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Original Article

The Relationship of Health-Related Behavior and Chronic Diseases with Self-Rated Health, a Multinational Comparison among Adult Population: Evidence from EASS 2010 Health Survey

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Abstract

Background: Multinational comparative study of the relation of self-rated health (SRH) with health behavior and chronic disease can ease our perception of differences in health factors between countries. We aimed to compare the relation of SRH with health behavior and chronic disease.

Methods: We attempted to analyze larger data obtained from 2010 East-Asian-Social-Survey and to compare the situation of China, Japan, South Korea, and Taiwan (Special administrative region of China). As these are neighboring regions having both similarities and differences in socio-demographic aspects as well as environment and cultures. The study was composed of 10,137 participants. Univariate and multiple regression analyses were employed to estimate the Odds Ratio (OR) and 95% Confidence intervals (CI) for SRH and health-related behavior, sociodemographic, chronic disease variables.

Results: The number of individuals reporting Good SRH was 6,648, with China having the higher proportion (P=<0.05). There were 3642 (35.9%) who suffered from chronic diseases. Overall, males, age group 18-30, nonreligious, higher education levels, singles, and those living in big cities had higher percentage of good health. Those without chronic diseases had higher percentage of good health (P=<0.05). The consumption of alcohol was associated with poor SRH in all regions. While less physical activity, diabetes mellitus, and ischemic heart disease were also responsible for poor SRH in all regions (P=<0.05).

Conclusion: Several health-related behaviors and chronic diseases are associated with poor self-rated health. Effective public health strategies, in promoting healthy lifestyles, and disease prevention intervention should be encouraged.

Keywords: Survey; Multinational; Comparative; Health related-behavior; Self-rated health

Introduction

The socioeconomic factors have a significant impact on health in countries (1-3). The health differentials within countries can be fashioned by the national health policies, the social security system, and availability of healthcare, the economic and political environment (4, 5).

Hence, a comparative analysis of the association between self-rated-health (SRH) and chronic disease with health behavior may provide useful evidence for addressing health gaps. The SRH is also known as self-perceived-health, self-assessed-health, and subjective health. It is also regarded as a subjective health assessment indicator, which is extensively used in health research and has wide range of applications. As an indicator, it is a cost-effective method in measuring the health status, regarded as one of the best indicators of social and personal levels (6).

Several previous studies have compared the association between socioeconomic factors and health among Western countries (5,7–11). Such associations vary in depth across countries. In an across continent study, socioeconomic status had more pronounced effect on elderly in Germany, whereas higher selective mortality was noted in middle and early old age groups in the United States (9). A study comparing social determinants of SRH among Americans and Canadians found that sociodemographic and socioeconomic factors are having considerable effects on individual health in each country (10). Freeman et al used data from the Collaborative Research on Ageing in Europe survey conducted in Finland, Poland, and Spain; they found a significant association between depression and socioeconomic status in all countries (11).

Lifestyle factors and health-related behaviors can affect a person. An unhealthy lifestyle may result in higher risk of chronic diseases (12, 13). Health-related behaviors and chronic diseases are strongly associated with the SRH (14-16). Whereas, multiple factors such as infrastructure, housing conditions, political situations, availability of clean water, affordable healthy food and easier access to health care services are closely related to SRH (17-19).

However, the relationship of health-related behavior and chronic diseases with self-rated health is not studied in East Asian countries. On the other hand, very, few studies have compared the association between socioeconomic factors and health in East Asian countries (20-23). The research on health comparison across nations is difficult because of the lack of data.

To prevail over these, we analyzed a dataset from the 2010 East-Asian-Social-Survey (EASS), a cross-national survey consisting of nationally descriptive samples from China, Taiwan, Japan and Korea. To the best of our knowledge, no research to date has explicitly compared the associations between SRH and chronic diseases with health behavior in these territories.

