

Briefing of 2020 Physical Fitness Study of Macao Residents

Sports Bureau, Macao SAR

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In an effort to keep abreast of Macao residents' physical fitness status and its relative changing pattern in a systematic manner, and to facilitate the development of scientific fitness among the general public, the Sports Bureau of Macao SAR Government, with the technical support from the China Institute of Sport Science of the General Administration of Sport of China, conducted the fourth physical fitness study of Macao residents in 2020 in collaboration with the Health Bureau, the Education and Youth Affairs Bureau (currently known as the Education and Youth Development Bureau), the Social Welfare Bureau, the Higher Education Bureau (currently being merged into the Education and Youth Development Bureau), Macao Polytechnic Institute (currently known as Macao Polytechnic University) and other departments.

This study was comprised of indicators related to physical health, including anthropometric measurements, physiological function, physical fitness and vision, etc.. Meanwhile, a questionnaire survey was conducted to investigate the exercise patterns and lifestyles of our residents. Subjects in our study were Macao residents aged 3~79, which were categorized into four age groups: young children (aged 3~6), children and adolescents (students, aged 6~22), adults (aged 20~59) and seniors (aged 60~79). Based on the stratified random and cluster sampling methods, subjects were picked from 52 institutions including kindergartens, schools, government departments, private institutions, social organizations and elderly service centres. Eventually, we randomly selected a total of 11,414 valid samples, including 1,113 young children, 5,335 children and adolescents (students), 3,892 adults and 1,074 seniors. However, as most young children start kindergarten when they reach age 3, and enter primary school at age 6 after 3 years of kindergarten attendance, there were insufficient aged 6 young children subjects collected from kindergartens. Thus, our analysis was only made in accordance with the 1,093 aged 3~5 young children picked from kindergartens. Our study results were as follows:

I. Basic Physical Fitness Conditions of Residents of All Ages in 2020

(I) Young Children

Our study indicated that, except for sit and reach, the level of various fitness indicators of Macao young children aged 3~5 in 2020 increased with advancing age, reflecting the main characteristics of growth and development. The average height of boys and girls was ranged from 98.7~111.9cm and 97.8~111.3cm, respectively, while the average weight of boys and girls was ranged from 15.3~19.4kg and 14.8~18.8kg, respectively. Among all physical fitness indicators,

balance showed the greatest increase with advancing age. Comparing the results of boys and girls, boys were slightly higher in height and weight, lower in body fat percentage, and better in speed and strength, while girls were better in flexibility.

(II) Children and Adolescents (Students)

In respect of anthropometric measurements, Macao children and adolescents (students aged 6~22) showed obvious growth and development, with the main growth period occurred at ages 6~16 for male students, and ages 6~15 for female students. The growth speed peaked in the growth spurt period (ages 7~14 for male students and ages 7~11 for female students), and afterwards most indicators of length and width were fully developed or nearly developed. The average height of male and female students was ranged from 120.0~174.1cm and 118.7~161.8cm, respectively. The average weight of students increased constantly with advancing age. Based on the comparison of male and female students, both the height and weight of male students were significantly higher than those of female students since age 13; whereas their body fat percentage was lower than that of female students in each age groups. Besides, male students had larger waist-to-hip ratio than female students.

Both their physiological function and physical fitness improved with advancing age, with the fastest growth speed observed in strength. Comparison between gender showed that male students had better physiological function than female students and they had better speed, strength and reaction as well. Whereas female students had slightly better balance and significantly better flexibility than male students.

