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Collective control, social-cohesion and health and wellbeing: Baseline survey results from the Communities in Control Study in England.

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ABSTRACT

Background: Area-based initiatives (ABIs) are receiving renewed interest as part of 'place-based public health' approaches to reducing health inequalities.

Purpose: Examine associations between collective control, social-cohesion and health amongst residents involved in the Big Local ABI.

Methods: Survey data on general health, mental wellbeing, perceptions of individual and collective control, and social-cohesion was obtained in 2016 for 1600 residents involved in the 150 Big Local ABI areas in England, 862 responded - a response rate of >50%. Adjusted mean differences and adjusted odds ratios were calculated using random effect linear and generalised estimating equation models. Subgroup analysis by gender and educational level was conducted.

Results: Mental wellbeing was positively associated with collective control (Mean Difference 3.06 units, 1.23-4.90) and some measures of social cohesion ('people in the area are willing to help each other' [Mean Difference 1.77 units, 0.75-2.78]). General health was positively associated with other measures of social cohesion (area-belonging [Odds Ratio 4.25, 2.26-7.97]).

Conclusion: Collective control and some aspects of social cohesion were positively associated with better mental wellbeing and self-rated health amongst residents involved with Big Local. These positive associations were often greater amongst women and participants with a lower education. Increasing the collective control residents have in ABIs could improve the health effects of ABIs.

Keywords: ABI, Health Inequality, Social Determinants, Socioeconomic status, Deprivation, Place

BACKGROUND

There are large health inequalities in England with life expectancy gaps of up to 9 years between the most and least deprived neighbourhoods.[1] There is also a two- year life expectancy gap between the North and South of England.[2,3] Understanding the factors that cause these geographical inequalities in health has been of major concern to public health policy and practice for many decades – most recently apparent in discussions about place-based public health.[4] Deprived neighbourhoods are often characterised by a lack of services, poor housing, neglected open spaces, high crime, and limited employment opportunities and area-targeted approaches to tackling these issues have grown in prominence over the past four decades.[5–7] Area-based initiatives (ABIs), as they have become known, are often time-limited programmes that provide additional financial resources to places of deprivation in order to address these social, economic, and environmental problems.[8,9] In the past four decades there have been numerous ABIs in the UK that have aimed to tackle geographical inequalities by changing one or more dimensions of individual behaviours, the physical environment (e.g. traffic calming measures[10]), or improving public services, housing, labour markets, or education (e.g. New Deal for Communities[8,11]).

Indeed, ABIs often aim to change places through engagement with local communities but implementation regularly shifts downstream and programmes become focused on *people* living in *places* rather than the *places* in which they live.[12] This 'lifestyle drift'[13] is notable in many ABIs - for example the Health Action Zones (HAZs) in England were intended to address place-based social determinants of health, but most of the interventions eventually implemented were focused on individual lifestyle factors.[12,14] Similarly, more recent programmes such as NHS England's Healthy New Towns, also aimed to address the upstream determinants of health (such as housing and access to health and social care services) but many initiatives actually implemented were focused on individual-level behaviour change (e.g. promoting physical activity and healthy eating).[15]

Therefore, much of the evidence base on the effectiveness of ABIs on improving health and reducing inequalities relates to individually-focused behaviour change programmes rather than programmes that give genuine control to communities to decide on changes to place. There is an emerging evidence base though which demonstrates that when ABIs resist lifestyle drift and focus on shaping place-based factors, there can be substantial health benefits.[11,12,16] For example, in their systematic review of the effectiveness of ABIs on reducing health inequalities, O'Dwyer et al., (2007)[12] found that ABIs tended to have the greatest effect on reducing place-based inequalities in health when they

changed some aspect of the physical environment, had adequate funding and had good partnerships and engagement with communities.[12] Moreover, Popay et al., (2015)[11] highlight, more clearly, the impact of collective control over decision making on health through their evaluation of the New Deal for Communities Programme (NDC). In local NDC programmes that were identified as being more community-led, there were greater positive impacts on markers of population level mental health outcomes.[11] This suggests that one of the pathways through which ABIs can potentially reduce health inequalities is through developing meaningful relationships with communities. Indeed, research by Lewis et al., (2019) suggests that the impact of ABIs is often undermined by low community involvement, collective control, and participation.[16] This work indicates there is a need to extend the evidence base on effectiveness of ABIs by exploring initiatives that are genuinely community-led and focused on affecting change in *places*, rather than in *people*.

