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The Impact of the Broadband China Strategy on BMI among Older Adults: Quasi-Experimental Evidence from China

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Abstract. Using the data from the China Health and Retirement Longitudinal Study (CHARLS), this paper applies the difference-in-differences (DID) method to examine the effect of the "Broadband China" strategy on the Body Mass Index (BMI) of middle-aged and older people. Based on the above study, the policy has increased the proportion of people with a normal BMI by about 1.88%. After controlling for the above variables, the result is still valid: registered residence type, age, gender, education level, marital status and income. Based on the above mechanism analysis, widespread Internet access will increase people's willingness to exercise regularly by around 1.37 per cent, and this may be due to more accessible health information, increased health awareness, or improved socialization opportunities. The results of the heterogeneity analysis show that the health improvement effect of this policy is relatively strong for rural residents, groups with lower levels of education, and adults over the age of 60; thus, digital infrastructure may play a supporting role in poverty alleviation and health equality. Digital infrastructure is also economically beneficial and has a positive impact on public health, so policies will be introduced to promote the healthy ageing of the population.

Keywords: Broadband China, BMI, healthy aging, difference-in-differences, health inequality

1. Introduction

Over the past decade, the rapid development of internet technology has deeply changed how people obtain information, communicate with others, and use public services. In 2013, the Chinese government officially launched the "Broadband China" strategy, which raised broadband infrastructure construction to the level of national development policy. The policy aimed to improve broadband coverage, increase network speed, and promote the development of a more universal and reliable digital infrastructure system. Because the policy was implemented through pilot cities and gradually expanded over time, it created clear differences across cities and years. This implementation process not only reshaped China's digital environment, but also provided a useful quasi-experimental setting for studying the economic and social consequences of digital infrastructure.

At the same time, population aging has become an increasingly important issue in China. For middle-aged and older adults, health is not only related to personal welfare and quality of life, but

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also closely connected with household care burden, medical expenditure, labor supply, and the sustainability of the social welfare system. Recently, problems of obesity, chronic diseases, loss of function and depression in older adults have attracted more attention. As China's population has been ageing at an increasing rate in recent years, healthy ageing is now a significant problem for economic and social governance [1]. Therefore, we need to learn what kind of policies can improve people's health in a relatively low-cost and sustainable way.

Most previous research has proposed multiple pathways for the effect of the Internet on health, including access to health information, socialization, physical exercise and changes in health behaviour [2-4]. On the one hand, the Internet has lowered the cost of obtaining health information and is now more accessible to the public; therefore, many health resources and online services are available for people to use. On the other hand, the Internet can also harm one's health by increasing social interaction, reducing loneliness, changing leisure habits, and thus failing to promote good self-care. Most previous studies have focused on single-user Internet use. This may lead to endogeneity because individuals in better health, education and income are more likely to use the Internet in the first place. Most of the previous studies have used self-reported health, depression, and life satisfaction; fewer have employed BMI as an objective indicator of physical health.

Most of the previous research has proposed multiple paths through which the Internet affects health, such as providing access to health information, promoting socialization, enabling exercise, and modifying health behaviour [2-4]. On the one hand, the Internet has reduced the cost of obtaining health information and is now more accessible to the public; therefore, many health resources and online services have been released for people to enjoy. At the same time, the Internet can also harm people's health by increasing socialization, reducing loneliness, altering leisure behaviour, and thus failing to promote good self-care. Most previous research has only examined single-user Internet use. Therefore, there is a problem of endogeneity: people in better health, education and income are more likely to use the Internet in the first place. Most of the previous research has used self-reported health, depression and life satisfaction, but fewer studies have used BMI as an objective measure of physical health.

The three contents of this paper are: First, it can be used to study the health effects of digital infrastructure under the staggered rollout of the "Broadband China" policy from a policy perspective. Second, it employs BMI to show a more objective measure of health and is thus not based solely on self-assessment of health. Third, it will examine the possible mechanisms and heterogeneity of this effect, such as whether it operates through physical exercise and whether the impact differs according to urban-rural status, education level and age group.