(III) Adults

The length and width indicators of Macao adults aged 20~24 had fully developed. The length indicators of adults aged 20~59 showed a decreasing trend with advancing age while their width indicators remained almost constant. As age increased, weight increased gradually between ages 20~29 in males and before age 55 in females, and it remained stable or decreased mildly thereafter. For males, their chest and waist circumference showed an increasing trend with advancing age before age 29 and age 55 respectively and they remained stable thereafter, whereas the chest and waist circumference of females kept increasing before age 55. For waist-to-hip ratio, both males and females kept increasing with age. Comparison between gender demonstrated that the height, weight and circumference indicators of males were all higher than those of females, whereas their body fat

percentage was lower than that of females; the body fat percentage of males increased until age 54, and then tended to become stable, while that of females continued to increase with advancing age.

As age increased, the overall level of physiological function of adults exhibited a gradually decreasing trend, mainly manifested as a gradual increase in blood pressure and a decrease in vital capacity. The physiological function of males was generally higher than that of females at the same age.

In respect of physical fitness, their grip strength and back strength varied mildly with advancing age, and the relative maximum value was maintained for a fairly long period. However, their explosive power, endurance strength, reaction and balance decreased more rapidly with advancing age. In comparison, although females had better flexibility than males and had no significant gender difference in balance, males had better performance in all other physical fitness indicators than females.

(IV) Seniors

The average height of Macao seniors aged 60~79 declined slightly with advancing age. As age increased, the average weight of male seniors decreased before age 74, and that of female seniors decreased between ages 65~79. The average chest circumference of male seniors decreased with advancing age, whereas that of female seniors increased with advancing age; the average waist circumference of male and female seniors increased slightly with advancing age; and their average hip circumference declined with advancing age. As age increased, the resting pulse of seniors remained stable, but their vital capacity declined significantly, and their cardiorespiratory endurance also gradually decreased. In addition, strength, flexibility, balance and reaction of seniors all decreased significantly with advancing age. In comparison, the height and weight of male seniors were both higher than those of female seniors, but their body fat percentage was lower than that of female seniors; and the physical fitness indicators of female seniors were all lower than those of male seniors, except for flexibility.

II. Major Changes of Physical Fitness of Residents of All Ages Compared with 2015 Results

To facilitate the evaluation of physical fitness changes of Macao residents during the period from 2015 to 2020, we used the physical fitness index (taking the results in 2005 as a basic value of

100, the higher the index value is, the higher the physical fitness level becomes) to compare the overall status of physical fitness of Macao residents in the two studies.

From the physical fitness index of Macao residents, the overall physical fitness level of Macao residents was slightly higher in 2020 than in 2015. The physical fitness index in 2020 was 103.08, which was increased by 0.27 from that in 2015. To be more specific, the composite index of anthropometric measurements was 99.43, which was 0.08 higher than in 2015; the composite index of physiological function was 101.94, which was 0.66 higher than in 2015; and the composite index of physical fitness was 105.14, which was similar to that in 2015. Major changes of residents of all ages were as below:

(I) Young Children

The physical fitness index of young children was 98.17, which was decreased by 1.67 from that in 2015.

The composite index of anthropometric measurements was 99.47, which was decreased by 0.74 from that in 2015. The height and weight of young children in 2020 declined slightly, whereas the prevalence of obesity showed an upward trend. According to the BMI classification (such as overweight and obesity) of the National Sample Standards (*China Sport Science*, 2021), and the critical value of underweight of the International Obesity Task Force (IOTF) standard, the total prevalence of overweight and obesity of boys was 15.7% in 2020, which was increased by 0.8% from that in 2015; and the total prevalence of overweight and obesity of girls was 11.4% in 2020, which was increased by 0.7% from that in 2015. It was worth noting that the prevalence of underweight was 4.3% among boys and girls in 2020, which was increased by 0.6% and 1.0% respectively. Comparing to the 2015 results, it showed that the change in body weight of young children was imbalanced.

The composite index of physical fitness was 97.28, which was decreased by 2.36 from that in 2015. Speed, upper limb strength and balance of boys and girls both declined, in which larger decrease was seen in boys, and their lower limb strength also decreased. Only agility coordination was improved among boys and girls, and improvement was also observed in girls' lower limb strength and flexibility.

