


Relationship between individual-level social capital and non-communicable diseases among adults in Honiara, Solomon Islands

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To cite: Tsuchiya C, Pitakaka F, Daefoni J, *et al.* Relationship between individual-level social capital and non-communicable diseases among adults in Honiara, Solomon Islands. *BMJ Nutrition, Prevention & Health* 2023;**6**:e000622. doi:10.1136/bmjnph-2023-000622

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Received 23 January 2023

Accepted 14 November 2023

Published Online First

28 November 2023



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ABSTRACT

Objective Solomon Islands is experiencing a change in disease burden, from communicable to non-communicable diseases (NCDs). Urgent action is necessary to reduce the risk of high economic and personal costs associated with NCDs. Social capital refers to the trust, norms and networks that provide social benefits and it is related to health. Despite the strong social bonds among Solomon Islanders, research on the association between social capital and health is lacking. Therefore, this study examines the state of individual social capital and its connection to NCD-related factors in the capital of the Solomon Islands.

Method In 2019, we conducted a cross-sectional study on 200 adults aged 20–80 years in urban and periurban settlements of the capital. Anthropometric measurements, questionnaires and interview surveys were conducted.

Results This study identified higher prevalence of obesity, blood glucose levels and blood pressure compared with previous studies in both study areas. Multiple linear regression analysis reported that in the periurban area, cognitive social capital was negatively associated with body mass index (BMI) ($p=0.005$), whereas joining a group was positively associated with BMI ($p=0.01$). In the urban area, social support from individuals and cognitive social capital were negatively associated with blood glucose levels ($p=0.03$, $p=0.007$). Moreover, cognitive social capital was negatively associated with systolic blood pressure and diastolic blood pressure ($p=0.03$, $p=0.006$). However, joining citizenship activity was positively associated with glucose levels ($p=0.04$).

Conclusion This study observed that participants living with people of the same linguistic group had high trust in each other. Furthermore, higher cognitive social capital and social support may reduce the risk of NCD-related factors, unlike joining group activities.

Public health implications Findings suggest that health professionals should consider the influence of social capital on health promotion and interventions to be effective.

INTRODUCTION

According to the WHO, more than 41 million of the 55 million deaths worldwide in 2019 were caused by non-communicable diseases (NCDs), such as cardiovascular diseases

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ While social capital has emerged as a social determinant of health and recent studies have indicated that it is related to health, the state of social capital and its association with the risk of non-communicable diseases (NCDs) remains unknown in the Solomon Islands.

WHAT THIS STUDY ADDS

⇒ We conducted this study in two areas: urban and periurban. Our findings revealed that almost all participants residing in both study areas in Honiara shared the same linguistic ties originating from Malaita and had strong social bonds with a high level of trust.

⇒ In the periurban area, cognitive social capital, such as trust, was negatively associated with body mass index (BMI), whereas joining a group was positively associated with BMI. In the urban area, social support from individuals and cognitive social capital were negatively associated with blood glucose levels. Moreover, cognitive social capital was negatively associated with systolic blood pressure and diastolic blood pressure. However, joining citizenship activity was positively associated with glucose levels.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ The findings underpin the urgent need for national and international policies to use social capital as a resource for the implementation of public policies or health programmes in each community to reduce the burden of NCDs in the Solomon Islands.

(CVDs), diabetes, respiratory diseases and cancer.¹ More than 77% of the mortality from NCDs occurs in low-income and middle-income countries, which suffer from the double burden of NCDs and communicable diseases.¹ Solomon Islands is one of the Pacific Island countries where the prevalence of obesity and diabetes is the highest in the world.² Dietary changes have occurred in the Solomon Islands—a decline in traditional food consumption and an increased

dependence on imported and processed foods.^{3 4} According to the WHO profile on NCD, the four leading causes of death in the Solomon Islands in 2018 were all NCD related: ischaemic heart disease, stroke, cancers and lower respiratory diseases. It is estimated that NCDs now account for 60% of all deaths.⁵ NCDs significantly impact finances in the Solomon Islands because they require lifelong treatment and follow-up.⁶ Regarding their risk factors, the prevalence of metabolic risk factors such as overweight or obesity, high blood glucose level and high blood pressure is also increasing. In terms of direct risk factors for NCDs, according to the WHO, 11% of adults have diabetes, and 17% have high blood pressure. Furthermore, 48.8% of men aged over 18 years are overweight and 16% are obese.⁵ Moreover, 62.7% of women are overweight, and 25% are obese.⁵ Previous studies have reported that metabolically healthy overweight or obese individuals showed a healthy metabolic profile.⁷ However, another study proposed that metabolically healthy obese individuals remain at a high risk of CVDs.⁸ Therefore, strategies to improve the direct risk factors are needed.