There is increasing evidence to suggest associations between individual and collective control over the places in which we live and better health outcomes.[17,18] Whitehead et al., (2016), for example, demonstrated that disadvantaged living environments can produce a sense of powerlessness and collective threat among residents leading to chronic stressors that, in time, damage health.[17] On the contrary, initiatives that empower residents to act collectively in challenging unhealthy environments can lead to improvements in health through social cohesion and improved material conditions in their neighbourhoods.[19] In their systematic review, for example, Milton et al., (2012) found that community-led initiatives had positive outcomes on housing quality, perceived reductions in crime rates, increased skills and knowledge among residents, and improvements in social trust and cohesion.[18] Moreover, it has been argued that inequalities in health may actually be driven by inequalities in collective control among social groups living in disadvantaged communities.[16] Marmot (2015), for example, suggests the social gradient in health is produced by variation in how much control people have over their lives and the places they live.[20]

This paper engages with- and extends- this emerging evidence base by exploring the associations between collective and individual control, social cohesion and area-belonging, and mental wellbeing and self-rated general heath amongst those actively engaged in the Big Local (BL) ABI in England. It also explores any inequalities by socio-economic status and gender.

METHODS

The Big Local Initiative

Big Local (BL) is an area-based community-led initiative funded by the National Lottery Community Fund (formerly Big Lottery Fund) and managed by a charitable organisation, Local Trust. The initiative provides 150 disadvantaged areas in England with at least £1million each for 10 years or more to support residents in making their community a better place to live. There is considerable flexibility in how residents decide to use the funds to improve local areas as places to live. However, a core element of the initiative is placing residents in control over the decisions on how the funding is spent in their area, this is done through the development of a BL Partnership in each area, which must be comprised of at least 51 per cent resident membership but can also include professionals involved with the local area. Moreover, the funding is accompanied by a package of support and guidance from Local Trust, which aims to build capabilities among residents including sharing information and to developing skills (http://www.localtrust.org.uk). The independent Communities in Control (CiC) study (https://communitiesincontrol.uk/) uses a mixed methods approach to evaluate the health and social impacts of BL.

Pilot Work

In our previous pilot work (using Qualitative Comparative Analysis) we identified different pathways to mental health improvement stemming from BL using a sample of 48 people actively involved in 15 BL areas.[21] We found that whilst various aspects of the intervention (including changes in self-perceptions of community control over decisions, area belonging, satisfaction with area, social cohesion, and safety) were linked to mental health improvements: positive changes in neighbourhood belonging was the most prominent factor.[21] This article expands our sample size to 862 people actively engaged across all 150 BL areas.

Data Collection and Sample Size

A longitudinal survey is delivered by Local Trust every two years, online and by post, to all individuals actively involved as members of the 150 BL partnerships in England. Local Trust collate and anonymise completed surveys, input the data into SPSS Version 23, and share with the CiC research team. The

data analysed in this paper is from the 2016 baseline survey when all 1600 BL partnership members were sent the questionnaire. 862 responded - a response rate of over 50%.

Outcome and Explanatory Variables

Since 2016 Local Trust has permitted the CiC research team to add validated questions to this survey relating to mental health and wellbeing [22] (the Shortened Warwick-Edinburgh Mental Wellbeing Scale – SWEMWBS) and general self-rated health (using the Census question with response categories ranging from very good to very bad).

Two Likert scale questions related to whether respondents felt able to influence decisions affecting their area, either collectively with others (collective control) or as individuals (individual control). Additional questions related to social-cohesion around involvement (feels got to know more people in the area, feels more connected, feels more positive about BL area, feels stronger sense of community) and area perceptions (feels people in the BL can be trusted; feels people in their BL are willing to help each other; feels belonging to the area). Data pertaining to socio-demographics (age, gender, ethnicity, education) as well as the hours per week volunteered in BL were also obtained from the survey.