In terms of dental caries, the prevalence of decayed primary teeth in 2020 was peaked at age 4 for both boys and girls, which was accounted for 44.3% and 39.5%, respectively. In general, both boys and girls had a lower prevalence of decayed primary teeth in 2020 than in 2015, and the

prevalence of decayed-missing-filled primary teeth was also lower for boys and girls in 2020. Comparison of the two studies showed that the regularity of difference in the prevalence of missing primary teeth and the prevalence of filled primary teeth between boys and girls was not significant, demonstrating that the status of primary teeth caries was improved among young children in 2020. According to the results of two studies, the prevalence of decayed permanent teeth, the prevalence of filled permanent teeth, the prevalence of missing permanent teeth and the prevalence of decayed-missing-filled permanent teeth all occurred at age 5, with an incidence rate ranging from 0.4%~0.6%.

It was noteworthy that young children were suspended from school and had stayed home for about half a year due to the COVID-19 pandemic and they took the physical fitness test in less than one month after resuming classes in September. In such a short time, young children were not able to fully adapt to the group living and learning environment of kindergartens, and the physical training classes were failed to be fully implemented. Since young children had a relatively strong plasticity in physical fitness, and thus it is believed that insufficient group living experience and systematic learning had posed certain impacts on the physical fitness test results of young children. The decline of young children's physical fitness in this study might be attributed to the above factors.

(II) Children and Adolescents (Students)

The physical fitness index of children and adolescents (students) was 98.20, which was decreased by 1.50 from that in 2015.

In particular, the composite index of anthropometric measurements was 98.34, which was increased by 0.05 from that in 2015. The average height, sitting height, circumference and width indicators of male and female students in most age groups increased in 2020. According to the BMI classification under the critical values of underweight, normal weight, overweight and obesity in the *Health Industry Standards of People's Republic of China WS/T 586-2018 and WS/T 456-2014*, comparative analysis of the two studies showed that the prevalence of overweight and obesity in male students in 2020 were 17.4% and 13.6% respectively, which was increased by 3.1% and 1.7% respectively, i.e. a total increase of 4.8% in overweight and obesity. The prevalence of overweight and obesity in female students in 2020 were 9.8% and 7.2% respectively, which was decreased by 1.4% and 0.6% respectively, i.e. a total decrease of 2.0% in overweight and obesity. However, the prevalence of underweight was increased by 1.9% in female students.

The composite index of physiological function was 94.87, which was decreased by 4.42 from that in 2015. In 2020, the average vital capacity of male and female students in most age groups decreased, with a significant decrease seen among male students. Whereas the resting pulse, systolic blood pressure and diastolic blood pressure of males and females in most age groups increased.

The composite index of physical fitness was 98.96, which was decreased by 1.48 from that in 2015. In most age groups, male students showed a decrease in most physical fitness indicators, with strength, strength endurance and cardiorespiratory endurance completely decreased, and balance, speed, flexibility and reaction slightly decreased. Female students had better status than males. Their strength declined in most age groups. and their speed and cardiorespiratory endurance mildly decreased, whereas their flexibility and strength endurance increased significantly, and their reaction and balance were improved slightly. Due to the COVID-19 pandemic, the test of the student category was postponed from January 2020 to September 2020. Students were suspended from school and stayed home for about half a year, during which their life schedule changed. This resulted in a certain decline in most of the physical fitness indicators.

As indicated in the study of dental caries, the prevalence of decayed primary teeth in male and female students decreased in 2020, whereas the prevalence of filled and missing primary teeth increased, as compared with the results in 2015. On the other hand, the prevalence of decayed permanent teeth decreased in 2020, whereas the prevalence of filled and missing permanent teeth increased slightly compared with those in 2015. The results indicated a mild improvement in dental caries of Macao students in 2020, but prevention efforts required to be further enhanced.