Methods

Study and data collection

The data used in this study were obtained from the 2010 EASS. The EASS survey is a result of substantial efforts by East Asian countries to establish an internationally comparable database on social issues. Precisely, the 2010 EASS included a health part regarding health status (self-rated health, chronic disease, etc.), health-related behaviors (smoking, drinking, exercise, etc.), caregiving and receiving care, health and social security insurance, social support and trust, epidemiology, family care need and care management, and on. The survey was managed face-to-face at participant's homes by trained interviewers from Jun to Dec 2010. The sample size was designed on representative probability sample of the adult population aged 18 or over, it was designed to achieve a norm of 1,400 cases, and, in any event, a minimum of 1,000 cases. Sampling methods followed in different regions were three-stage Probability Proportion Size in China, two stage stratified random sampling; stratified by regional block and population size in Japan, multi-stage

area probability sampling in South Korea and three-stage stratified Probability Proportion Size sampling in Taiwan. Initial sample sizes were in China (5,370), Japan (4,500), South Korea (2,500), Taiwan (4,424) and valid response rates were 72% (3,866) in China, 62.1% (2,496) in Japan, 63% (1,576) in South Korea, and 49.5% (2,199) in Taiwan were obtained respectively. Participants' ages ranged from 18 to 89 years. The survey approach has been described in an online report (24). The EASS data archive is publicly accessible data from anonymous respondents.

Verbal informed consent was obtained from all participants due to the limited time for survey interviews, and waivers of written consent were authorized by an ethics committee. Ethical approval for this study was not required as the study is based on open data source (EASS data archive).

Variables

The individuals' self-rated health was the dependent variable. The participants were asked to answer the question, "How would you rate your health?" on a five-point scale (excellent, very good, good, fair and poor). The responses were grouped into two categories Good ("excellent" or "very good" and "good") and Poor ("fair" or "poor"). The independent variable of concern included health-related behaviors (smoking, drinking, physical activity, health checkup) and chronic diseases (Diabetes mellitus, Hypertension, Ischemic Heart disease, respiratory problems, and other chronic diseases).

Socio-demographic variables included sex, age, religious group (no religion/roman catholic/protestant/Islam/Buddhism/other religions), residential area (urban/rural), marital status (married, widowed, divorced, separated, never married, cohabiting), educational level (no formal qualification, elementary school, junior high, high school, junior college, university, graduate school). Age was categorized into six groups: 18-30 yr, 31-40 yr, 41-50 yr, 51-60 yr, 61-70 yr and >71.

Statistical Analysis

The frequency distribution of sociodemographic, health-related behavior and chronic disease variables were described as counts and proportions. Differences in sociodemographic, health-related behavior and chronic disease variables between SRH behaviors were examined using the Chi-square test. In addition, differences in hypertension, heart disease and other chronic diseases between countries were also examined using the Chi-square test. Univariate and multiple regression analyses were employed to estimate the Odds Ratio (OR) and 95% Confidence intervals (CI) for SRH and health-related behavior, sociodemographic, chronic disease variables. SRH status was a dependent variable. Here, Good SRH was the reference category. The results are shown as Odds Ratios (ORs) with 95% Confidence intervals. The *P-value* of <0.05 was considered statistically significant. The SPSS (IBM Corp., Armonk, NY, USA) (ver. 22) was used to run the tests.

Results

Table 1 shows the sociodemographic distribution of the study population. China shows a higher proportion of the individuals who reported good health (P =<0.05). Overall, males, age group 18-30, nonreligious, higher education levels, singles, and those living in big cities had higher percentage of reported good health. Table 2 shows the prevalence of SRH affected by health-related behaviors. Those without chronic diseases had higher percentage of good health (P =<0.05). Similarly, those who never smoked, never drank, exercised several times a week, and had regular health checkups reported Good health (P=<0.05). Table 3 shows that the age group, female gender, marital status, drinking, physical activity, chronic diseases (diabetes, ischemic heart disease) were significantly (P<0.05) related to Poor SRH status. The supplementary tables 4-7 show the data of regions separately.