Data Analysis

Data were summarised using descriptive statistics (mean, standard deviation for continuous variables, percentages for categorical variables). Our control and cohesion explanatory factors were then examined for bivariate associations with both the health outcomes, and the initial model included those with a p value of ≤0.25.[23] The final parsimonious model retained variables with significant associations along with factors adjusted for age, gender, ethnicity, educational status and hours volunteered (Tables 1 and 2). A random effect linear model was used to examine the associations between SWEMWBS, demographics, and our explanatory variables. Similarly, a generalised estimating equation model was used to examine the associations between self-rated health and our explanatory variables. The analyses were also segregated by sex and educational status to enable the exploration of any potential differential effects. The SWEMWBS results are presented as mean difference with 95% confidence intervals between the reference category and the comparison group. The self-rated health results are presented as odds ratios and 95% confidence intervals. All models, except the disaggregated ones were adjusted for age. Where the confidence intervals do not include zero values, then this implies a significant positive or negative association.

RESULTS

Survey Respondent Characteristics

Table 1 summarises the descriptive statistics for the characteristics of the survey respondents and comparative data for England from the 2011 census.[24] All were active members of a BL partnership at the time of the survey in 2016. A higher proportion of women participated in the study than men, and those aged 45-64 made up the majority (52%). Most of the survey respondents were White (88%), whilst only 4% were Asian/Asian British, and 3% were Black/Black British. Regarding educational status, 6% had no formal education, 7% had a vocational education, and 41% had one or more degrees. When compared to English census data from 2011, the BL population represents a greater proportion of people aged over 45, more women, more people of white ethnicity, and a greater number of people with high educational backgrounds.

Health Outcomes

Table 2 provides a summary of the health and explanatory outcomes. The mean SWEMWBS score was 24.2 (±4.3). Nearly three-quarters of the participants (74%) reported that their general health was 'Good' or 'Very good'. The vast majority (89%) strongly agreed that they felt positive about their area and that people in their area could be trusted (88.9%). Regarding involvement with BL, the highest percentage of agreement among respondents was for the statement that they feel they got to know more people in the area (95%). The lowest percentage agreement was observed for feeling that they were able to have stronger sense of community (88%). Area level perception was generally high: 90% felt they belong to the BL area, 89% felt people in the area can be trusted, and 86% agreed people are willing to help each other. Overall, participants reported positively about their area and involvement with BL, with <2% reporting strong disagreement with these indicators. A higher proportion of respondents strongly agreed that they have collective control over decisions in their area (36%) compared to that for individual level control (25%). For both indicators, about 5% disagreed or strongly disagreed that they have collective or individual level control over decisions in their area.

Multivariate Models

Table 3 shows the final parsimonious model including the explanatory factors that remained significantly associated with SWEMWBS amongst this same group of BL partnership members after adjusting for demographic (age, gender, ethnicity), socio-economic (educational status), and levels of

participation (hours involved). Only two of our explanatory factors were significantly associated with SWEMWBS: 'willingness to help each other', and 'collective control over decisions in their area'. Although included in the initial model and some showed significant bivariate association (Supplementary Table 1), not all of the explanatory variables were significant and retained in the final model.

Overall, those participants who agreed that 'people in the area are willing to help each other' were on average two units higher on the SWEMWBS score compared to those who disagreed (MD 1.77 units, 0.75-2.78). The subgroup analysis found that the difference was significant amongst women (MD 2.55 units, 1.00-4.10) and participants without a degree level education (MD 1.90 units, 0.58-3.23). There were no significant differences in SWEMWBS scores amongst male participants or those with a higher level of education.

SWEMWBS score also varied significantly by participants' perceptions of whether they felt there was 'collective control over decisions in their area'. Overall, those participants who agreed that 'there was 'collective control over decisions in their area' were on average three units higher on the SWEMWBS score compared to those who disagreed (MD 3.06 units, 1.23-4.90). It also varied by sex: the mean difference was significant for men (MD 3.35 units, 1.30, 5.40) but not women. In terms of education, it was significant for both educational groups, although slightly higher amongst those with a degree (no degree MD 2.66 units [0.24-5.08], degree MD 3.41 units [0.53, 6.28]).