There are underlying factors behind the direct risk factors for NCDs. Modifiable risk factors for NCDs include unhealthy diet, physical inactivity, tobacco use and harmful alcohol consumption. Furthermore, a combination of factors, such as genetic, hormonal, biochemical, age-related, ethnic, economic, social, environmental, cultural and political factors, contributes to NCDs.⁹

Social capital has emerged as a social determinant of health, and recent studies have indicated its association with NCDs. According to Putnam, social capital refers to trust, norms and networks that provide social benefits and it is related to health.¹⁰

Previous studies have proposed two components of social capital: structural and cognitive.^{11–13} Structural social capital is the observable social participation and access to resources and social actions in the network.^{11 12} Cognitive social capital refers to trust, social norms, reciprocity, social values, attitudes and beliefs in the community.^{11 12} Recent studies have indicated that structural social capital, including social participation between an individual and a group, and cognitive social capital, including trust, positively influence health and health behaviours, such as smoking, alcohol intake and fruit and vegetable intake.^{14–16}

Wantok is a Solomon Islands' pidgin word derived from the English phrase 'one talk'. The Wantok system in the Solomon Islands is defined as an extended family that speaks the same language. It is a term used to express group identity, belonging to a group, reciprocal support and caring for others.^{17 18} Furthermore, it is a social norm and the fundamental structure for social networks and access to resources in the Solomon Islands.^{17 18}

In the Solomon Islands, social relationships may impact eating behaviours, physical activity patterns and body weight because people have strong social bonds and share food with their extended family (Wantok), which comprises a large group of people. However, no research

has been conducted on the association between social capital and health. Therefore, this study aims to examine the state of individual social capital and how individual social capital between people is associated with NCD-related factors to develop effective NCD prevention techniques in the Solomon Islands.

METHODS

Research area

Solomon Islands is part of the Melanesian group of islands located in Oceania, northeast of Australia. According to the Solomon Islands National Statistics Office, the population in 2019 were approximately 721 455, with 13% living in Honiara.¹⁹

The target population of this study was residents of Honiara, the capital of the Solomon Islands. This study was conducted in two geographically distinct sites in Honiara: urban and periurban.

Fishing Village, located in Vura Ward, was the first site, comprising 1729 individuals in the urban area. This site is located along the Kukum Highway, east of Honiara. The community of Fishing Village is a 1950s resettlement from Lau Lagoon, Malaita Island. The second study site was located behind Honiara city, requiring 1.5 hour to reach the Honiara central market on foot and by bus, known as Jericho 1 and Jericho 2. This site is located between the hills and valleys of Kola'a. Its community is a resettlement from Kwara'ae, Malaita Island. It has limited road access and no formal connection to utilities and services, resulting in severe pollution along the riverine valley.

In terms of social groups, village communities are organised into a formalised community known as a community association.⁴ The community association includes a health committee to address health problems and a policy committee to develop health policies in the community.⁴ As a civil society in the study sites, church groups existed, including funeral, women's, men's and youth groups.⁴ At the study sites, church groups offered varied services, such as nursing the sick, Sunday school, music groups and awareness activities in health, such as family planning, protection from infectious diseases and health improvement.⁴ Both study sites had work unions, such as fishery and agricultural associations and sports groups.⁴

Design and subjects

We conducted a cross-sectional study on 123 participants from Fishing Village on 11 March 2019–15 March 2019 and 77 participants from Jericho on 11 August 2019–18 August 2019.

We recruited adult subjects aged 20–80 years and explained the research purposes to them. We obtained their informed consent, and no incentive was offered for participation. Anthropometric measurements and an interview on social capital were conducted with all subjects. The surveys were conducted using Solomon Islands' pidgin English—the lingua franca of the Solomon Islands.