Table 1: Sociodemographic distribution of the study population

Variables	*Total*	*Self-rated Health*		*Chi-square*	*P-value*
		Good N= 6,648	Poor N=2,415		
Country/District		73.35	26.65	569.18	<0.01
CN	3,866(38.1)	3,158(81.7)	708(18.3)		
JP	2,496(24.6)	1,770(70.9)	726(29.1)		
KR	1,576(15.6)	1,200(76.1)	376(23.9)		
Tw	2,199(21.7)	1,023(46.5)	1,176(53.5)		
Sex				21.03	<0.01
male	4,856(47.9)	3,670(75.6)	1,186(24.4)		
female	5,281(52.1)	3,765(71.3)	1,514(28.7)		
Age group				558.90	<0.01
18-30	1,733(17.0)	1,464(84.5)	269(15.5)		
31-40	1,902(19.0)	1,581(83.1)	321(16.9)		
41-50	2,067(20.0)	1,622(78.5)	445(21.5)		
51-60	1,790(18.0)	1,250(69.8)	540(30.2)		
61-70	1,468(14.5)	936(63.8)	532(36.2)		
>70	1,169(11.5)	591(50.6)	578(49.4)		
Religious main groups				270.03	<0.01
no religion	6,122(60.4)	4,776(78.0)	1,346(22.0)		
roman catholic	168(1.7)	124(74.0)	44(26.0)		
protestant	577(5.7)	433(75.0)	144(25.0)		
Islam	105(1.0)	68(64.8)	37(35.2)		
Buddhism	1,726(17.0)	1,118(64.8)	608(35.2)		
other Christian religions	16(0.2)	14(87.5)	2(12.5)		
other eastern religions	1,242(12.2)	676 (54.5)	566(45.5)		
other religions	16(0.2)	14(87.5)	2(12.5)		
dk, refused	165(1.6)	110(66.5)	55(33.5)		
Education				310.94	<0.01
highest education level					
no formal qualification	760(7.5)	391(51.4)	369(48.6)		
elementary school	1,406(13.9)	901(64.1)	505(35.9)		
junior high	1,908(18.8)	1,463(76.7)	445(23.3)		
high school	2,870(28.3)	2,124(74.0)	746(26.0)		
junior college	1,197(11.8)	986(82.4)	211(17.6)		
university	1,696(16.7)	1,337(78.8)	359(21.2)		
graduate school	281(2.8)	229(81.6)	52(18.4)		
dk, refused	19(0.19.0)	14(73.7)	5(26.3)		
Marital status				194.73	<0.01
married	7,152(70.6)	5,371(75.1)	1,781(24.90)		
widowed	782(7.8)	407(52.0)	375(48.01)		
divorced	338(3.3)	233(68.9)	105(31.08)		
separated (have intention to divorce)	41(0.5)	26(63.6)	15(36.36)		
never married	1,741(17.3)	1,348(77.5)	393(22.55)		
cohabiting	53(0.6)	36(68.7)	17(31.3)		
Urban rural				53.45	<0.01
a big city	1,627(16.1)	1,233(75.8)	394(24.2)		
the suburbs or outskirts of a big city	1,396(13.8)	1,029(73.7)	367(26.3)		
a town or a small city	3,291(32.5)	2,480(75.4)	811(24.6)		
a country village	2,598(25.6)	1,827(70.2)	777(29.8)		
a farm or home in the country	122(1.2)	69(56.6)	53(43.4)		
Tw: not asked	1,103(10.9)				

Note: CN: China; JP: Japan; KR: South Korea; Tw: China Taiwan

Table 2: Chronic Diseases and Health-related behaviors

Variables	*Total*	*Self-rated Health*		*Chi-square*	*P-value*
		Good	Poor		
Have chronic diseases or longstanding health problem				1.6e+03	<0.01
Yes	3,642(36.1)	1,782(48.9)	1860(51.1)		
No	6,455(63.9)	5,654(87.6)	801(12.4)		
How often smoke					
Daily	2,138(21.2)	1,671(78.1)	467(21.8)		
Several times a week	146(1.4)	109(74.7)	37(25.3)		
Several times a month	58(0.6)	41(70.7)	17(29.3)		
Several times a year or less often	42(0.4)	32(76.2)	10(23.8)		
Never	6,656(65.9)	4,779(71.8)	1,877(28.2)		
Tw: not asked for subsample	1,064(10.5)				
How often drink alcoholic drinks				183.43	<0.01
Daily	955(9.5)	718(75.2)	237(24.8)		
Several times a week	1,159(11.5)	969(83.6)	190(16.4)		
Several times a month	1,283(12.7)	1,049(81.8)	234(18.2)		
Several times a year or less often	1,344(13.3)	991(73.7)	353(26.3)		
Never	4,286(42.5)	2,896(67.6)	1,390(32.4)		
Tw: not asked for subsample	1,064(10.5)				
How often do physical activity				116.14	<0.01
Daily	1,559(15.5)	1,159(74.3)	400(25.7)		
Several times a week	2,060(20.5)	1,641(79.7)	418(20.3)		
Several times a month	1,309(13.0)	1,038(79.2)	273(20.8)		
Several times a year or less often	1,334(13.2)	992(74.4)	341(25.6)		
Never	3,810(37.8)	2,581(67.7)	1,229(32.3)		
Had health checkup					
Yes, regularly	3,116(30.81)	2,366(75.9)	750(24.1)		
Yes, but not regularly	2,323(22.97)	1,800(77.5)	523(22.5)		
No	2,475(24.47)	1,944(78.5)	531(21.5)		
Tw: not asked	2,199(21.75)				

