Food Insecurity and Subjective Wellbeing among Arab Youth living in varying contexts of political instability: Data from the Gallup World Poll 2014-2015

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Conflict of interest:

There are no real or perceived conflicts of interest to disclose.

List of abbreviations:

CI: Confidence Interval

FAO: Food and Agriculture Organization

FIES: Food Insecurity Experience Scale

GWP: Gallup World Poll

ILO: International Labour Organization

IQR: Inter-Quartile Range

N/A: No observations available

NEI: Negative Experience Index

PEI: Positive Experience Index

PSAVT: Political Stability and Absence of Violence and Terrorism

SD: Standard Deviation

UN: United Nations

VIF: Variance Inflation Factor

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ABBREVIATIONS

CI: Confidence Interval

FAO: Food and Agriculture Organization

FIES: Food Insecurity Experience Scale

GWP: Gallup World Poll

IQR: Inter-Quartile Range

MFI: Moderately Food Insecure

N/A: No observations available

NEI: Negative Experience Index

PEI: Positive Experience Index

PSAVT: Political Stability and Absence of Violence and Terrorism

SFI: Severely Food Insecure

SD: Standard Deviation

VIF: Variance Inflation Factor

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ABSTRACT

Purpose

To investigate associations between food insecurity experience and subjective wellbeing in Arab youth, across different political stability settings.

Methods

Data from the Gallup World Poll (2014-2015) were extracted for youth aged 15-24 years living in 19 Arab countries (n= 8,162). Food insecurity was assessed using the Food Insecurity Experience Scale. Life Evaluation Score and Affect Balance were used as indicators of youth wellbeing. The 2014 Political Stability and Absence of Violence and Terrorism score was used to stratify Arab countries into three categories; high, medium and low political stability. Multivariable regressions were performed to explore the relationship between food insecurity and wellbeing indices adjusting for socio-demographic and socio-economic factors, across different political stability settings.

Results

The prevalence of food insecurity among Arab youth ranged between 3.1% in Lebanon to 91.3% in South Sudan. Food insecurity (moderate and severe) was negatively correlated with life evaluation (β: -0.74 for moderate food insecurity; -1.28

for severe food insecurity, p-value <0.001), and affect balance (β: -22.03 for moderate food insecurity; -33.88 for severe food insecurity, p-value <0.001). These results were consistent across political stability groups, independently from socio-demographic and socio-economic factors.

Fewer factors were correlated with life evaluation and affect balance in low as compared to medium and high political stability settings.

Conclusions

Food insecurity is an independent risk factor for Arab youth wellbeing. Efforts to improve youth wellbeing can be channelled through food security interventions.

Keywords

Food insecurity; Youth; Wellbeing; Arab; Food Insecurity Experience Scale; Life Satisfaction; Affect balance

IMPLICATIONS AND CONTRIBUTION

This is the first study to investigate correlations between individual-level food insecurity experience and wellbeing in Arab youth, and how these differ by political stability settings. By understanding experiences of food insecurity in youth, youth-centred policies and interventions can better mitigate the impact of food insecurity on youth wellbeing.

The Arab region has continued to witness high levels of political instability and protracted conflicts (1). It has been implied that the youth bulge and consequently high levels of youth unemployment (1, 2) combined with increases in food prices and food insecurity, contributed to deteriorations in wellbeing that led to the Arab uprisings of the last decade (2, 3), and subsequent civil unrest. In fact food insecurity has been described as a “driver” (4) and “threat multiplier for conflict” (5, 6). The contribution of food insecurity to wellbeing in youth has been documented to some extent in the literature (7, 8).

Recent wellbeing research has focused on subjective wellbeing (9) as a complex concept which is not simply equivalent to happiness, but rather consisting of three different components: high positive affect reflected by how frequently positive emotions are felt; low negative affect reflected by how frequently negative emotions are felt; and a person’s own judgement of their life, also called life evaluation or life satisfaction (10).