Table 4 presents the final parsimonious model including the explanatory factors associated with self-rated general health amongst BL partnership members. After adjusting for demographic (age, gender, ethnicity), socio-economic (educational status), and levels of participation (hours involved), only one of our explanatory factors was significantly associated with better self-rated general health: feelings of area-belonging. Some of the predictors (e.g. individual control, feels got to know more people, or feels more connected) did not also show bivariate association to be included in the initial model (Supplementary Table 2). Our other explanatory variables were not significant in the final model.

Overall, the odds ratio for having 'good health' was around four times higher amongst those who agreed they 'belonged to the area' than who disagreed (OR 4.25, 2.26-7.97). The association was

significant for both men (OR 3.23, 1.42-7.38) and women (OR 4.57, 1.96-10.67), and for both degree (OR 2.87, 1.19-6.95) and no degree (OR 6.34, 2.39-16.79) educational groups. However, the strength of association was stronger for women and those with no degree.

DISCUSSION

Main findings of this study

The main findings from this study indicate that some – but not all - aspects of control and social-cohesion are associated with better mental wellbeing and self-rated general health amongst participants in a community-led ABI. Specifically, we found positive associations amongst participants between some measures of social cohesion (conceptualised as 'people in area are willing to help each other') and collective control ('collective control over decisions in area') and better mental health and wellbeing. For social cohesion, the positive associations were only significant for women and participants with a lower education. Similarly, for collective control, the association with better mental health and wellbeing was significant for men (but not women) and for both educational groups, although it was larger amongst those with a higher education. A different element of social cohesion mattered for self-rated general 'good health' - participants that felt they 'belonged to the area' had significantly higher rates of good health – both men and women and for both educational groups. The strength of association for 'good health' was stronger for women and those with a lower education. However, our other explanatory variables - including individual level control - were not significantly associated with health and well-being status amongst those actively engaged in the Big Local initiative (BL) in England.

What is already known on this topic

Although there is limited empirical evidence exploring the effects of community-led area-based initiatives on health outcomes, some studies have reported improvements in health outcomes resulting from increased collective control and social cohesion. A survey of communities undergoing regeneration in Glasgow found that residents' perceptions of their ability to influence decisions where they lived were positively associated with mental health outcomes but similar to this study did not find a similar association with physical health.[25] In a study on neighbourhood belonging, Elliott et al.,[26] also found moderate associations with wellbeing stemming from greater social participation in the

area, which increased feelings of belonging to the neighbourhood. Gale et al.,[27] found that individuals who reported a strong sense of social cohesion in their neighbourhood also reported higher levels of wellbeing. Moreover, in our previous work[21] we found that where BL partnership members reported improvements in social trust and feelings of belonging to their area these were related to improvements in mental wellbeing.[21] However, as Portes[28] argues there may be negative or unintended consequences if initiatives succeed in building social trust within communities and engaging people in collective action, but gains are not equally distributed - with residents from higher socio-economic backgrounds having greater benefits.[29] Indeed, some studies have reported that living in areas with higher elements of social cohesion can actually be harmful for excluded residents.[29]

What this study adds

This article adds to the emerging empirical evidence base on associations between community-led area-based interventions, collective control, social cohesion and health outcomes. Our findings, showing an association between collective control and mental wellbeing, tentatively suggest that it is not just participation in an ABI that matters for health - but feeling that it is possible to have influence over local decisions - potentially as a result of the ABI – matters too. This adds to the literature which suggests that increasing collective control over place-shaping could be a potential pathway to better health and lower health inequalities - particularly if there is a conscious effort to increase participation from people from lower socio-economic backgrounds.[28,29] Whether this finding is attributable to the BL initiative can only be theorised at this stage (as our data are cross-sectional), nevertheless, the pattern observed is supported by evidence from the study's linked qualitative component.[16] For example, our longitudinal qualitative investigation shows how the BL initiative is creating participatory spaces that offer opportunities for residents to build relationships and connections with others in their neighbourhood as well as develop capabilities for collective control over decision making.[30] More generally, our findings are also consistent with theory that suggests factors such as trust and feeling part of a neighbourhood can help to facilitate collective action in pursuit of shared goals.[31] Notably, however, the survey did not find an association between *individual* control and health and well-being. While the reasons for this require further investigation, this does point to the possibility that participation in collective processes (when positively experienced) are more likely to be beneficial for wellbeing than when trying to individually influence area decisions.[17,18] This has important implications for the future design and implementation of ABIs.