Tw= Taiwan

Table 3: The association of the poor SRH of the whole population

Variables	*Odds Ratio*	*Std. Err.*	*Z*	*P>|z|*	*[95% Conf.*	*Interval]*
Age	1.18	0.03	7.60	0.000	1.13	1.23
Sex	1.04	0.07	0.57	0.568	0.92	1.18
Marital	1.21	0.02	9.49	0.000	1.16	1.26
Employment status	1.00	0.00	0.83	0.406	0.99	1.01
Religion	1.00	0.00	3.72	0.000	1.00	1.01
Urban rural	1.02	0.03	0.79	0.431	0.97	1.07
Degree	0.96	0.02	-2.23	0.026	0.92	0.99
Ethnic	0.81	0.02	-7.16	0.000	0.77	0.86
Smoking	0.97	0.07	-0.38	0.702	0.84	1.12
Drinking	1.27	0.05	6.25	0.000	1.18	1.37
Physical activity	1.18	0.05	4.22	0.000	1.10	1.28
Chronic disease	1.30	0.09	3.80	0.000	1.14	1.50
Hypertension	0.71	0.05	-4.66	0.000	0.61	0.82
Diabetes Mellitus	1.32	0.13	2.81	0.005	1.09	1.60
Ischemic Heart disease	1.16	0.11	1.49	0.135	0.96	1.40
Respiratory Problem	0.77	0.07	-2.73	0.006	0.64	0.93
Others diseases	0.95	0.06	-0.83	0.406	0.84	1.07
_cons	0.21	0.05	-6.23	0.000	0.13	0.35

SRH= Self-rated Heath, OR=Odds Ratio; 95% Conf.= 95% Confidence Interval

In China age, living area, drinking, physical activity, chronic diseases were significantly (P<0.05) associated with poor SRH (Supplementary Table 4). In Japan, marital status, and physical activity were significantly (P<0.05) associated with poor SRH (Supplementary Table 5). In Korea, age, smoking, failure of regular health checkups, and chronic diseases were significantly (P<0.05) associated with poor SRH (Supplementary Table 6). In Taiwan, marital status, drinking, and physical activity were significantly (P<0.05) associated with poor SRH (Supplementary Table 7). Supplementary tables will be available only via contacting the corresponding author.

All the regions except China, showed association between smoking and poor SRH. The consumption of alcohol was associated with poor SRH in all regions. While less physical activity, diabetes mellitus, and ischemic heart disease were also responsible for poor SRH in all regions (P =<*0.05*). It is evident from supplementary tables 4-7 that poor compliance with health-related behaviors was associated with poor SRH in all regions. While Japan reported significantly higher proportion of chronic disease issues related to poor SRH (P=<*0.05*).

China reported poor SRH with increasing age, females, unemployment, drinking, less physical activity, irregular health checkup, and chronic diseases.

Japan reported similar findings with the addition of smoking associated with poor SRH. Korea also reported similar findings as Japan. Taiwan did not report the association of age or smoking with the poor SRH. While other findings were similar to rest of the regions. The association of ischemic heart disease and diabetes mellitus with poor SRH was seen in all regions. South Korea had highest proportion of those without chronic diseases or long-standing health issues (P=<0.05) (Supplementary Table 8). Supplementary tables will be available only via contacting the corresponding author.