Young people are negatively affected by the consequences of food insecurity in terms of physical and mental health (7), diet quality (7, 11) and school attendance (7). Adolescents living in food insecure households exhibit lower psychosocial function (12) and have been shown to be more likely to experience depressive disorders and suicidal thoughts (8). More generally, the wellbeing of individuals affected by food insecurity, regardless of their age, is impeded, whereby food insecurity hinders adequate nutritional status and overall health of the food insecure (7) and hampers their social wellbeing .

The recent addition of the Food Insecurity Experience Scale (FIES) to the yearly Gallup World Poll (GWP) survey allows the measurement of food insecurity experience from individual respondents aged 15 years and above. Recent analyses have used these data to examine the association between food insecurity and subjective wellbeing in a global sample of individuals aged above 15 years and found food insecurity to be strongly and negatively associated with wellbeing (13, 14). Although these aggregate analyses conclude that consistent associations exist across global regions; none have focused on youth-specific vulnerability to food insecurity experience, and the relative contribution of food insecurity to youth wellbeing.

The additional stressors of political instability may also modify this association. We therefore use the GWP data to investigate correlations between individual-level food insecurity experience and wellbeing in Arab youth, and stratify the analyses by political instability in countries of the Arab region.

METHODS

The study is a cross-sectional analysis of a survey conducted by GWP in Arab countries.

The GWP is an annual survey that includes individuals, aged 15 years and above, in over 150 countries worldwide, using probability-based, multi-cluster sampling. Survey questions were asked to a nationally representative sample of about 1,000 individuals in each country, through face-to-face or telephone interviews (15). In this study, the dataset covered 19 countries of the Arab region, defined as the group of member countries of the Arab League,

including data on food insecurity and subjective wellbeing variables. Although South Sudan is not an official member of the Arab League, it was included in this analysis as it has applied to join the Arab League with its membership status currently pending, and with a considerably high prevalence of food insecurity and low political stability in South Sudan, we considered it important to document youth wellbeing in this newly independent country of the region. Data were pooled from two waves of the GWP surveys, covering years 2014 and 2015, in an effort to increase sample sizes. Data from young respondents, as per the United Nations Department of Economic and Social Affairs definition of youth (aged between 15 and 24 years inclusive) (16), were considered, providing a sample of 8,162 individuals across 19 Arab countries. This global definition of youth was used to account for the variety of national norms and definitions of youth In the Arab region, and to allow for better comparability of results within the literature on this topic. Gallup had obtained all necessary and required approvals from governing bodies, and individual consent in each country where Gallup conducted interviews.

Variables

Two variables that cover different aspects of subjective wellbeing were considered for this analysis. Life evaluation score, which is the global validated life evaluation measure based on Cantril's Self-Anchoring Scale (17), represents a person's judgment of their life as a whole and is considered an evaluative measure of subjective wellbeing. Respondents were asked to give an evaluation of their current life based on a scale from zero (worst possible life) to ten (best possible life) (18).

Affect balance is the result of the mathematical difference between Positive Experience Index (PEI) and Negative Experience Index (NEI), based on Bradburn's Affect Balance Scale (19). PEI and NEI are both measures of an individual's emotional wellbeing experienced on the day before the survey, each based on a set of five dichotomous questions ("Yes" or "No") related to positive or negative emotions respectively, like laughter, enjoyment and rest on one hand, and anger, sadness and worry on the other hand (18).

Individual-level food insecurity status was measured using the FIES, an experience-based measure of food insecurity developed by the FAO Voices of the Hungry project (20) which consists of an eight-point scale (21). Three categories of food security were created based on FIES scores in this analysis: food secure, moderately food insecure (MFI) and severely food insecure (SFI). These categories were based on country-level cut-off points derived by FAO using Item Response Theory methods which defined cut-offs for moderate food insecurity, ranging from 3 to 5 out of 8, and for severe food insecurity, ranging from 5 to 8 out of 8 (21).