Limitations of this study

The study is subject to a number of important limitations. The survey sample is skewed towards the highly educated, the majority are over the age of 45 and report very good or good health. This is unsurprising given the evidence that shows how people from more deprived social backgrounds or those with poor health are less likely to participate in volunteering activities.[32] Although the reliance on self-reported health may limit the precision and reliability of these findings, there is evidence that shows a strong association between self-reported health and more objective outcomes such as mortality.[33] The lack of evidence for association with other predictors we observe can also be due to lack of statistical power. We only use cross-sectional data so we cannot assess whether it is participation in the ABI that has led to increased feelings of collective control or whether the feelings pre-dated participant involvement. Indeed, those involved with BL may have opted into the programme due to a pre-existing sense of collective control.

CONCLUSION

This study engages with- and extends- the small, empirical public health evidence base on community-led ABIs and health outcomes by examining associations between subjective perceptions of collective and individual control over decisions made in an area and social cohesion with mental wellbeing and self-rated general heath amongst those actively engaged in the Big Local initiative (BL). Using baseline data from over 800 participants across 150 disadvantaged communities in England, the study has found that collective control and - some measures of - social cohesion are associated with better mental wellbeing and self-rated general health amongst participants. It has also found that the health benefits were often greater amongst women and participants from lower educational backgrounds. However, ABIs such as BL that attract highly educated residents in greater numbers than those from lower educational background may be widening inequalities within communities as the benefits of involvement are not equally distributed. Future work should longitudinally explore the causal links between community involvement, collective control and health outcomes.

Research ethics

Ethical approval for the research was obtained from Lancaster University Faculty of Health and Medicine's Research Ethics Committee.

Disclosure statement

No potential conflict of interest was reported by the authors.

Contributors

VJM led write up of background literature with CB, contributed to interpretation of findings, and prepared manuscript for publication. NA led the data analysis, interpretation, and led the writing up of findings with CB. JP conceived the idea for the overall CiC study, led on the planning and development of the study and advised on data collection, analysis, and interpretation. EH contributed to write up of background literature and interpretation of results. CB and AK conceived quantitative study design and advised on analysis and interpretation. All authors contributed to the writing of the article and approved the final version.

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Table 1. Characteristic of the population of Big Local active participants

Variables	Category	n (%)	2011 Census[1] England n= 53,012,456 (%)
Age	29 and under	34 (4.0)	Aged 15-29 (11)
	30 - 44	150 (17.7)	(21)
	45 - 64	438 (51.8)	(25)
	65 and over	224 (26.5)	(16)
Gender	Female	472 (56.6)	(51)
	Male	358 (42.9)	(49)
	Other	4 (0.5)	-----
Ethnicity	White	742 (88.0)	(85)
	Mixed ethnicity	11 (1.3)	(2)
	Black, African, Caribbean, Black British	24 (2.8)	(3)
	Asian/ Asian British	32 (3.8)	(8)
	Other ethnicity	8 (0.9)	(1)
	Prefer not to say	26 (3.1)	-----
Educational status	None	45 (5.5)	(22)
	School level	102 (12.5)	(13)
	Higher School	52 (6.4)	(15)
	College/Uni (not a degree)	176 (21.5)	(12)
	One/ more degrees	338 (41.3)	(27)
	Technical/ vocational	59 (7.2)	(0.9)
	Prefer not to say	46 (5.6)	-----

[1] Office for National Statistics ; National Records of Scotland ; Northern Ireland Statistics and Research Agency (2016): 2011 Census aggregate data. UK Data Service (Edition: June 2016). DOI: http://dx.doi.org/10.5257/census/aggregate-2011-1

Table 2. Outcome and Explanatory Factors among Big Local partnership members in 2016

