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Causes of Different Walking Distances between Cities

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ABSTRACT

Many Japanese think that walking is good for their health. However, not many people know or walk the right amount. In this paper, we introduce the effects of walking on health and factors related to the amount of walking reported in previous studies. In addition, the authors point out what seems to be incorrect in previous studies.

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INTRODUCTION

According to a Ministry of Health, Labor and Welfare report, “Those who have a lot of physical activity or exercise frequently have low morbidity and mortality from ischemic heart disease, hypertension, diabetes, obesity, osteoporosis, colon cancer, *etc.*" [1)]. It is also recognized that “physical activities and exercises have an effect on improving mental health and quality of life”. Furthermore, it is shown that “physical activities in daily life such as walking are effective in reducing bedridden and death even in elderly people”. It is also said that “a specific means of increasing the amount of physical activity in daily life is to try to increase physical activity centered on walking”[1)]. In other words, daily exercise can prevent mental and physical diseases. On the other hand, excessive exercise can cause injury and harm health. Therefore, it is extremely important to introduce an appropriate amount of basic motion with low load such as walking.

Many people walk less and consciously wish to increase their walking. There are a number of previous studies on how to increase walking and events that can increase walking. A report indicated that use of public transportation to commute created more opportunities to walk to the station or bus stop or transfer[2)]. The density of housing (the percentage of houses built per land) and the convenience to access shops, stations, and buses are related to whether walking and public transportation are used as means of commuting[2)]. The high spread of public transportation, such as railways, is related to decreased car use during commuting[3)]. In large metropolitan areas, public transportation commuters account for about 60% of daily physical activity by commute[3)].If a compact city is established and walking time can be shortened, the walking selection probability increases. When walking becomes a habit, it can possibly further increase the probability of walking selection[3)]. The larger the city size, the greater the average number of steps (this is inconsistent with the previous description)[4)]. Public transportation users in the Tokyo area use 2.7 times more steps when commuting compared to automobile users[2)].

We know the walking situation of multiple cities in Japan through residence or frequent visits, and we realize that it may not always be the case with previous research. In this paper, we consider what causes such differences.

The situation of the city that the authors know

We describe the subjectivity of our residential or long-stay cities. Tokyo, where there is almost

no resident history in, but there was a work place and it was often used for commuting to. Chiba City, Chiba Prefecture, is where one of the author's homes is situated, which they visit frequently. Kanazawa City, Ishikawa Prefecture, is a city where all authors have lived. Matsumoto City, Nagano Prefecture, is a city where authors often visit for work. Kochi City, Kochi Prefecture is a city where one of the authors currently lives. Amakusa City, Kumamoto Prefecture, is an area where the author's relatives live, and one of the authors often stays for a long time. Among them, Kanazawa and Matsumoto are cities with high snowfall in winter, and Amakusa and Kochi are temperate cities but rich in nature with a small population.

Tokyo and Chiba are capital cities or cities close to the capital city and have well developed public transportation networks.

In Tokyo, Chiba, Kanazawa, Matsumoto, Kochi and Amakusa, the authors consider that the amount of walking varies in the order of Kanazawa, Amakusa> Tokyo, Chiba > Matsumoto, Kochi. Fig. 1 shows the average walking amount of the prefecture in 2016. Since this data is the average value of all cities in each prefecture, there are some discrepancies among the authors' perspectives. In Kanazawa, the city bus network is well-developed, but schedules tend to be delayed in winter and the time required for movement is likely to vary. Compared to walking, the bus takes a detour, which does not result in much of a time difference; therefore, people may choose walking which is easy to control. While moving by car, there is limited parking in the city center with a burden of parking fees. In the case of using a bicycle, the problem of securing a bicycle parking space is similar to that in case of a car. It is possible to stop without choosing a place, which is not the same with a car. However, the elderly may not be able to ride a bicycle, so there may be a tendency for walking to increase.

Amakusa has a lower population density compared to Kanazawa and public transportation is not well-developed. It is often necessary to move by private car, but there are people without a license. Mobile sales of food by car are also being carried out. You have to go out on foot due to unavoidable circumstances such as shopping or going to the hospital (if you cannot walk, use a cheap shared taxi). Compared to Kanazawa, people are forced to walk with almost no other options. If the percentage of people who shop online increase in the future, the amount of walking may be greatly decreased.

In Matsumoto, the traffic network is relatively well developed, but there are few pedestrians. There are many shops near the station, but other places are dotted with shops and entertainment

facilities, so many people move by car or bicycle. Kochi residents tend to use cars rather than walk. There are few shops to which you can walk, and if it is in the center, there is limited parking space and a burden of parking fees. Free parking lots are often provided in suburban stores rather than in the center, and this might hinder walking and result in increased car use.

To summarize, the following factors can increase walking: 1) Easy connection to public institutions (Tokyo), 2) Availability of a destination within walking distance (Tokyo, Chiba), 3) It is customary to walk (Chiba).On the other hand, the amount of walking increases as a result of trying to make up for the shortcomings: 4) There is no transportation necessary to go out (Amakusa), 5) Even if there is public transportation, it takes time and is expensive (Kanazawa), 6) While using public transportation, you have to walk to the station or bus stop (Chiba). On the other hand, the reason why the amount of walking decreases is that there is no destination in a place where you can walk (Kochi, Matsumoto).