Other variables conceptualised to be associated with subjective wellbeing included socio-demographic variables: age, sex, marital status, total household size, and residence. Age was coded as a binary variable, with a cut-off point of 19 years; considering that the definition of youth used in this study, and endorsed by the United Nations for statistical purposes, encompasses "adolescents" (aged 15-19 years) and "young adults" (aged 20-24 years)(22). It is likely that employment and education, key variables in the analyses, would be differentially associated with food insecurity and wellbeing

in youth aged up to 19y as compared to those aged 20y and above. Socio-economic variables examined included: educational level, employment status and within-country quintiles of yearly household income. The latter variable was generated based on annual household income at country-level. For the purpose of the study, the country-level political stability score (PSAVT), one of the World Bank's Worldwide Governance Indicators, was used to stratify countries into three categories based on tertiles of the 2014 political stability scores (23): high political stability countries (Jordan, Kuwait, Mauritania, Morocco, Saudi Arabia, Tunisia, UAE), medium political stability countries (Algeria, Bahrain, Egypt, Lebanon, Libya, Palestinian territories) and low political stability (Iraq, Somalia, South Sudan, Sudan, Syria, Yemen). The political stability score aims to capture perceptions of how likely it is for a government to be destabilized or overthrown through violence, including perceptions of the likelihood of occurrence of politically-motivated violence and terrorism. A country's score generally ranges between -2.5 (weak governance performance) and 2.5 (strong governance performance) (24).

Conceptual model

We used a conceptual model (Figure 1) adapted from Frongillo et al (13) and Breisinger et al (2). Based on the Frongillo model, living conditions (employment, poverty, education and food insecurity) influence individual wellbeing through several pathways: societal, psychological and biological. In this study, we conceptualize political instability as the context within which these living conditions exist and which can be influenced. Political instability itself combined with poor economic policies lead to poverty, low education and employment and food insecurity. In turn, food insecurity as well as other

poor living conditions create societal discontent that can lead to uprisings and political instability. We therefore conceptualize a bidirectional relationship between political stability and living conditions (including food insecurity) and hypothesize that within these contexts, food insecurity and individual wellbeing are differentially associated.

Statistical methods

Data were analysed using Stata software (version 14.0). The svyset command and sampling weights provided by GWP were used to adjust for the sampling effect in all country-level statistical analyses, and results presented were weighted estimates.

A set of descriptive analyses was run at country level, for each political stability category and for the region overall.

A set of bivariate linear regressions was conducted to assess the cross-country associations between: (a) prevalence of any food insecurity and mean life evaluation score, (b) political stability and prevalence of any food insecurity, and (c) mean life evaluation score and political stability.

Bivariate and multivariable linear regressions were used to investigate the correlation between food insecurity and youth wellbeing; all analyses were stratified by political stability group. Co-variates included socio-demographic and socio-economic variables. Variables were retained in final models if they were associated with either of the wellbeing indices in bivariate with a p-value above 0.2. Variables with a theoretical rationale for inclusion such as employment status were retained in models regardless of statistical

significance. Country and wave (2014 vs 2015) variables were included as fixed effects.

Test for multi-collinearity was conducted by calculating Variance Inflation Factors (VIF), and Household size was found to be collinear with other variables in the final model, so it was excluded.

Data were missing on employment status for Kuwait and Bahrain, and on income for Somalia; these countries were therefore excluded from multivariable regression models.

1 RESULTS

Study population

Data on 8,162 individuals aged 15-24y were used in descriptive and bivariate analyses (Table 1). Prevalence of any food insecurity in Arab youth ranged between 3.1% in Lebanon and 92.4% in South Sudan. Overall, 71.3% of the sample of Arab youth were food secure, 14.9% were MFI and 13.8% SFI.

Table 2 presents the characteristics of Arab youth in each political stability group and the region overall. Detailed descriptive data on youth characteristics by country can be found in Supplementary table 1.