Height was assessed using Seca 213 portable stadiometer (model 213, SECA, Germany) with a precision of 0.1 cm. Weight was measured using a portable scale (BC-705N, Tanita, Japan) with a precision of 0.1 kg. Blood pressure was measured using a blood pressure monitor (HEM-1010, OMRON, Japan). Blood glucose levels were assessed in mg/dL using a blood glucose monitor (OneTouch Ultra View, Johnson & Johnson, Japan). Body composition was determined using the body mass index (BMI): individuals with a BMI <25 kg/m² were classified as normal weight, those with a BMI of 25–29.9 kg/m² as overweight and those with a BMI of >30 kg/m² as obese.²⁰ According to the WHO, a blood glucose level of ≥126 mg/dL is considered high fasting glucose, and systolic blood pressure (SBP) of ≥140 mm Hg and diastolic blood pressure (DBP) of ≥90 mm Hg are considered high blood pressure.^{21 22}

The short version of the Adapted Social Capital Assessment Tool (SASCAT) was used to measure individual social capital.¹² Structural social capital was measured using three questions about group membership, support from groups and support from individuals and two questions about citizenship activities. In addition, cognitive social capital was measured using four questions on trust, social harmony, sense of belonging and sense of fairness in the villages. Group items of the questions about structural social capital in SASCAT were modified to suit the social groups in the communities after a pilot study (table 1). In addition, we asked the participants an open-ended question about their opinion of the association between social relationships and health in the community.

Statistical analyses and calculations were performed using R software with the EZR package.²³ Factors associated with higher BMI, blood glucose level and blood pressure were identified using multiple regression analysis. Model 1 was adjusted for age and sex, whereas model 2 was adjusted for age, sex, income and educational attainment.

RESULTS

Characteristics of study participants

Table 2 shows the characteristics of the study participants. In Fishing Village, 72.4% of the participants were women; in Jericho, 53.2% were women. The mean age was 49.5 years (SD=11.2) in Fishing Village and 37.6 years (SD=13.9) in Jericho. The number of years they were living in the community was 31.4 years (SD=16.8) in Fishing Village and 18.4 years (SD=14.9) in Jericho; 56.6% and 66.2% of the participants from Fishing Village and Jericho, respectively, were born in Malaita and migrated to Honiara. Regarding their mother tongue, 82.1% of the participants from Fishing Village were Lau from north Malaita, and 85.7% were Kwara'ae from central Malaita. In terms of food production, 73.3% and 40.2% of the participants from Jericho and Fishing Village, respectively, own gardens and 45.5% and 11.7% in Fishing Village and Jericho, respectively, fish on their own.

Table 1 Short version of the Adapted Social Capital Assessment Tool

Questions	Coding/score range
Group membership	
1. In the last 12 months, have you been an active member of any of the following types of groups in your village?	Score between 0 and 12
Work-related union	
Community association	
Community health committee	
Community policy committee	
Political group	
Church group	
Funeral group	
Sports group	
Women's group	
Men's group	
Youth group	
Others	
Support from groups	
2. In the last 12 months, did you receive any emotional or economic help or assistance from the group?	Score between 0 and 12
Work-related union	
Community association	
Community health committee	
Community policy committee	
Political group	
Church group	
Funeral group	
Sports group	
Women's group	
Men's group	
Youth group	
Others	
Support from individual	
3. In the last 12 months, did you receive any emotional or economic assistance from anyone of the following?	Score between 0 and 11
Family (husband, wife, father, mother, sibling, grandmother or grandfather)	
Relatives	
Neighbours	
Friends in your community	
Friends outside of community	
Religious leaders	
Politicians	
Government officials/civil officials	

Continued

Table 1 Continued

Questions	Coding/score range
Community leaders	
Charitable organisations/NGOs	
Others	
Citizenship activities	
4. In the last 12 months, have you joined together with other village members to address a problem or common issues?	Yes=1, no=0
5. In the last 12 months, have you talked with a big man or government about problems in this village?	Yes=1, no=0
Cognitive social capital	
6. In general, can the majority of people in this village be trusted?	Yes=1, no=0
7. Do the majority of people in this village generally get along with each other?	Yes=1, no=0
8. Do you feel you are really a part of this community?	Yes=1, no=0
9. Do you think that people in this community would try to take advantage of you if they got the chance?	Yes=0, no=1
NGO, non-governmental organization.	

Anthropometric characteristics

Table 2 shows the health status of the participants by study area. Women have a higher prevalence of obesity than men in both communities. Significant differences were observed between the study areas in mean weight, BMI classification, mean waist, mean hip, waist-to-hip ratio, mean SBP and DBP, and the prevalence of elevated SBP and DBP. Mean weight, waist and hip values were significantly higher in Fishing Village than in Jericho. In addition, 62.6% of the participants from Fishing Village were obese, a percentage considerably higher than that in Jericho. In addition, elevated SBP and DBP were significantly more common in participants from Fishing Village than in Jericho. In Fishing Village, 49.6% of the participants had elevated SBP, and 37.4% had elevated DBP, significantly higher than those in Jericho. In terms of fasting sugar levels, 34.1% and 33.8% of the participants from Fishing Village and Jericho, respectively, exhibited high blood glucose levels.