In terms of vision, our study showed that the incidence of poor vision was still high in each age group in 2020. The incidence of poor vision in male students was 67.9% in 2020, which was decreased by 2.1% from 70.0% in 2015; and the incidence of poor vision in female students remained unchanged, accounting for 73.8% in both 2015 and 2020.

(III) Adults

Compared with the results in 2015, the physical fitness index of adults aged 20~39 in 2020 was 103.93, which was increased by 1.37; whereas that of adults aged 40~59 in 2020 was 103.96, which was decreased by 0.15.

The composite index of anthropometric measurements of Macao adults aged 20~39 was 99.29, which was increased by 0.78 from that in 2015; whereas the composite index of anthropometric measurements of Macao adults aged 40~59 was 99.43, which was decreased by 0.55 from that in

2015. Generally, the height of male and female adults increased slightly in most age groups in 2020. The weight of males showed an overall increase in all ages, while the weight of females increased between ages 20~34 and decreased at ages 35 and onwards. Compared with the circumference indicators in 2015, the chest and hip circumferences of males increased, whereas their waist circumference decreased slightly, and the waist-to-hip ratio declined significantly; for females, the chest, waist and hip circumferences of females aged 20~39 increased slightly, but their waist-to-hip ratio decreased considerably; the chest and hip circumferences of females aged 40~59 increased slightly, whereas their waist circumference decreased mildly, and their waist-to-hip ratio varied little in 2020.

Based on BMI classification of underweight, normal weight, overweight and obesity, comparison between 2020 and 2015 revealed that the prevalence of overweight in male adults aged 20~39 increased by 5.6%, and that of obesity decreased by 2.5%. Although the prevalence of obesity decreased, the prevalence of overweight increased dramatically, which was a total increase of 3.1% in overweight and obesity. For female adults, the prevalence of overweight in females decreased by 2.5%, and the prevalence of obesity increased by 1.1%, which was a total decrease of 1.4% in overweight and obesity. The proportion of underweight females aged 20~39 in the two studies stayed remarkably high, accounting for 15.7% in 2020 and 18.4% in 2015, and thus high importance should be attached. The prevalence of overweight in male adults aged 40~59 decreased by 4.7%, and that of obesity increased by 1.7%, totaling a decrease of 3.0% in overweight and obesity; whereas the prevalence of overweight in females decreased by 4.6%, and that of obesity decreased by 3.5%, which was a total decrease of 8.1% in overweight and obesity.

The composite index of physiological function of Macao adults aged 20~39 was 103.50, which was increased by 1.02 from that in 2015; whereas the composite index of physiological function of Macao adults aged 40~59 was 103.58, which was increased by 3.10 from that in 2015. Compared with the results in 2015, the resting pulse of adults decreased and no obvious change in trend was observed in their blood pressure. On the other hand, the vital capacity of male adults aged 25~44 declined in 2020, while that of male adults increased in other age groups. The vital capacity of female adults varied mildly between ages 20~39, and increased between ages 40~59. The cardiorespiratory endurance was improved in both male and female adults.

The composite index of physical fitness of Macao adults aged 20~39 was 106.13, which was increased by 1.81 from that in 2015; whereas the composite index of physiological function of adults aged 40~59 was 106.21, which was decreased by 1.80 from that in 2015. Compared with the results in 2015, the grip strength of Macao adults decreased dramatically, while their strength

endurance increased significantly, with their back strength increased, and vertical jump decreased slightly. The one foot stands with eyes closed (OFSEC) time of male adults increased mildly between ages 20~39, but declined significantly between ages 40~59, whereas the OFSEC time of females adults increased obviously in the two age categories of 20~39 and 40~59. The flexibility of male adults declined significantly while the flexibility of female adults increased substantially between ages 20~39 and slightly increased between ages 40~59. For choice reaction time, the reaction of male adults increased slightly between ages 20~39, but decreased mildly between ages 40~59 whereas the reaction of female adults was improved significantly in the two age categories of 20~39 and 40~59.