Country-level analyses of food insecurity, wellbeing and political stability

Bivariate analyses

A cross-country bivariate linear regression showed lower mean life evaluation scores in countries with higher food insecurity prevalence rates (R-squared=0.45; p=0.0015) (Figure 2.a). Similar analyses showed higher prevalence of food insecurity (R-squared=0.37; p=0.0054) (Figure 2.b) and lower life evaluation (R-squared=0.43; p=0.0023) (Figure 2.c) in countries with lower political stability. Similar results were found for affect balance (data not shown).

1.1 Multivariable analyses of associations between food insecurity and wellbeing indices; stratified by political instability groupings

1.1.1 Life evaluation

In a multivariable regression model examining the correlation between life evaluation and any food insecurity, adjusting for socio-demographic and socio-economic factors (Table 3), food insecurity (moderate and severe) was consistently correlated with lower life evaluation score in the region overall and in all political stability groups. In fact, life evaluation score decreased in a dose response manner with increasing severity of food insecurity.

Youth above 19 years had lower life evaluation scores than those below 19 years of age in high and medium political stability countries. Being female was associated with higher life evaluation score in the region and in all political stability settings. Life satisfaction was not found to be significantly correlated with marital status nor residence in this subpopulation.

As for socio-economic factors, tertiary education was associated with higher life evaluation score when compared to elementary or lower, in the region overall. Employed youth had higher life evaluation scores than those unemployed in medium political stability countries and in the region overall. Increasing household income was only associated with higher life evaluation above the third quintile in medium and high political stability countries. However, in low political stability settings, this association became apparent only in the richest quintile of household income.

Of these models, the adjusted R-squared was highest at 0.2238 in high political stability countries, and lowest at 0.1105 in low political stability countries; indicating that all factors included in the model combined had a stronger contribution to subjective wellbeing in high political stability settings than in low political stability settings.

1.1.2 Affect balance

Table 4 presents multivariable regression models investigating the correlation between any food insecurity and affect balance adjusting for socio-demographic and socio-economic factors, and by political stability grouping. As another proxy of subjective wellbeing, affect balance was also consistently correlated with food insecurity (moderate and severe) in youth in all political stability groups, with decreases in affect balance paralleling increasing severity of food insecurity.

The association between age and affect balance was similar to that with life evaluation with youth above the age of 19 years having lower affect balance compared to those 15-19 years of age; in the case of affect balance, this was the case for all political stability settings. In contrast to the positive association between

female sex and life evaluation, affect balance was negatively correlated with female sex in medium political stability countries only. Similarly to life satisfaction, affect balance was not found to be correlated with marital status nor residence.

Although secondary education was associated with higher affect balance, this was only significant in low political stability countries and the region overall. Similar associations were found between unemployment and affect balance as those seen with life evaluation. Being out of the workforce was associated with higher affect balance in high and medium political stability countries, when compared to being employed.

Household income was associated with higher affect balance in medium and low political stability countries starting at the third quintile of income.

In contrast to the models of life evaluation, the adjusted R-squared was highest at 0.2626 in low political stability countries, and lowest at 0.0986 in high political stability countries.

2 DISCUSSION

This analysis focused on Arab youth, and explored the correlation between food insecurity and subjective wellbeing across different political stability settings. It found a consistent association between food insecurity (moderate and severe) and negative wellbeing indices, in this case life evaluation and affect balance, in Arab youth independently from socio-demographic and socio-economic factors. These

results are in line with the literature that showed that food insecure youth had lower life satisfaction (8, 12).

We found food insecurity (moderate and severe) to be a stronger predictor of wellbeing than other socio-demographic and socio-economic measures. This finding is aligned with an analysis of the global adult sample (15y+) of the GWP, which found that food insecurity was more strongly correlated with wellbeing indices than living conditions such as income, housing and employment (13). The importance of food insecurity as an impeding factor for wellbeing could be explained by the fact that concerns related to food access are tightly linked to stress and therefore poor wellbeing. This also highlights the central position that the ability to access food occupies in an individual's wellbeing status, regardless of their socio-economic status.