The results of SASCAT by study area

Table 3 shows the results of SASCAT by study area. It reveals that 16.9% of the participants from Jericho joined one group, whereas 68.8% joined two or more groups. Conversely, 26.8% of the participants from Fishing Village joined one group, and 48.0% joined two or more groups. The mean score for membership was 2.2 (SD=2.2) in Fishing Village and 3.6 (SD=3.0) in Jericho. A large

proportion of the participants from Fishing Village joined church groups. Participants from Jericho joined community groups, such as a work-related union, community health committee, community policy committee, men's group or youth group, more than those in Fishing Village.

The participants from Jericho had significantly more support over the past 12 months from a work-related union, community association, community health committee, community policy committee, political group, funeral group, sports group, men's group or youth group than those in Fishing Village. The mean score for social support from groups was 0.7 (SD=1.6) in Fishing Village and 2.2 (SD=3.1) in Jericho.

Regarding support from individuals over the past 12 months, participants from Jericho had more support from neighbours, friends in the community, friends living outside the community, religious leaders, politicians, government officials, community leaders and non-governmental organizations (NGOs) than those from Fishing Village. Participants from Fishing Village received support from close family and extended family rather than others. The mean scores for social support from individuals were 2.4 (SD=2.7) in Fishing Village and 4.3 (SD=3.9) in Jericho.

Citizenship activities were not considerably different between the two study areas. There were also no significant differences between the two study areas in terms of trust, social harmony and sense of belonging. Regarding the sense of fairness, significantly more participants from Jericho responded that people in the community take advantage of others compared with those in Fishing Village.

The association between BMI, blood glucose level, and blood pressure, and the variables of SASCAT

Table 4 shows the results of multiple linear regression analysis with BMI, blood glucose level and SBP and DBP, in addition to the variables of SASCAT. Multiple linear regression analysis reported that in the periurban area (Jericho), cognitive social capital was negatively associated with BMI ($p=0.005$), and joining a group was positively associated with BMI ($p=0.01$). In the urban area, social support from individuals and cognitive social capital were negatively associated with blood glucose levels ($p=0.03$, $p=0.007$). Moreover, cognitive social capital was negatively associated with SBP and DBP ($p=0.03$, $p=0.006$). However, joining citizenship activity was positively associated with glucose levels ($p=0.04$).

Variance inflation factors of all variables were <2 ; therefore, multicollinearity was not present among the variables.

Social relationships and health

A man in Jericho talked about health and social relationships:

Many people, sometimes more than 10, live together in a house. The one who has the most money has to feed more than 10 people. We cook in a big pot

Table 2 Participant's characteristics per study area

	Total	Urban (Fishing Village) n=123	Periurban (Jericho) n=77	P value
Sex, n (%)				
Men	70 (35.0)	34 (27.6)	36 (46.8)	0.009
Women	130 (65.0)	89 (72.4)	41 (53.2)	
Age (mean±SD)	44.9 (13.6)	49.5 (11.2)	37.6 (13.9)	<0.001
Place of birth, n (%)				
Honiara	67 (33.7)	45 (36.9)	22 (28.6)	0.43
Malaita	120 (60.3)	69 (56.6)	51 (66.2)	
Others	12 (6.0)	8 (6.6)	4 (5.2)	
Language, n (%)				
Kwara'ae	69 (34.5)	3 (2.4)	66 (85.7)	<0.001
Lau	101 (50.5)	101 (82.1)	0 (0.0)	
Pidjin	11 (5.5)	9 (7.3)	2 (2.6)	
Other	19 (9.5)	10 (8.1)	9 (11.7)	
Height (cm) (mean±SD)	158.7 (7.1)	158.6 (6.9)	158.7 (7.4)	0.662
Weight (kg) (mean±SD)	81.9 (53.2)	87.9 (66.4)	72.3 (13.8)	0.043
BMI (mean±SD)	32.6 (21.8)	35.1 (27.2)	28.7 (5.4)	0.046
BMI classification, n (%)				
Normal	29 (14.5)	9 (7.3)	20 (26.0)	<0.001
Overweight	65 (32.5)	37 (30.1)	28 (36.4)	
Obesity	106 (53.0)	77 (62.6)	29 (37.7)	
Waist (cm) (mean±SD)	99.1 (13.2)	100.9 (13.7)	96.2 (11.7)	0.011
Hip (cm) (mean±SD)	105.9 (13.8)	110.7 (12.9)	98.1 (11.3)	<0.001
Waist-to-hip ratio (mean±SD)	0.9 (0.1)	0.9 (0.1)	0.99 (0.1)	<0.001
SBP (mmHg) (mean±SD)	137.5 (26.3)	143.1 (29.1)	128.5 (17.8)	<0.001
DBP (mmHg) (mean±SD)	82.9 (13.6)	87.8 (12.6)	75.0 (11.2)	<0.001
Raised SBP (≥140 mm Hg), n (%)	79 (39.5)	61 (49.6)	18 (23.4)	<0.001
Raised DBP (≥90 mm Hg), n (%)	52 (26.0)	46 (37.4)	6 (7.8)	<0.001
Blood glucose level (mg/dL) (mean±SD)	129.3 (48.4)	130.9 (50.7)	125.5 (46.8)	0.455
Diabetes classification, n (%)				
Normal (<100 mg/dL)	32 (16.0)	20 (16.3)	13 (16.9)	1
Borderline (100≤125 mg/dL)	100 (50.0)	61 (49.6)	38 (49.4)	
High (≥126 mg/dL)	68 (34.0)	42 (34.1)	26 (33.8)	