(IV) Seniors

The 2020 study was oriented to seniors aged 60~79, while the 2015 study was conducted among seniors aged 60~69. Thus, comparative study was only conducted in the aged 60~69 groups.

The physical fitness index of seniors was 104.43, which was increased by 0.98 from that in 2015.

The composite index of anthropometric measurements of seniors was 100.72, which was decreased by 0.69 from that in 2015. In 2020, the height and weight of seniors decreased slightly. The circumference indicators of male seniors all increased, whereas their waist-to-hip ratio decreased; the circumference indicators of female seniors declined slightly, and their waist-to-hip ratio remained unchanged. Based on the BMI classification of underweight, normal weight, overweight and obesity, the comparison between 2015 and 2020 demonstrated that the prevalence of overweight in male seniors was decreased by 1.5%, and the prevalence of obesity was increased by 0.2%; for female seniors, the prevalence of overweight and obesity was decreased by 11.1% and 3.0%, respectively.

The composite index of physiological function of seniors was 99.75, which was decreased by 1.81 from that in 2015 and the composite index of physical fitness was 107.79, which was increased by 2.78 from that in 2015. Compared with their physiological function in 2015, the resting pulse of male seniors declined and that of females varied little; the blood pressure increased in both male and female seniors; the vital capacity of male seniors declined, and that of female seniors increased slightly. In terms of physical fitness indicators, seniors' strength and flexibility both declined substantially, with a more significant decrease observed in male seniors; reaction and balance of male and female seniors both increased, with a more significant increase found in female seniors.

(V) Comparison of Two Physical Fitness Studies of Macao Residents

1. Summary:

We used the physical fitness index to reflect the longitudinal changes of physical fitness of Macao residents, and took the overall level of physical fitness of Macao residents aged 3~69 in the first study of 2005 as a benchmark (basic value: 100). The higher the values recorded in the following studies were, the higher the overall level of physical fitness became. Based on the indexes of the two studies, we found that the overall level of physical fitness of Macao residents was improved slightly in 2020, compared with that in 2015. Particularly, the overall level of physical fitness of young children and adolescents (students) declined, whereas that of adults and seniors increased generally.

Year of Study	Physical Fitness Index of Macao Residents of All Ages					
	Young Children	Children and Adolescents (Students)	Adults		Seniors	Overall
			Ages 20~39	Ages 40~59		
2015	99.84	99.70	102.56	104.11	103.45	102.81
2020	98.17	98.20	103.93	103.96	104.43	103.08
Difference	1.67↓	1.50 ↓	1.37 ↑	0.15 ↓	0.98 ↑	0.27 ↑

As indicated in our comparative studies, the physical fitness of young children and adolescents (students) in 2015 increased generally, compared with the results in 2010. However, the rising trend failed to be maintained in 2020, probably due to the COVID-19 pandemic. The test for the categories of young children and students was postponed from January 2020 to September 2020, during which young children and students suspended classes and stayed home for about half a year. The changes occurred in their life schedule in this period had posed a great impact on these subjects who had a relatively plastic physical fitness status, thus resulting in a decline in their physical fitness test conducted shortly after resuming classes. On the other hand, adults and seniors could better understand the essentiality of physical exercise for enhancing their immunity, so they made wise use of their spare time to exercise properly during the pandemic, which led to their overall physical fitness improved somewhat.

2. Summary for Young Children:

- (1) The overall level of physical fitness declined.
- (2) The prevalence of overweight and obesity was increased by about 1%, and the prevalence of

underweight was also increased by about 1%, indicating the imbalance of weight development in young children.

- (3) There was decline in the speed, strength and balance of young children, but their physical coordination and girls' flexibility were improved.
- (4) The incidence of primary teeth caries was still high, in which the prevalence of decayed primary teeth and the prevalence of decayed-missing-filled primary teeth were both lower than those in 2015, reflecting improvement of primary teeth caries in young children in 2020.