Interestingly, in low political stability settings, where the prevalence of any food insecurity was higher and subjective wellbeing indices were lower, we found fewer socio-demographic and socio-economic factors to be correlated with subjective youth wellbeing when compared to medium and high political stability settings.

It is also noteworthy that certain socio-economic variables were differentially associated with life evaluation and affect balance; likely due to the differences in the constructs underlying these two wellbeing indices. For example, adolescent girls and young women had higher life evaluation than adolescent boys and young men in the Arab world. This result is somewhat surprising in the Arab region, given that Arab countries are ranked at the bottom of Global Gender Gap analyses and that gender inequality dominates several aspects of Arab women's lives (25), which should

theoretically induce lower life evaluation in young Arab women compared to young Arab men. According to other literature in the Arab world that found young females to be happier than young males, this could be due to high unemployment rates that negatively affect young men more than young women, in societies where men are expected to be the main providers for the family (26). There were however no significant associations between sex and affect balance, except in medium political stability countries. This could be related to young women evaluating their lives better than young men, despite not necessarily experiencing more positive emotions and less negative emotions.

Age was weakly associated with both components of subjective wellbeing; with youth above 19y having lower wellbeing than those below 19y. This is consistent with other studies that find wellbeing to decrease with age (14, 27-29).

Employment, education and income were the main socio-economic correlates of subjective wellbeing in this study, although not equally across political stability settings. In a review on youth life satisfaction, being unemployed was repeatedly found to be associated with lower life evaluation, especially among school-leavers, when compared to being employed or not looking for a job (28). As for education, several studies found a positive correlation between each additional educational level and wellbeing and some found that mid-level education was associated with the highest life evaluation score, according to a review on the topic (30). In this study, higher levels of education were associated with better life evaluation in high political stability settings and with higher affect balance in low political stability settings. The fact that higher levels of education were associated with higher affect balance in low

political stability settings but not with higher life satisfaction could be explained by the high unemployment rates among Arab youth, especially in these countries, regardless of educational achievements. Whereas higher education in high political stability settings typically leads to better employment opportunities and therefore better life evaluation. Income was strongly correlated with subjective wellbeing in Arab youth in line with the global literature (31, 32).

The differences in wellbeing correlates across political stability groups could be explained by low life evaluation scores and therefore dissatisfaction with life in Arab youth living in low political stability settings. It may be that improvements in socio-demographic and/or socio-economic exposures are not sufficient to increase the life satisfaction of this group. Living in fragile countries prone to violence exposes youth to a range of factors that could negatively impact their wellbeing and place them at higher risk of mental disorders (33). However, the correlation between any food insecurity and subjective wellbeing remains strong even in low political stability settings. In these settings, food insecurity is likely an indicator of overall vulnerability and therefore a strong correlate of wellbeing (5).

Researchers have attempted to explore pathways linking food insecurity to subjective wellbeing, through the societal, psychological, and biological aspects of food insecurity. At the societal level, food insecurity is linked to negative wellbeing through the socioeconomic value of food; food insecurity has been found to lead to shame (34), psychosocial distress (35), decreased participation in communal activities (36) and negative coping strategies such as selling assets, begging, and engaging in risky behaviours (37, 38). As for the psychological pathway, food

insecurity can be considered as a stressful event which leads to daily and/or chronic stress (12), causing anxiety linked to uncertainty about food supply (36, 39). At the biological level, food insecurity is directly linked to food deprivation and consequent deterioration of nutritional status. This biological effect of food insecurity is thought to lead to increased depression and irritability, similar to the effects of chronic dieting and starvation (40).

Strengths and limitations

This study adds to the understanding of youth wellbeing and its correlates in the Arab world; a context riddled with conflict and political upheavals. Specifically, it sheds the light on the role of food insecurity in youth wellbeing in different political stability contexts. Also, this is the first study, to our knowledge, to investigate these relationships among youth within the Arab region.