P values were calculated using the χ^2 test and Student's t-test.

BMI, body mass index; DBP, diastolic blood pressure; SBP, systolic blood pressure.

with a large amount of rice and small cabbage and taiyo (canned tuna) that are cheap. Vegetables, meat, and fish are too expensive to buy. Information about health is spread more through social participation in the community rather than mass media.

A woman in Fishing Village talked about health and social relationships:

I really want to cook with meat and vegetables for a good balance for body, but when I eat with a lot of people, money is limited, so I end up eating mainly

cheap rice and noodles. Chicken is expensive, so it is eaten only by close family. We sometimes hide chicken from relatives and provide only rice for them.

DISCUSSION

Health status

Our findings reveal that obesity (53.5%), high blood glucose level (34.0%) and high blood pressure (39.5%) in the urban and periurban residents displayed higher

Table 3 Results of SASCAT

	Total n=200	Urban (Fishing Village) n=123	Periurban (Jericho) n=77	P value
Membership, n (%)				
Work-related union	27 (13.8)	13 (10.7)	14 (18.9)	0.135
Community association	63 (32.1)	28 (23.1)	35 (46.7)	0.001
Community health committee	45 (23.0)	14 (11.6)	31 (41.3)	<0.001
Community policy committee	23 (11.7)	5 (4.1)	18 (24.0)	<0.001
Political group	21 (10.8)	9 (7.5)	12 (16.0)	0.094
Church group	107 (54.0)	69 (56.1)	38 (50.7)	0.467
Funeral group	15 (7.7)	9 (7.5)	6 (8.0)	1
Sports group	50 (25.5)	26 (21.5)	24 (32.0)	0.129
Women's group	70 (35.5)	38 (31.1)	32 (42.7)	0.125
Men's group	33 (16.8)	12 (9.9)	21 (28.0)	0.001
Youth group	61 (31.1)	25 (20.7)	36 (48.0)	<0.001
Others	26 (13.3)	17 (14.0)	9 (12.0)	0.829
The number of memberships, n (%)				
None	42 (21.0)	31 (25.2)	11 (14.3)	0.016
Member of 1 group	46 (23.0)	33 (26.8)	13 (16.9)	
Member of 2 or more groups	112 (56.0)	59 (48.0)	53 (68.8)	
Social support from groups, n (%)				
Work-related union	16 (8.2)	3 (2.5)	13 (17.3)	0.001
Community association	23 (11.7)	8 (6.6)	15 (20.0)	0.006
Community health committee	23 (11.8)	3 (2.5)	20 (26.7)	<0.001
Community policy committee	13 (6.6)	2 (1.7)	11 (14.7)	0.001
Political group	17 (8.6)	5 (4.1)	12 (16.0)	0.007
Church group	40 (20.4)	23 (18.9)	17 (23.0)	0.58
Funeral group	10 (5.1)	1 (0.8)	9 (12.0)	0.001
Sports group	21 (10.8)	8 (6.7)	13 (17.3)	0.031
Women's group	39 (19.9)	19 (15.6)	20 (27.0)	0.07
Men's group	21 (10.7)	7 (5.8)	14 (18.7)	0.008
Youth group	24 (12.3)	6 (5.0)	18 (24.0)	<0.001
Others	11 (5.6)	3 (2.5)	8 (10.8)	0.022
Social support from groups, n (%)				
None	123 (61.5)	88 (71.5)	35 (45.5)	<0.001
Member of one group	24 (12.0)	14 (11.4)	10 (13.0)	
Member of two or more groups	53 (26.5)	21 (17.1)	32 (41.6)	
Social support from individuals, n (%)				
Husband, wife, parents, siblings, grandparents	117 (59.4)	76 (61.8)	41 (55.4)	0.45
Relatives	112 (56.6)	69 (56.1)	43 (57.3)	0.88
Neighbour	75 (37.9)	32 (26.0)	43 (57.3)	<0.001
Friends in the community	77 (38.9)	35 (28.5)	42 (56.0)	<0.001
Friends outside the community	63 (31.8)	31 (25.2)	32 (42.7)	0.012
Religious leaders	61 (30.8)	21 (17.1)	40 (53.3)	<0.001
Politicians	28 (14.1)	11 (8.9)	17 (22.7)	0.011
Government officials	23 (11.6)	7 (5.7)	16 (21.3)	0.001