Although from the previous study, it seems that compact city conversion would increase the chances of walking, it is doubtful whether it will increase the amount of walking. It is necessary that the destination is located at a moderate (intermediate) distance. For instance, if it is too close, walking will not increase and if it is too far, you will select a moving means such as a car compared to walking. As for the idea that the average number of steps increases when the city size is large, if the scale is too large, the person will be forced to exercise more than their physical strength and will consequently be unable to walk. Walking through gaps while using public transport may also help restore physical strength and raise awareness of exercise.

CONCLUSION

As mentioned earlier, walking is essential for maintaining good health. Moreover, if you can incorporate it in your life you will have the advantage of not taking extra time. In particular, many modern Japanese people think that there is not enough time, so if they can do it unconsciously, it will be easy to continue. If Japanese people think that daily exercise can be done only by walking, about 8000 steps per day are required[6]. This amount is equivalent to walking about 6 kms for about 1-2 hours a day. Adding walking time to life is often difficult, such as reducing sleep time. For example, it may be relatively easy to achieve by starting from changing the route of 4,000 steps one way to walking from other means of transportation, or by switching to part of the use of escalators and elevators, and of moving by bus and train. If you try to walk forcibly, it may be easy to hurt your joints or continue daily before you achieve

the required athletic ability by walking. As a result, it is necessary to maintain the athletic ability, but to continue it is important to adjust and not overdo it. Ideally, if you were moving casually, you are walking a lot as a result. Furthermore, if a government approach is possible, it may be necessary to devise a way to encourage people walk. For example, Kochi Prefecture created a "Health Passport" program where customers receive shopping discounts based on the number of walking steps. If shops and hospitals arenot too far (compact city conversion), and walking is time-saving or comfortable, the possibility of choosing walking will increase. However, these behaviors need to be habituated before becoming one becomes elderly and/or handicapped[7]. Walking habits maintain athletic ability, and the ability to walk (suppression of sarcopenia) holds because athletic ability continues.

In countries including Japan, recent smartphone games are thought to encourage walking. The world-famous "Pokemon GO" uses the location recognition smartphone function to catch and grow monsters by walking. It is devised such that you need to walk to meet people's desire to collect. The train or car movement is perceived as being faster than walking, and the game does not proceed, so actual walking is essential for the game to continue. Therefore, Pokemon GO became a certified app for the Japan Sports Agency project that encouraged people to incorporate sports into their lives in July 2019[8]. As described above, working on people's interests and creating an easy-to-walk environment will lead to the spread and habit of daily exercise, and ultimately to maintaining health.

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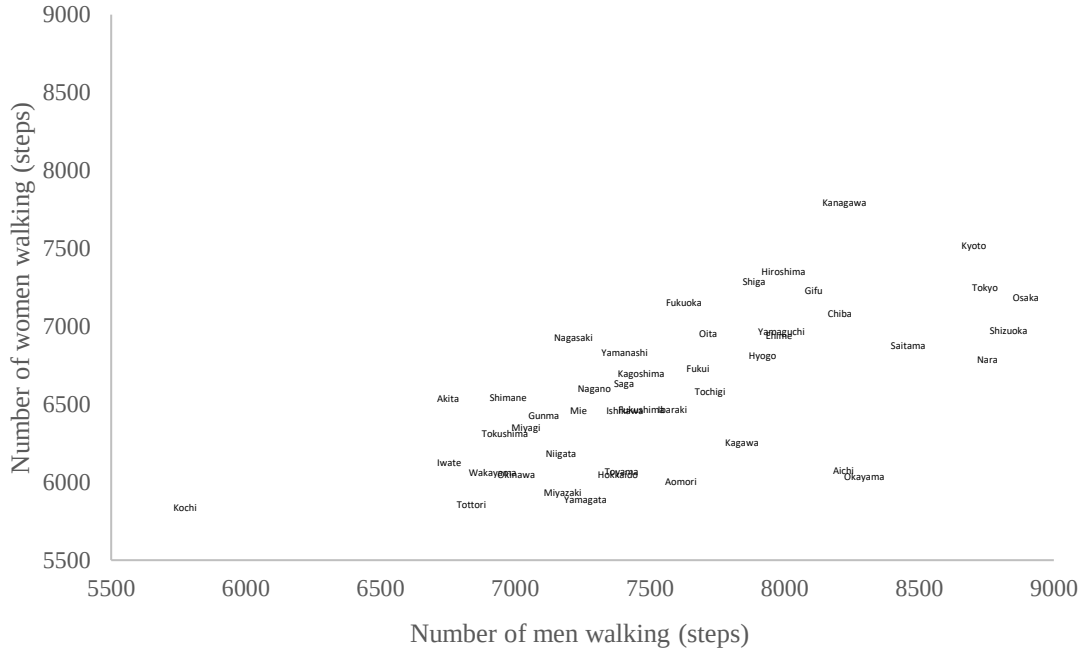

Figure No. 1: Average number of steps per day for adult men and women by prefecture

Based on the data of Reference 5.
The symbol is the name of each prefecture.
Researched in October-November 2016.
Ages of men and women are 20-64 years old.
No data for Kumamoto Prefecture since Kumamoto was affected by the earthquake at the time of data acquisition.
This data does not separate urban and suburban areas.