Variables	Category	n (%), Mean ± SD
SWEMWBS	Mean ± SD	24.2 ± 4.3
Self-rated general health	Very good	254 (30.5)
	Good	366 (43.9)
	Fair	163 (19.5)
	Bad	45 (5.4)
	Very bad	6 (1.0)
Involvement: feels got to know more people in the area	Strongly agree	333 (39.4)
	Agree	471 (55.7)
	Disagree	35 (4.1)
	Strongly disagree	6 (0.7)
Involvement : feels more connected	Strongly agree	255 (31.4)
	Agree	492 (60.6)
	Disagree	57 (7.0)
	Strongly disagree	8 (1.0)
Involvement: feels more positive about BL area	Strongly agree	234 (29.0)
	Agree	500 (62.0)
	Disagree	62 (7.7)
	Strongly disagree	11 (1.3)
Involvement: feels stronger sense of community	Strongly agree	227 (28.4)
	Agree	474 (59.4)
	Disagree	83 (10.4)
	Strongly disagree	14 (1.8)
Area: people in the BL can be trusted	Strongly agree	141 (19.8)
	Agree	(491) 69.1
	Disagree	66 (9.3)
	Strongly disagree	13 (1.8)
Area: people in their BL are willing to help each other	Strongly agree	153 (20.3)
	Agree	492 (65.3)
	Disagree	96 (12.7)
	Strongly disagree	13 (1.7)
Area: feels belonging to the area	Strongly agree	233 (29.6)
	Agree	478 (60.7)
	Disagree	66 (8.4)
	Strongly disagree	10 (1.3)
Collective control	Strongly agree	307 (36.3)
	Agree	429 (50.8)
	Neither	79 (9.3)

	Disagree	26 (3.1)
	Strongly disagree	4 (0.5)
Individual control	Strongly agree	202 (24.6)
	Agree	443 (54.0)
	Neither	133 (4.3)
	Disagree	35 (4.3)
	Strongly disagree	8 (1.0)
Unpaid hours/week volunteered	< 5 hours	386 (58.3)
	5-9 hours	133 (20.1)
	10-14 hours	73 (11.0)
	15-19 hours	29 (4.4)
	20-24 hours	22 (3.3)
	25-29 hours	9 (1.4)
	30 and more	10 (1.5)

Table 3. Analysis of SWEMWBS among Big Local participants (overall) and subgroup analyses by sex and educational level

Variables	Categories	Mean difference (Confidence intervals)				
		All (n = 500)	**Male (n=229)**	**Female (n=271)**	**No Degree (n = 267)**	**Degree (n = 233)**
Sex	Female	0.07 (-0.61, 0.75)			0.15 (-0.80, 1.09)	-0.02 (-1.02, 0.98)
	Male	Ref				
Education	Have degree	-0.40 (-1.0, 0.29)	-0.33 (-1.25, 0.60)	-0.60 (-1.63, 0.42)		
	No degree	Ref	Ref	Ref		
People in their BL are willing to help each other	Agree	1.77 (0.75, 2.78)	1.12 (-0.21, 2.45)	2.55 (1.00, 4.10)	1.90 (0.58, 3.23)	1.35 (-0.33, 3.02)
	Disagree	Ref	Ref	Ref	Ref	Ref
Collective involvement can influence decisions in area	Agree	3.06 (1.23, 4.90)	3.35 (1.30, 5.40)	2.15 (-1.28, 5.58)	2.66 (0.24, 5.08)	3.41 (0.53, 6.28)
	Neither	0.40 (-1.76, 2.56)	0.95 (-1.53, 3.44)	-0.88 (-4.77, 3.01)	0.11 (-2.67, 2.90)	0.21 (-3.36, 2.90)
	Disagree	Ref	Ref	Ref	Ref	Ref

**Adjusted for age, gender, education, ethnicity and hours of involvement

Table 4. Estimates of associations between self-rated 'good health' and explanatory factors amongst Big Local participants, overall and disaggregated analysis by sex and education levels

		Odds ratio (Confidence intervals)				
Variables	**Category**	**Overall (n = 551)**	**Male (n = 247)**	**Female (n = 305)**	**No Degree N = 303)**	**Degree (n = 249)**
Sex	Female	1.03 (0.69, 1.53)			0.90 (0.53, 1.54)	1.38 (0.72, 2.65)
	Male	Ref			Ref	Ref
Education	Have degree	1.68 (1.05, 2.69)	1.32 (0.74, 2.37)	2.10 (1.04, 4.24)		
	None	Ref	Ref	Ref		
Feel belongs to the BL area	Agree	4.25 (2.26, 7.97)	3.23 (1.42, 7.38)	4.57 (1.96, 10.67)	6.34 (2.39, 16.79)	2.87 (1.19, 6.95)
	Disagree	Ref	Ref	Ref	Ref	Ref