Continued

Table 3 Continued

	Total n=200	Urban (Fishing Village) n=123	Periurban (Jericho) n=77	P value
Community leaders	47 (23.7)	14 (11.4)	33 (44.0)	<0.001
Charitable organisations/NGOs	14 (7.1)	1 (0.8)	13 (17.3)	<0.001
Others	15 (7.7)	3 (2.5)	12 (16.2)	0.001
Social support from individuals, n (%)				
None	64 (32.0)	37 (30.1)	27 (35.1)	<0.001
Member of 1 group	19 (9.5)	19 (15.4)	0 (0.0)	
Member of 2 or more groups	117 (58.5)	67 (54.5)	50 (64.9)	
Citizenship activity, n (%)				
Joining with other community members to address a problem	96 (48.5)	58 (47.2)	38 (50.7)	0.66
Talked with authorities about problems in the community	68 (34.3)	43 (35.0)	25 (33.3)	0.88
Cognitive social capital, n (%)				
People are trusted	140 (71.4)	88 (72.7)	52 (69.3)	0.63
People get along well	144 (73.1)	86 (70.5)	58 (77.3)	0.32
Feeling part of the community	186 (93.9)	113 (91.9)	73 (97.3)	0.14
People try to take advantage of you	137 (69.5)	75 (61.5)	62 (82.7)	0.002

P values were calculated using the χ^2 test and Student's t-test.

NGO, non-governmental organization; SASCAT, short version of the Adapted Social Capital Assessment Tool.

percentages than data from the WHO NCD profile.⁵ Notably, obesity was more prevalent in Fishing Village than in Jericho probably because of the rapid population growth and urbanisation in Honiara. Fishing Village is located in the centre of the city, whereas Jericho is in a valley far from the centre. Urbanisation is a factor that causes significant changes in diet and activity patterns.²⁴ People in Fishing Village may consume more high calorie and processed foods and engage in sedentary activities.

Social capital between the two study areas

This study reveals that almost all participants lived with people of the same linguistic ties originating from Malaita in both study areas; Lau in Fishing Village, Kwara'ae in Jericho. Historically, Malaitan people moved to the capital and nearby regions and relied on Wantok to safeguard their lives. The earlier settlers may provide new immigrants with places to live, food, social networks and sometimes jobs.²⁵

This study reports that participants from Jericho had higher structural social capital, such as group membership and supportive relationships with people or individuals in the group, compared with those in Fishing Village. In Jericho, the level of support from family, relatives and social groups was considerably higher than that in Fishing Village. People lived far from the city centre; hence, they needed to support each other in the community through farming, collecting firewood and fetching water. Maintaining a close relationship with the natural environment and preserving their custom were fundamental life values.⁴

In Fishing Village, although participants did not belong to many groups similar to participants from Jericho, the trust among participants from both communities was strong. Moreover, more than 50% of the participants belonged to church groups, indicating that church groups played an important role in the community. Tsuchiya reported that church groups provide the service of caring for sick people and awareness activities in health.⁴ To promote a health programme related to NCDs in the urban area, working with church groups may be effective because they could provide informal services to urban residents.

Cognitive social capital and health improvement

In both communities, higher cognitive social capital led to a healthier BMI, lower blood glucose level and lower blood pressure. According to previous studies, trust was associated with healthy lifestyle behaviours: people exhibiting high levels of trust had a lower risk of becoming obese than those with low levels of trust.^{26–28} Furthermore, high levels of trust among neighbours may result in the spread of health-promoting behaviours in the community.²⁹ In Solomon Islands, information from reliable people might be recognised as more beneficial, and the psychological feeling of security may have a positive effect on engaging in positive health behaviours.