Discussion

In this regard, several studies have been done, especially in European countries where SRH was used in population health surveys because the data are convenient to extract from the community (6). Nevertheless, less information has been found about Asian countries, especially, the developing countries where it's becoming a major problem nowadays. It is mostly overlooked by the policymakers, physicians even have less awareness among the mass population, there have been some studies in Asian peoples but mostly on specific area or city based, which provides us a narrow view about the important relationship between SRH, Health-related behaviors and chronic diseases. A study in Malaysia, showed several unhealthy lifestyle behaviors (smoking, consumption of alcohol, physical inactivity, underweight) and chronic diseases (Heart diseases, Hypertension, Asthma, Arthritis, hypercholesterolemia) are significantly associated with poor SRH among Malaysian adults (25). Another study among South Korean population in a metropolitan city showed; health state had significant correlations with health behaviors in Metropolitan residents (26). A population-based survey in China coverings five rural areas and five urban cities, showed that suffering from various Chronic diseases increased the chance of reporting a poor global SRH (27).

In Japan, health-related behavior had strong connection with SRH in those in-between middle age and aged population. Males tended to describe fair or poor health as household income decreased. The results for women were different, social isolation and low social support had a stronger association for fair or poor SRH than low household income. Observed health was associated with socio-economic and common characteristics among middle-aged and elderly residents in Japan. (28). Comparable studies in Thailand showed about three in five respondents reported that their health was fair, very bad, or bad. Oldness, social factors, comorbidities, and abundance of psychosocial complaints are related to poor health. Long-term comorbidities, working grade, psychosocial complaints were the sturdiest elements of the poor SRH of aged population in Thailand (29).

While a study in Singapore showed that gender, ethnicity, marital status, education, household income, age, self-reported doctor-diagnosed illnesses, alcohol intake, exercise, and body mass index are all associated with poor SRH (30). The National Health Survey of Pakistan showed evident relationship among exercise, tobacco use, chronic diseases, functional status, and psychosocial symptoms with SRH and concluded with these were the strongest determinants of poor SRH (31).

These close regions in East Asia are similar in their choices of health-related behavior. Although China has reported the higher proportion of good SRH, the factors influencing poor SRH were almost similar in all regions. Therefore, increased awareness of healthy lifestyles and disease prevention along with regular follow-up of chronic diseases can improve the poor SRH among individuals.

Limitations

The data used is more than a decade old. There is need to have recent data for understanding the current position.

Conclusion

Several health-related behaviors and chronic diseases are associated with poor SRH. Effective public health strategies, in promoting healthy lifestyles, and disease prevention intervention should be encouraged. Further cooperation among the regions can improve the outcomes of promoting healthy lifestyles.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission,

redundancy, etc.) have been completely observed by the authors.

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Conflict of interest

The authors declare that there is no conflict of interest.

References

1. Lantz PM, Lynch JW, House JS, et al (2001). Socioeconomic disparities in health change in a longitudinal study of US adults: the role of health-risk behaviors. *Soc Sci Med*, 53(1):29–40.
2. Wen M, Gu D (2011). The effects of childhood, adult, and community socioeconomic conditions on health and mortality among older adults in China. *Demography*, 48(1):153–81.
3. Costa-Font J, Hernandez-Quevedo C (2012). Measuring inequalities in health: what do we know? What do we need to know? *Health Policy*, 106(2):195–206.
4. Siddiqi A, Nguyen QC (2010). A cross-national comparative perspective on racial inequities in health: the USA versus Canada. *J Epidemiol Community Health*, 64(1):29–35.
5. Dubikaytis T, Harkanen T, Regushevskaya E, et al (2014). Socioeconomic differences in selfrated health among women: a comparison of St. Petersburg to Estonia and Finland. *Int J Equity Health*, 13:39.
6. Jylga M (2009). What is self-rated health and why dies it predict mortality? Towards a unified conceptual model. *Soc Sci Med,* 69(3):307-16.
7. Mackenbach JP, Stirbu I, Roskam AJ, et al (2008). Socioeconomic inequalities in health in 22 European countries. *N Engl J Med*, 358(23):2468–81.
8. von dem Knesebeck O, Luschen G, Cockerham WC, et al (2003). Socioeconomic status and health among the aged in the United States and Germany: a comparative cross-sectional study. *Soc Sci Med*, 57(9): 1643–1652.
9. von dem Knesebeck O, Geyer S (2007). Emotional support, education and self-rated health in 22 European countries. *BMC Public Health*, 7:272.
10. Prus SG (2011). Comparing social determinants of self-rated health across the United States and Canada. *Soc Sci Med*, 73(1):50–9.
11. Freeman A, Tyrovolas S, Koyanagi A, et al (2016). The role of socio-economic status in depression: results from the COURAGE (aging survey in Europe). *BMC Public Health*, 16(1):1098.
12. World Health Organization (2009). Global health risks: mortality and burden of disease attributable to selected major risks. World Health Organization. https://apps.who.int/iris/handle/10665/44203 (accessed May 2019)
13. Mora RR (2012). Lifestyle medicine: the importance of considering all the causes of disease. *Rev Psiquiatr Salud Ment*, 5:48–52.
14. Molarius A, Janson S (2002). Self-rated health, chronic diseases, and symptoms among middle-aged and elderly men and women. *J Clin Epidemiol*, 55(4):364–70.
15. Pisinger C, Toft U, Aadahl M, et al (2009). The relationship between lifestyle and self-reported health in a general population The Inter99 study. *Prev Med*, 49(5):418–23.
16. Harrington J, Perry IJ, Lutomski J, et al (2010). Living longer and feeling better: healthy lifestyle, self-rated health, obesity and depression in Ireland. *Eur J Public Health*, 20:91–5.