2. Policy background

The national policy of "Broadband China" aims to enhance the country's information infrastructure. In 2013, the State Council issued the strategy and its implementation plan to promote broad-band network coverage, high-speed networks, public service access, and the construction of a safe and reliable next-generation information infrastructure. The Policy is also a technical plan for network construction. It also helped to achieve the general goals of constructing digital public services, promoting industrial upgrading and developing the area. In 2013, the State Council issued the Broadband China Strategy and its Implementation Plan, and broadband development was thus designated as a national strategy.

A feature of the policy is that it was not introduced in all the cities at the same time. Instead, the Chinese government has chosen different cities and city clusters as pilot areas in different batches. Therefore, there were differences in both cities and at different times. Some cities joined the pilot

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programme earlier; others joined later or did not join during the sample period. As the policy has been rolled out in different batches through pilot cities, many studies have used it as a quasi-natural experiment to investigate the impact of digital infrastructure [5, 6]. Therefore, the treated and untreated areas before and after the policy can be compared.

The cities in the "Broadband China" pilot policy are taken as the treatment group, and the other cities are taken as the control group in this paper. The difference-in-differences method will examine whether the change in BMI results from the intervention for these groups. In contrast to a single measure of Internet use by individuals, this policy-based Design can reduce selection bias by using city-level policy exposure as the primary indicator, rather than behaviour.

3. Literature review

3.1. Evaluation of the policy effect of the Broadband China strategy

Existing studies on the Broadband China strategy mainly focus on urban innovation, industrial upgrading, enterprise digital transformation, green innovation, and resource allocation efficiency [5, 7, 8]. Many studies treat the policy as a quasi-experiment in digital infrastructure construction. These studies find that the policy can improve information flows, reduce transaction costs, promote firm digital transformation, increase innovation, and improve resource allocation. Research on enterprise digitalisation and corporate innovation has shown that high-speed Internet networks can be used to improve production through digital technology [9].

Although there are studies on economic growth and firm behaviour in the literature, research on the health benefits of the "Broadband China" policy is relatively scarce. Recently, some research has begun to explore the effect of digital infrastructure on residents' health [10], healthcare access [11], and mental health [12]. The above studies are relevant to the fact that digital infrastructure will affect the division of labour and the spread of disease. More research is still needed on middle-aged and older adults; they are more likely to be digitally excluded and also have higher health demands.

3.2. Internet, broadband expansion, and healthy aging

Many studies utilizing CHARLS and other survey data have found that, at the individual level, people who use the internet more frequently are generally healthier older adults [13]. The Internet can enhance self-reported health, reduce depression, promote socialisation and expand access to health information. Some studies have also indicated that people's lives online may have altered their daily exercise, health habits and other self-management behaviors [14].

However, this literature has the following two deficiencies. First, the individual internet use is not random. Healthier, wealthier, more educated and socially active older adults are more likely to use the Internet. Therefore, it is not possible to draw a strong causal conclusion from only the individual's Internet use. Second, most studies have focused more on mental health and subjective well-being. Although the above results are necessary, BMI is also a better indicator of a person's health and weight control [15, 16].

Digital Infrastructure can be applied in various ways to promote health improvement. Good high-speed broadband will help older people learn about their health, use online medical services, connect with family and take part in society more easily. It may make people want to change their daily lives and exercise more often. However, it may not be the same for all groups. Rural residents, lower-educated people and older adults will be more affected because they have had more difficulty accessing information and public services in the past.

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3.3. Research limitations and contributions

In short, there are still some gaps in the existing studies. First, the problem of causal identification will be alleviated by avoiding individual Internet use in the study. Second, the ideal goal of a good BMI should also be achieved. Third, the mechanism and heterogeneity analysis need to be extended further to determine whether digital infrastructure benefits health, and if so, how and for whom.

In order to close these gaps, this study examines the impact of the "Broadband China" strategy on middle-aged and older people' BMI using a quasi-natural experiment. This study offers evidence on the connection between digital infrastructure and healthy aging by merging CHARLS micro-level data with policy variance.