Structural social capital and health improvement

Social support from individuals—a structural social capital—was associated with low blood glucose levels in Fishing Village. Structural social capital can influence

Table 4 Results from multiple linear regression analysis with BMI, blood glucose level and blood pressure in both study sites

		Group membership (no=0, yes=1)	Support from groups (no=0, yes=1)	Support from individuals (no=0, yes=1)	Citizenship activity (no=0, yes=1)	Cognitive social capital (low=0, high=1)	P value of the model	Adjusted R ²	
Urban (Fishing Village)	BMI	β (SE)*	-1.5 (6.5)	7.5 (6.0)	1.4 (5.7)	7.3 (5.3)	-6.3 (5.2)	0.41	0.001
		P value	0.81	0.21	0.80	0.17	0.22		
		β (SE)†	-5.3 (6.8)	9.2 (6.2)	1.5 (6.0)	5.8 (5.5)	-8.5 (5.4)	0.23	0.02
		P value	0.43	0.14	0.80	0.29	0.12		
	Blood glucose level	β (SE)*	-17.8 (11.4)	-9.0 (10.6)	-21.6 (10.0)	18.6 (9.3)	-24.7 (9.1)	0.005	0.1
		P value	0.12	0.40	0.03	0.04	0.007		
		β (SE)†	-18.7 (12.1)	-9.0 (11.1)	-20.4 (10.6)	18.7 (9.7)	-26.2 (9.7)	0.02	0.09
		P value	0.12	0.42	0.05	0.06	0.007		
	SBP	β (SE)*	3.9 (6.5)	7.4 (6.1)	-3.5 (5.7)	2.9 (5.3)	-11.6 (5.2)	0.005	0.1
		P value	0.55	0.22	0.54	0.57	0.03		
		β (SE)†	5.3 (6.8)	5.7 (6.3)	-1.3 (6.0)	3.5 (5.5)	-12.7 (5.5)	0.009	0.1
		P value	0.44	0.37	0.82	0.52	0.02		
DBP	β (SE)*	1.2 (2.9)	4.3 (2.7)	-3.1 (2.5)	3.3 (2.4)	-6.5 (2.3)	0.04	0.06	
	P value	0.67	0.12	0.23	0.17	0.006			
	β (SE)†	2.1 (3.0)	3.6 (2.7)	-2.4 (2.6)	4.0 (2.4)	-6.9 (2.4)	0.04	0.07	
	P value	0.48	0.19	0.37	0.10	0.005			
Periurban (Jericho)	BMI	β (SE)*	4.7 (1.7)	-4.0 (2.0)	0.2 (1.9)	1.2 (1.5)	-4.1 (1.4)	0.02	0.12
		P value	0.02	0.83	0.92	0.40	0.005		
		β (SE)†	5.1 (2.1)	-0.8 (2.0)	0.7 (2.1)	1.2 (1.5)	-4.1 (1.4)	0.04	0.10
		P value	0.01	0.71	0.74	0.42	0.005		
	Blood glucose level	β (SE)*	-12.4 (17.5)	-4.2 (17.4)	11.6 (17.2)	-11.3 (12.9)	7.3 (12.4)	0.50	-0.008
		P value	0.48	0.81	0.50	0.38	0.56		
		β (SE)†	-12.9 (18.3)	-0.8 (18.2)	7.3 (18.4)	-11.2 (13.1)	8.3 (12.7)	0.63	-0.02
		P value	0.48	0.96	0.69	0.40	0.51		
	SBP	β (SE)*	2.6 (6.5)	9.5 (6.5)	-10.3 (6.4)	5.0 (4.8)	-8.2 (4.6)	0.02	0.1
		P value	0.69	0.15	0.11	0.30	0.08		
		β (SE)†	4.4 (6.8)	8.2 (6.8)	-8.7 (6.8)	4.8 (4.9)	-8.4 (4.7)	0.04	0.1
		P value	0.52	0.23	0.20	0.32	0.08		
DBP	β (SE)*	6.3 (4.3)	1.9 (4.2)	-3.1 (4.2)	3.7 (3.1)	-5.1 (3.0)	0.17	0.05	
	P value	0.15	0.65	0.47	0.24	0.09			
	β (SE)†	7.4 (4.4)	1.5 (4.4)	-2.3 (4.4)	3.6 (3.1)	-5.0 (3.0)	0.18	0.05	
	P value	0.10	0.74	0.60	0.25	0.10			

*Model 1: age and sex were adjusted.

†Model 2: age, sex, income and education were adjusted.

BMI, body mass index; DBP, diastolic blood pressure; SBP, systolic blood pressure.

lifestyle behaviours when people attempt to obtain resources related to health promotion.^{28 29} Moreover, they can access additional resources such as financial and physical support through the social network.^{28 29} In Fishing Village, the social network might be the means to healthcare and support.