**Adjusted for age, gender, education, ethnicity and hours of involvement

Supplementary Table 1: Bivariate associations between Short Warwick Edinburgh Mental Well-Being Score (SWEMWBS) and predictors

Variables	Category	Mean difference, Confidence intervals	P value
Sex	Female	-0.26 (-0.87, 0.35)	0.403
	Male	Ref	
Age groups	29 and below	2.25 (0.66, 3.84)	0.006
	30-44	-0.36 (-1.26, 0.55)	
	45-64	-0.44 (-1.15, 0.28)	
	65 and over	Ref	
Ethnicity	White	-0.73 (-1.80, 0.350)	0.184
	Others	Ref	
Education	Degree level	0.10 (-0.53, 0.72)	0.764
	No degree		
Involvement: feels got to know more people	Agree	1.09 (-0.33, 2.52)	0.133
	Disagree	Ref	
Involvement : feels more connected	Agree	1.46 (0.35, 2.58)	0.010
	Disagree	Ref	
Involvement : feels more positive	Agree	2.25 (1.25, 3.25)	<0.001
	Disagree	Ref	
Involvement : feels stronger sense of community	Agree	2.16 (1.26, 3.06)	<0.001
	Disagree	Ref	
Area: people in the BL can be trusted	Agree	2.61 (1.62, 3.60)	<0.001
	Disagree	Ref	
Area: people in their BL are willing to help each other	Agree	2.20 (1.33, 3.06)	<0.001
	Disagree	Ref	
Area: feel belongs to the BL area	Agree	2.59 (1.59, 3.59)	<0.001
	Disagree	Ref	
Individual control over area decisions	Neither	0.40 (-1.10, 1.95)	<0.001
	Agree	2.69 (1.36, 4.02)	
	Disagree	Ref	
Collective control over area decisions	Neither	1.48 (-0.36, 3.30)	<0.001
	Agree	4.38 (2.81, 5.95)	
	Disagree	Ref	
Hours involved in participating in BL		0.02 (-0.03, 0.06)	0.454

Supplementary Table 2. Bivariate associations between Self-rated general health and predictors

Variables	Category	Odds ratio, Confidence intervals	P value
Sex	Female	1.06 (0.79, 1.43)	0.698
	Male	Ref	
Age groups	29 and below	3.31 (1.18, 9.27)	0.005
	30-44	2.15 (1.31, 3.53)	
	45-64	1.43 (1.01, 2.04)	
	65 and over	Ref	
Ethnicity	White	0.59 (0.32, 1.09)	0.073
	Others	Ref	
Education	Degree level	1.72 (1.19, 2.49)	0.004
	No degree	Ref	
Involvement: feels got to know more	Agree	1.02 (0.54, 1.91)	0.961
	Disagree	Ref	
Involvement : feels more connected	Agree	1.26 (0.75, 2.12)	0.404
	Disagree	Ref	
Involvement : feels more positive	Agree	2.17 (1.27, 3.72)	0.012
	Disagree	Ref	
Involvement : feels stronger sense of community	Agree	1.48 (0.91, 2.38)	0.142
	Disagree	Ref	
Area: people in the BL can be trusted	Agree	2.67 (1.62, 4.40)	0.002
	Disagree	Ref	
Area: people in the BL are willing to help each other	Agree	1.84 (1.13, 3.01)	0.023
	Disagree	Ref	
Area: feel belongs to the BL area	Agree	2.17 (1.34, 3.53)	0.011
	Disagree	Ref	
Individual control over area decisions	Neither	1.60 (0.76, 3.37)	0.325
	Agree	1.64 (0.91, 2.94)	
	Disagree	Ref	
Collective control over area decisions	Neither	2.44 (1.03, 5.77)	<0.001
	Agree	2.32 (1.16, 4.65)	
	Disagree	Ref	
Hours involved in participating in BL		0.97 (0.95, 0.99)	0.033