4. Research hypotheses

4.1. Overall effect hypothesis

The "Broadband China" strategy will promote public health by enhancing Internet access, lowering information costs, and increasing the use of digital government services. Now that a broad-band network has been built, older adults are more familiar with information on health and have gained some online services. The changes may help the people manage their health better and maintain a normal BMI. At present, the corresponding empirical data have not been obtained. One study that used the "Broadband China" strategy as a quasi-natural experiment found that the policy increased BMI in older people through mechanisms such as reduced sleep time, lower exercise frequency, and poorer mental health [15]. On the other hand, other studies have also found that people older than 65 use the Internet regularly and enjoy improved health and well-being as a result [4]. Given the mixed results above, further research is needed to explore the actual impact of the Broadband China strategy on middle-aged and older adults' BMI. Therefore, this paper proposes the following hypothesis:

Hypothesis 1: The "Broadband China" strategy can help reduce the BMI of middle-aged and older adults.

4.2. Mechanism assumptions

Digital Infrastructure May Affect BMI Via Health Behaviour. With the improvement of internet access, older people will be able to learn about exercise, diet and health-care for seniors. They may also have a stronger desire for socialization through exercise. Evidence supports the above path. One study found that the use of the Internet positively predicted exercise among older adults, and social support partially mediated this effect [17]. Another study that used accelerometer-derived physical activity data found that older adults who used the Internet infrequently or not at all were less likely to reach the WHO-recommended level of physical activity compared with those who used the Internet regularly [18]. Research on rural older adults has shown that digital literacy can motivate them to participate in fitness and exercise activities and regulate their diet voluntarily [19]. Therefore, exercise may be a way in which the "Broadband China" policy affects BMI. Therefore, this paper proposes the following hypothesis:

Hypothesis 2: The "Broadband China" strategy promotes healthier behavior and moderate exercise to some extent, thus reducing BMI.

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4.3. Heterogeneity assumption

The health effect of digital infrastructure may differ across groups. Rural residents often have weaker offline public services and fewer health information channels. People with lower education may face higher information barriers. Older individuals may also benefit more if digital infrastructure reduces social isolation and improves access to health information [20]. Therefore, the effect may be stronger among these groups. Research has found the same. An organised investigation has found that the Digital Divide is a cause of health disparities, and older adults in rural and low-income areas face numerous obstacles in using telemedicine services and obtaining accurate health information. According to data from China, the relationship between digital literacy and self-assessed psychological well-being is relatively weak for older adults and those with lower levels of education [21]. Rural digitalisation has also been shown to improve the physical health of older adults, and less-educated older adults have gained more in physical health benefits. In addition, cross-national evidence from 30 countries shows that older adults without internet access have lower frequencies of healthy lifestyles and poorer health status, and educational level exhibits the strongest effect size in access comparisons [22]. Therefore, the health benefits generated by the "Broadband China" strategy may be more pronounced among these groups. Therefore, this paper proposes the following hypothesis:

Hypothesis 3: The health effect of the "Broadband China" strategy is stronger among rural residents, people with lower education, and older individuals.

5. Methodology

5.1. Data sources

The China Health and Retirement Longitudinal Study (CHARLS) provides the data. CHARLS is an all-country survey of Chinese people over the age of 45 and their partners. Collect data on the subjects' demographics, family conditions, health status and healthcare behaviour, occupation, income and social participation. Given that this paper studies the health of middle-aged and older adults, CHARLS is suitable for the research question.

The final sample includes 35,924 observations. The individual-level CHARLS data are matched with city-level information on the implementation of the "Broadband China" pilot policy. The key treatment variable is constructed according to whether the respondent's city had implemented the policy in a given year. If the respondent lived in a city that had entered the pilot program by that year, the treatment variable equals 1; otherwise, it equals 0.

5.2. Variable

5.2.1. Independent variable

The main independent variable is the DID policy variable. It equals 1 if the respondent's city had implemented the "Broadband China" policy in the corresponding year, and equals 0 otherwise. This variable captures exposure to the digital infrastructure policy.

5.2.2. Dependent variable

The dependent variable is BMI status. Based on whether the respondent's BMI falls within the normal range, this paper constructs a binary variable. If BMI is within the normal range, the variable

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equals 1. If BMI is outside the normal range, the variable equals 0. This variable measures whether the respondent has a relatively healthy body weight status.

5.2.3. Control variables

Several individual factors that affect BMI are controlled for in this paper. They are: Hukou status, age, gender, education level, marital status and personal income. Hukou is 1 if the person is in the city, and 0 otherwise. Gender is coded as 1 for male and 0 for female. Education is graded from 0 to 4, where 0 indicates illiteracy, 1 is primary school, 2 is middle school, 3 is high school, and 4 is college or above. Marital Status is 1 if the respondent is married, and 0 otherwise. Personal Income is represented by the logarithm of personal income.