3. Summary for Children and Adolescent (Students):

- (1) The overall level of physical fitness declined.
- (2) The prevalence of overweight and obesity was increased by 4.8% in male students while it was decreased by 2.0% in female students. However, the prevalence of underweight was increased by 1.9% in female students, indicating that there was overweight problem in male students while female students were in excessive pursuit of slimness.
- (3) The vital capacity of students decreased, with a more significant decrease seen in male students.
- (4) There was decline in most of the physical fitness indicators such as strength, speed and cardiorespiratory endurance decreased among students, in which their grip strength decreased the most. Male students had mild decline in strength endurance, balance, flexibility and reaction, whereas female students had significant improvement in flexibility and strength endurance, as well as slight improvement in reaction and balance.
- (5) The incidence of dental caries and poor vision remained fairly high. Compared with the results in 2015, the prevalence of decayed permanent teeth decreased in 2020, but the prevalence of filled and missing permanent teeth increased slightly. Although this indicated a slight improvement in dental caries problems of Macao students in 2020, continuous efforts should be made on the prevention of dental caries. On the other hand, the incidence of poor vision of students varied little.

4. Summary for Adults:

- (1) Adults had increased exercise level, and their overall level of physical fitness increased.
- (2) The total prevalence of overweight and obesity of male adults was increased by 3.1% between ages 20~39, but was decreased by 3.0% between ages 40~59. For female adults, it

declined generally, with the decrease accounting for 1.4% between ages 20~39 and 8.1% between ages 40~59.

- (3) It was worth mentioning that the proportion of underweight in female adults was fairly high between ages 20~39 according to the results in both 2015 and 2020 studies, accounting for 18.4% in 2015 and 15.7% in 2020. Attention should be paid to the excessive pursuit of slimness by females.
- (4) The vital capacity declined slightly among male adults aged 20~39, whereas it increased significantly among male adults aged 40~59. For female adults, their vital capacity varied mildly among young females, and increased slightly among middle-aged females.
- (5) Adults' cardiorespiratory endurance increased significantly.
- (6) Adults' grip strength declined substantially, whereas their strength endurance increased significantly.
- (7) Male adults' flexibility decreased mildly between ages 20~39, and declined dramatically between ages 40~59. In contrast, flexibility increased significantly among young females, and it increased slightly among middle-aged females.
- (8) The balance and reaction of male adults aged 20~39 increased mildly. For male adults aged 40~59, their balance decreased substantially and their reaction declined mildly. For female adults, there was improvement in these two indicators in both age categories of 20~39 and 40~59.

5. Summary for Seniors:

- (1) Seniors had increased level of exercise, and their overall level of physical fitness also increased.
- (2) The total prevalence of overweight and obesity was decreased by 1.3% among male seniors, and 14.1% among female seniors.
- (3) The vital capacity declined slightly among male seniors, whereas increased mildly among female seniors.
- (4) An obvious decrease was observed in grip strength of seniors.
- (5) Seniors had significantly decreased flexibility, and a more significant decrease was found among male seniors.
- (6) The reaction and balance increased slightly among male seniors, while they increased

significantly among female seniors.

III. Scientific Fitness Literacy of Macao Residents in 2020

Scientific fitness literacy means people scientifically develop their fitness potential according to their respective strengths, as well as actively interact with the environment and build a virtuous cycle from motivation, knowledge and understanding, attitude, ability, and skills to behavior and habits, and finally be able to consciously improve a certain level of lifelong participation in sports, fitness and other related activities. The evaluation of scientific fitness literacy consists of 4 dimensions, namely, cognition, attitude, ability and skill, as well as behavior and habit.