17. Cummins S, Stafford M, Macintyre S, et al (2005). Neighbourhood environment and its association with self-rated health: evidence from Scotland and England. *J Epidemiol Community Health*, 59:207–13.
18. Poortinga W, Dunstan FD, Fone DL (2008). Neighbourhood deprivation and self-rated health: The role of perceptions of the neighbourhood and of housing problems. *Health Place*, 14:562–75.
19. Freidoony L, Chhabi R, Kim CS, et al (2015). The components of self-perceived health in the Kailali district of Nepal: A cross-sectional survey. *Int J Environ Res Public Health*, 12:3215–31.
20. Hanibuchi T, Nakaya T, Murata C (2012). Socio-economic status and self-rated health in East Asia: a comparison of China, Japan, South Korea and Taiwan. *Eur J Public Health*, 22(1):47-52.
21. Yamaoka K (2008). Social capital and health and well-being in East Asia: a population-based study. *Soc Sci Med*, 66(4):885–99.
22. Nomura K, Yamaoka K, Nakao M, et al (2010). Social determinants of self-reported sleep problems in South Korea and Taiwan. *J Psychosom Res*, 69(5):435-40.
23. Nishimura J (2011). Socioeconomic status and depression across Japan, Korea, and China: exploring the impact of labor market structures. *Soc Sci Med*, 73(4):604–14.
24. Anonymous (2019). East Asian social survey. http://www.eassda.org/ (accessed May 2019)
25. Ying Ying Chan, Chien Huey Teh, Kuang Kuay Lim, et al (2015). Lifestyle, chronic diseases and self-rated health among Malaysian adults: results from the 2011 National Health and Morbidity Survey (NHMS). *BMC Public Health*, 15: 754.
26. Kim SC (2018). Health Behaviors: A Cross-Sectional Study of South Korean Residents in a Metropolitan Area. *Med Clin Rev*, 4:1-5.
27. Song X, Wu J, Yu C, et al (2018). Association between multiple comorbidities and self-rated health status in middle-aged and elderly Chinese: The China Kadoorie Biobank study. *BMC Public Health*, 18:744.
28. Wang N, Iwasaki M, Otani T, et al (2005). Perceived health as related to income, socio-economic status, lifestyle, and social support factors in a middle-aged Japanese. *J Epidemiol*, 15:155–162.
29. Haseen F, Adhikari R, Soonthorndhada K (2010). Self-assessed health among Thai elderly. *BMC Geriatr*, 10:30.
30. Lim WY, Ma S, Heng D, et al (2007). Gender, ethnicity, health behaviour & self-rated health in Singapore. *BMC Public Health*, 7:184.
31. Ahmad K, Jafar TH, Chaturvedi N (2005). Self-rated health in Pakistan: results of a national health survey. *BMC Public Health*, 5:51.