5.3. Statistical method

The following are the four stages of empirical analysis: The descriptive statistics of the primary variables, such as means, standard deviations, minimum and maximum values, etc., will be presented in the first section of this work. In order to examine how the Broadband China plan affects BMI, this research establishes a difference-in-differences model in the second stage.The basic model can be written as equation (1):

$$BMI_{ict} = \beta_0 + \beta_1 DID_{ct} + \beta_2 X_{ict} + \mu_c + \lambda_t + \varepsilon_{ict} \quad (1)$$

Where BMI_{ict} is a dummy variable that indicates whether or not person *i*, who resides in city *c*, has a normal BMI in year *t*. The policy treatment variable, DID_{ct} is equal to zero if city *c* did not implement the Broadband China pilot policy in year *t*. Hukou status, age, gender, education, marital status, and personal income are among the individual-level control variables represented by the vector X_{ict}. ε_{ict} is the error term, μ_c stands for city fixed effects, and λ_t for year fixed effects. The Broadband China strategy's average treatment effect on the likelihood of keeping a normal BMI is captured by the coefficient of primary interest, β_1.

In the third stage, this paper constructs a mechanism model (see equation (2)) to examine whether the Broadband China strategy affects BMI by increasing moderate-intensity physical exercise. In the fourth stage, this paper conducts subgroup regressions to explore whether the effect of the Broadband China strategy differs across urban and rural residents, education levels, and age groups.

$$Exercise_{ict} = \alpha_0 + \alpha_1 DID_{ct} + \alpha_2 X_{ict} + \mu_c + \lambda_t + \varepsilon_{ict} \quad (2)$$

Where $Exercise_{ict}$ represents whether the respondent participates in moderate-intensity physical exercise. The coefficient α_1 measures whether the Broadband China strategy significantly promotes physical exercise.

6. Research results

6.1. Descriptive analysis

Table 1 is the descriptive statistics of the primary variables. The total number of samples is 35,924. The mean of the BMI status is 0.51, and approximately 51 per cent of the sample have a normal BMI. The mean of the DID variable is 0.38, and approximately 38 per cent of the observations are in the scope of the "Broadband China" policy.The mean value of household is 0.19, which shows that

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urban residents account for about 19% of the sample, while rural residents account for the majority. The average age is 60.09, indicating that the sample mainly consists of middle-aged and older adults. The mean value of gender is 0.48, meaning that the gender distribution is relatively balanced. The average education level is 1.00, suggesting that the overall education level of the sample is relatively low. The mean value of marital status is 0.87, which indicates that most respondents are married. The average log personal income is 4.84. Overall, the descriptive statistics show that the sample is suitable for studying health aging in China. The sample includes many rural and lower-educated respondents, which is important because these groups may be more strongly affected by digital infrastructure improvement.

Table 1. Descriptive analysis of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
BMI	35,924	0.51	0.50	0	1
DID	35,924	0.38	0.49	0	1
Household	35,924	0.19	0.39	0	1
Age	35,924	60.09	9.65	45	115
Gender	35,924	0.48	0.50	0	1
Education	35,924	1.00	1.13	0	4
Marriage	35,924	0.87	0.34	0	1
Income	35,924	4.84	4.50	0	14

6.2. The impact of Broadband China on BMI

Table 2 reports the baseline regression results. Column (1) does not include control variables, while Column (2) includes hukou, age, gender, education, marital status, and personal income. In both models, the coefficient of DID is positive and statistically significant.

Column (1) shows that the coefficient of DID is 0.0237; thus, under the "Broadband China" policy, the probability of normal BMI is about 2.37 percentage points higher than without this policy (after controlling for other factors). As shown in Column (2), after controlling for individual characteristics, the coefficient is reduced to 0.0188 and is still statistically significant. Therefore, the policy will raise the likelihood of a normal BMI by about 1.88 percentage points. Thus, the baseline result supports Hypothesis 1.

