it is clear that in order to achieve health and longevity, it is necessary to understand the nature of the biological clock, and pay due conformity to it, i.e., all human activities should be synchronized with the operation of the biological clock. It is helpful for the human body to maintain mental well-being and stay relaxed when awake by having enough rest each day.

Arbitrarily altering the time and frequency of sleep will directly affect the circadian rhythm of the brain and reduce work efficiency and induce diseases. There are cases of people with reduced resistance, accelerated aging or endocrine disorders, which are all due to staying up late at night for a long time. In the post-epidemic era, a healthy balance between work and rest should be highly valued and emphasized, and people who attach importance to physical health will not overwork at the cost of their physical well-being, but will instead insist on a reasonable and regular balance between work and rest to improve work efficiency and prevent diseases by giving full play to the immune capacity.

4.4 Expectations for Health and Longevity in the Post-epidemic Era

This year marks the third year into the national battle against the epidemic, and at present, China has entered the post-epidemic era with the COVID epidemic generally under control. In this covert battle that has taken away many lives, people should settle down and think about the meaning of life, the ancient pursuit of health and longevity, and the attitude towards life that should be adopted in this new era, and here a brief discussion is presented based on the above-mentioned points of view.

5 Conclusion

The present analysis, which is based on the life tables of 520 scholars, reveals that the median life expectancy of these individuals is 84.47 years. This figure surpasses the national life expectancy indicator of 77.93 years, as reported by the National Health and Wellness Commission of China on July 5, 2022 [10]. Consequently, it can be deduced that the academic community has a longer lifespan in comparison to the general population. In this study, scholars in the fields of mathematics, physics, and chemistry were analyzed, but in the future, a comprehensive examination of scholars from other disciplines, such as medicine, engineering, literature, among others, is imperative to determine if scholars from different fields have differing life expectancy compared to the general population.

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The following supporting information can be downloaded at <https://data.mendeley.com/datasets/t35xz3ntj6/1>.

References

1. China Life insurance.(2010).China life insurance industry experience life table(in Chinese)
2. Li,Z.(2005)Life Analysis of Modern Mathematicians in China.Mathematics in practice and theory,03:99-104.(in Chinese)
3. R Core Team (2022). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/.12c>
4. Baidu Encyclopedia,2022.Administrative divisions of the People's Republic of China.<https://baike.baidu.com/item/%E4%B8%AD%E5%8D%8E%E4%BA%BA%E6%B0%91%E5%85%B1%E5%92%8C%E5%9B%BD%E8%A1%8C%E6%94%BF%E5%8C%BA%E5%88%92/1292734>
5. Zhuhai College of Science and Technology,2022.Liu Dezhi. <https://www.zcst.edu.cn/2022/1208/c4613a170250/page.htm>(in Chinese)
6. Zhuhai College of Science and Technology,2022.NI Mingfang.<https://www.zcst.edu.cn/2021/0629/c4613a162080/page.htm>(in Chinese)
7. Zhuhai College of Science and Technology,2022.Fu jun.(in Chinese)
8. Zhuhai College of Science and Technology,2022.Feng Hong.<https://gg.zcst.edu.cn/2021/1229/c562a165669/page.htm>(in Chinese)
9. School of Statistics and Data Science and Technology, 2022.staff. <https://gg.zcst.edu.cn/562/list.htm>(in Chinese)
10. Transcript of the NCHS July 5, 2022 press conference. Department of Publicity.<http://www.nhc.gov.cn/xcs/s3574/202207/16833fe2630e49338195edd979b6d386.shtml>

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