In the interviews, a man in Jericho stated that health-related information was spread more through social participation in the community than through mass media. In Solomon Islands, mass media, such as the Internet and television, are available only to a few people. Sharing important information through social bonding in the community is essential for promoting health programmes.

Social capital's negative impact on health

Unexpectedly, group membership and citizenship, which is a component of structural social capital, were associated with negative health impacts, such as high BMI values in Jericho and high blood glucose levels in Fishing Village.

In a previous study conducted in Japan, elderly people who participated in sports and hobby groups showed favourable values for several health screening items at health check-ups.³⁰ Poortinga and Nieminen *et al* also reported that participating in citizenship activities has positive associations with smoking behaviours and vegetable and fruit intake.^{14 15} Contrary to previous studies, our results indicate that social networks were used to increase food supply and consumption. The more people belong to a group, the more likely they are to obtain food, which might eventually increase food intake, including processed foods with high salt and oil content.

Sharing food culture

Owing to the Wantok system, participants discussed food insecurity and food preparation. They mentioned that when they buy meal ingredients, they compromise nutrition to avoid food shortages. A previous study has also indicated that people share food with their extended families; to feed everyone, they are likely to use cheap, bulky foods, such as rice, root crops and imported noodles, which may increase the prevalence of obesity.⁶

The tradition of sharing food is a type of social insurance, and it is crucial to establish and maintain social relationships with family, close friends and neighbours in the community in Solomon Islands. However, changing eating behaviours and improving nutrition in extended families will be challenging under current social norms. Health must be improved in the community using social capital while inheriting the spirit of mutual aid of *Wantok* to tackle the increasing prevalence of NCDs.

Limitations

There are three limitations to this study. First, this was a cross-sectional study, which could not generally infer causal relationships between social capital and obesity. Therefore, a longitudinal study must be conducted to confirm the causal relationship between obesity and its

risk factors. Second, sample sizes for some comparisons may have been limited, potentially lacking the power to examine specific effects and having a potential sampling bias, which could decrease its statistical power. In addition, our analysis only focused on individual-level social capital. Other forms of social capital, such as collective-level social capital, may have different correlations with NCD factors. More studies on collective-level social capital and NCDs are required in Solomon Islands.

CONCLUSION

In the shift from rural to urban life, this study discovered that participants who lived with people sharing the same linguistic ties had a high level of trust in each other.

Multiple linear regression analysis reported that in the periurban area, higher cognitive social capital was negatively associated with higher BMI, and joining a group was positively associated with higher BMI. In the urban area, social support from individuals and cognitive social capital were negatively associated with blood glucose levels. Moreover, cognitive social capital was negatively associated with SBP and DBP. However, joining citizenship activity was positively associated with high glucose levels, which supports the theory that social capital has both positive and negative impacts on health. Health professionals must consider the influence of social capital on the community when planning future health programmes and interventions.

Acknowledgements We thank all the participants and those who generously contributed their time and ideas during the research process: Sakae Inoue (former volunteer coordinator of JICA), Miki Yoshioka, Shiori Iwai, and Aya Nagai (former JICA volunteer), Olivia Bale, Annie Rofeta, and Audrey Jack (Kukum clinic), Scholastica Nohopara, Cornelius Atolo batu, Edwin thoa mo, and Veerah Reuben (Ministry of Health and Medical Services). We also appreciate Minato Nakazawa (Kobe University) for valuable advice.

Contributors CT is a guarantor who accepts full responsibility for the the study, had access to the data, and controlled the decision to publish. CT and TF contributed to the design of the study, data analysis and interpretation of the results and writing the manuscript. FP and JD contributed to design of the study and conduct the field surveys. All authors finally approved the final version of manuscript.

Funding This study was supported financially by the Kanae Foundation and the KAKENHI Grant-in-Aid for Scientific Research (project number: 20H00045 (Takuro Furusawa, Kyoto University)) of the Japan Society for the Promotion of Science.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study was conducted in accordance with the guidelines of the Declaration of Helsinki and was approved by the Ethics Committee of Kyoto University (Project number R1691) and Solomon Islands Health Research and Ethics Review Board of the Ministry of Health and Medical Services (HRE029/18).

Provenance and peer review Not commissioned; externally peer reviewed by Wanja Nyaga, NNEdPro Global Institute for Food, Nutrition and Health, United Kingdom of Great Britain and Northern Ireland.

Data availability statement Data are available on reasonable request.

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