The Control Variables also have some reasonable patterns. Urban Hukou is positively correlated with normal BMI. Age is negatively correlated with a normal BMI; thus, older people are more likely to have an abnormal BMI. Gender has a negative coefficient; therefore, men are less likely to have a normal BMI in this sample. Education is positively correlated with a normal BMI; thus, it is likely that people with higher education have healthier weights. Marital status is positively correlated with a normal BMI, and personal income is not statistically significant.

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Table 2. Regression results of Broadband China on BMI

	BMI	
	(1)	(2)
DID	0.0237***	0.0188***
	[0.0130, 0.0343]	[0.0082, 0.0293]
Household		0.0800***
		[0.0657, 0.0944]
Age		-0.0021***
		[-0.0028, -0.0015]
Gender		-0.1229***
		[-0.1336, -0.1121]
Education		0.0236***
		[0.0182, 0.0290]
Marriage		0.0519***
		[0.0357, 0.0681]
Income		-0.0006
		[-0.0019, 0.0007]
_cons	0.5013***	0.6088***
	[0.4947, 0.5078]	[0.5619, 0.6557]
N	35924	35924

Note: 95% confidence intervals in brackets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$.

6.3. The mediating mechanism of Broadband China on BMI

Table 3 examines whether physical exercise may be a mechanism through which the "Broadband China" policy affects BMI. The dependent variable is whether the respondent participates in physical exercise. Column (1) does not control for individual characteristics, while Column (2) includes control variables.

The findings demonstrate that both columns have a positive and statistically significant DID coefficient. The "Broadband China" strategy raises the likelihood of moderate physical activity by almost 1.37 percentage points, as indicated by the coefficient of 0.0137 once control variables are added. This finding implies that enhancing internet infrastructure could promote increased physical activity among older persons.

This finding is consistent with the mechanism discussed above. Broadband access may make it easier for older adults to obtain health information, learn about exercise, and become more aware of the importance of weight management. It may also improve social connection, which can indirectly encourage outdoor activities and exercise participation. Therefore, moderate physical exercise may partly explain why the policy improves BMI outcomes. This result supports Hypothesis 2.

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Table 3. Regression results of the mediating mechanisms of Broadband China on BMI

	Moderate-intensity exercise	
	(1)	(2)
DID	0.0123***	0.0137***
	[0.0033, 0.0214]	[0.0047, 0.0227]
constant	0.2312***	0.4181***
	[0.2256, 0.2367]	[0.3780, 0.4582]
Control variables	NO	YES
N	35924	35924

Note: 95% confidence intervals in brackets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. No indicates that the control variable has not been controlled, and YES indicates that the control variable has been controlled.

6.4. Heterogeneous analysis of the impact of Broadband China on BMI

6.4.1. Urban-Rural heterogeneity analysis

Table 4 reports the heterogeneity results by hukou status. The results show that the "Broadband China" policy has a positive effect in both urban and rural groups, but the effect is larger among rural residents. For urban residents, the coefficient is 0.0146. For rural residents, the coefficient is 0.0197. This means that the policy increases the probability of normal BMI by about 1.46 percentage points in urban areas and 1.97 percentage points in rural areas.

This result suggests that rural residents may benefit more from digital infrastructure improvement. One possible reason is that rural areas previously had weaker access to information, medical resources, and public services. When broadband infrastructure improves, the marginal benefit for rural residents may be larger. This is consistent with the idea that digital infrastructure can reduce the information gap between urban and rural areas.

Table 4. Regression results of the impact of Broadband China on urban-rural heterogeneity in BMI

	BMI	
	(1)	(2)
	Urban	Rural
DID	0.0146***	0.0197***
	[-0.0091, 0.0382]	[0.0079, 0.0315]
constant	0.7005***	0.6084***
	[0.5898, 0.8112]	[0.5559, 0.6608]
Control variables	YES	YES
N	6853	29071

Note: 95% confidence intervals in brackets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. No indicates that the control variable has not been controlled, and YES indicates that the control variable has been controlled.

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6.4.2. Analysis of educational attainment heterogeneity

Table 5 is the heterogeneity results by education level. According to the results, the policy had a stronger and statistically significant effect on people without college education. For individuals with college education or higher, the coefficient is 0.015 and not statistically significant. Individuals without higher education have a coefficient of 0.020 and are statistically significant.