This study was based on the questionnaire survey conducted among Macao residents aged 3~79 in 2020. Except that only two dimensions of ability & skill and behavior & habit were examined in the aged 3~6 and 7~9 groups of children (because children of such ages are not able to accurately understand and express their cognition and attitude to scientific fitness), all evaluative dimensions of scientific fitness literacy were examined in all other age groups including the aged 10~12, 13~18, 19~59, and 60~79 groups. The findings are summarized as below:

(I) Cognition for Fitness

This evaluative dimension aimed to study Macao residents' understanding of scientific fitness knowledge. The age distribution of cognition scores exhibited a gradually rising trend, from 71.06 points in subjects aged 10~12 to 86.75 points in subjects aged 30~39, and the score of each age group afterwards remained above 84 points. Generally speaking, seniors had better cognition than adults, while adults had better cognition than children and adolescents. As a crucial time node, ages 19~29 marked a key stage during which individuals stepped out of school and entered society. Meanwhile, their cognitive level developed into a new phase, with cognitive score increasing from 71.38 points to 83.69 points, and then kept increasing consequently afterwards.

(II) Attitude to Fitness

This aimed to study the extent to which residents believed physical exercise was beneficial, fun and enjoyable and their participation rate in exercise. The age distribution of attitude scores was close to that of cognition generally, presenting a rising trend with advancing age. The score peaked among subjects aged 70 onwards, accounting for 66.68 points. The lowest score was 52.24 points which was observed in subjects aged 13~18, suggesting that they did not have an active or proactive attitude towards physical fitness. The overall attitude score was ranged from 50~70 points, which

was lower than the cognition score (70~90 points).

(III) Fitness Skills

This aimed to study residents' basic physical abilities to perform body movements and their exercise skill level. Our study indicated that the age distribution of ability and skill scores presented an inverse U-shape. The score started to rise from childhood, and reached a peak of 62.62 points between ages 13~18. Thereafter, the score was reduced as age increased. An obvious plateau was observed among adults in the aged 30~39 and 40~49 groups. In other words, their abilities and skills maintained at a certain level with advancing age, then declined abruptly after age 50. The overall distribution matched with the changing patterns of physiological function.

(IV) Fitness Habits

This aimed to study the residents' participation level in physical exercise. Our study demonstrated that the age distribution of behaviors and habits presented a W-shape. A score of 72.63 points was first seen young children, followed by 36.35 points in children aged 7~9, 51.71 points in students of Primary 1~3, and 35.02 points in adults aged 30~39. The score of adults was generally low, ranging from 30~40 points. After middle age, the score continued to rise with advancing age until a score of 54.27 points was reached in seniors. The above scores reflected that the age groups with best physical exercise level were young children, seniors and students of Primary 4~6 in descending order. Moreover, scores in habit was more than 10 points lower than scores in attitude, reflecting that there was still much room for improvement in Macao residents' fitness habits.

(V) Differences in Physical Exercise of Macao Residents between 2020 and 2015

With an aim to better understand the factors that influenced the physical fitness of Macao residents, we briefly reviewed and compared the daily physical exercise patterns of Macao residents in 2020 and 2015. In our study, subjects were defined as "frequent exercisers" if they exercised 3 or more times weekly, with a duration longer than 30 minutes each time and an exercise intensity reaching moderate or above level". The proportion of "frequent exercisers" among primary students was increased from 11.8% in 2015 to 25.5% in 2020, which was an increase of 13.7% in 5 years. Whereas the proportion of "frequent exercisers" among secondary students was 18.13%, which was basically the same as 18.06% in 2015. For university students, their physical exercise included those doing both at school and after school, and 32.5% of them were "frequent exercisers". For adults, the proportion of "frequent exercisers" was 36.1%, which was increased by 20.1% from

16.0% in 2015. For seniors aged 60-69, 50.2% of them were “frequent exercisers”, which was increased by 11.6% from 38.6% in 2015.

Note: Please refer to the *2020 Physical Fitness Report of Macao SAR Residents* for details.