This result suggests that lower-educated individuals benefit more from the "Broadband China" policy. A possible explanation is that people with higher education already have better access to health knowledge and digital resources before the policy. In contrast, people with lower education may face stronger information barriers. When digital infrastructure improves, they may gain more new access to health information and public services, which can improve health behavior and BMI outcomes.

Table 5. Regression results of the heterogeneous effects of Broadband China on BMI by educational attainment

	BMI	
	University and above	Never attended college
	(1)	(2)
DID	0.015	0.020***
	[-0.009, 0.038]	[0.008, 0.031]
_cons	0.6262***	0.6143***
	[0.3408, 0.9117]	[0.5660, 0.6625]
Control variables	YES	YES
N	1,284	34,640

Note: 95% confidence intervals in brackets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. No indicates that the control variable has not been controlled, and YES indicates that the control variable has been controlled.

6.4.3. Age heterogeneity analysis

Table 6 reports the heterogeneity results by age group. The effect of the "Broadband China" policy is stronger among people aged above 60. For the group above 60, the coefficient is 0.0225. For the group below 60, the coefficient is 0.0165. Both coefficients are statistically significant, but the size of the effect is larger for the older group.

This result suggests that older adults may receive greater health benefits from digital infrastructure. People above 60 often face higher risks of social isolation, chronic disease, and reduced physical activity. Better internet infrastructure may help them access health information, keep contact with family members, and develop healthier routines. Therefore, the policy effect is stronger among older individuals. This finding supports Hypothesis 3.

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Table 6. Regression results of Broadband China's impact on BMI by age heterogeneity

	BMI	
	(1)	(2)
	Over 60 years old	Under 60 years old
DID	0.0225***	0.0165***
	[0.0068, 0.0381]	[0.0017, 0.0313]
_cons	0.6919***	0.6492***
	[0.5970, 0.7867]	[0.5509, 0.7475]
Control variables	YES	YES
N	16,115	18,373

Note: 95% confidence intervals in brackets. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.001$. No indicates that the control variable has not been controlled, and YES indicates that the control variable has been controlled.

7. Conclusions

This study examines how the "Broadband China" plan affects middle-aged and older Chinese persons' BMI. The strategy significantly raised the likelihood of becoming overweight, according to CHARLS data and a difference-in-differences model.After adjusting for Hukou status, age, gender, education, marital status and personal income, the policy is associated with a relatively higher risk of normal BMI by about 1.88%. Therefore, policies for digital infrastructure may have beneficial health effects that go beyond their original technological and economic purposes.

Based on the mechanism analysis, the "Broadband China" policy has raised the likelihood of physical exercise by about 1.37 per cent. Therefore, exercise may be a path by which the digital infrastructure affects BMI. Good-quality broadband can help older adults get more health information and learn about exercises and diet to live healthier lives. It can promote socialization and inspire people to be more active. Although this paper cannot prove that exercise is the only reason, the results offer supporting evidence for the effect of health behaviour.

The uneven distribution also has certain reasons. Rural residents, those without higher education, and older adults over the age of 60 are more affected. These groups are more likely to have information asymmetry and poor access to public services before the policy. Therefore, the construction of broadband networks may be more beneficial to these people. Therefore, it can be seen that good digital infrastructure will help reduce health disparities among all people, provided that disadvantaged groups are included.

There are the following policy recommendations. First, digital infrastructure should not be viewed solely as an economic or technical issue. It can also be the focus of public health policies for older people. Second, examine how older adults use the digital facilities in daily life. Construction of the high-speed network is not the end. Improve digital literacy, build user-friendly online health services, and help older adults learn to use the Internet safely and effectively. Third, more support needs to be provided for the rural area and less-educated older adults; although these groups can use the digital infrastructure, they face more difficulties in doing so.

This paper has some deficiencies as well. First, although the DID model enhances causal inference, more robustness tests are still required, such as parallel-trend tests, placebo tests and other

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definitions of BMI. Second, the analysis of the mechanism only covers physical exercise. Other ways in the future that can be studied include health information access, use of online medical services and social participation. Third, the paper uses a binary indicator for normal BMI; in the future, continuous BMI can also be used. Fourth, city-level policy implementation may not fully reflect the actual situation of individuals using the Internet; therefore, future research can combine policy exposure with individual-level digital behaviour.

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