The strengths of the GWP data include the use of validated measures consistently across a set of countries, which allowed for the inclusion of large enough sample sizes in each model. However the GWP data poses some limitations including the fact that some countries of the Arab region were not included and others had missing data, and that some country surveys were conducted via face to face interviews while others through telephone interviews, possibly introducing some responder bias. Response rates were also not reported by GWP, which means that there is a chance of selection bias in case of high refusal rates. This factor, in addition to the exclusion of some areas in certain countries due to security reasons could negatively affect the representativeness of samples, particularly in low political stability settings. It is also important to note that both food insecurity and wellbeing indices are self-

reported measures, prone to be affected by the respondents' mood during the interview rather than by their general wellbeing status. FIES measures might also be affected by exaggeration as a result of food aid expectations by respondents, which could lead to falsely high food insecurity prevalence.

Due to the cross-sectional nature of the study, it is not possible to draw any conclusions about causality nor the causal pathways linking food insecurity and all other factors studied to youth wellbeing. There is also a potential for residual confounding in the association between subjective wellbeing and its correlates, due to unmeasured potential covariates, which might bias estimates of associations found.

Conclusions and recommendations

This study focusing on Arab youth found a consistent association between food insecurity and negative wellbeing indices. Food insecurity can thus be considered as an independent risk factor that threatens youth wellbeing in the Arab world.

Given the crucial role of youth in the positive development of the Arab region, especially during the current challenging period amidst continued conflict and political change, it will be important to focus on interventions aiming to improve youth wellbeing. Such interventions should integrate components that address food insecurity as a core determinant of wellbeing in Arab youth.

Future research could explore the causal pathways between food insecurity and subjective wellbeing in youth, and the links between the different components of food insecurity and subjective wellbeing.

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E. Table

Table 1. Political stability score and sample size of Arab countries included in the analysis

Countries	Sample size of youth respondents	PSAVT score
Algeria	295	-1.17
Bahrain	343	-0.94
Egypt	431	-1.58
Iraq	412	-2.47
Jordan	516	-0.56
Kuwait	268	0.14
Lebanon	464	-1.72
Libya	172	-2.32
Mauritania	613	-0.58
Morocco	401	-0.39
Palestine	542	-1.99
Saudi Arabia	487	-0.24
Somalia	562	-2.49
South Sudan	668	-2.54
Sudan	181	-2.36
Syria	381	-2.76
Tunisia	517	-0.93
UAE	388	0.81
Yemen	521	-2.53

Table 2. Characteristics of youth in the Arab region, and by political stability group

Variable	**High political stability** **N=3,190**	**Medium political stability** **N=2,247**	**Low political stability** **N=2,725**	**Arab region overall** **N=8,162**
Food security status				
Food secure (%)	81.0	83.3	46.3	71.3
Moderately FI (%)	12.1	11.8	21.6	14.9
Severely FI (%)	6.9	4.9	32.1	13.8
Socio-demographic characteristics				
Age (median; [IQR]) (years)	19.6 [17, 22]	19.6 [17, 22]	19.5 [17, 22]	19.5 [17,22]
Sex (%)				
Males	54.6	53.6	49.5	52.7
Females	45.4	46.4	50.5	47.3
Marital status (%)				
Not with a partner	88.8	87.1	68.1	81.6
With a partner	11.2	12.9	31.9	18.4
HH size (median; [IQR]) (Individuals)	6.7 [5, 8]	6.2 [4, 8]	8.1 [5, 10]	7.0 [5,9]
Residence (%)				
Rural	39.0	39.6	68.2	48.6
Urban	61.0	60.4	31.8	51.4

Socio-economic characteristics				
Educational level (%)				
Elementary or less	26.1	20.2	67.8	37.8
Secondary	66.4	73.2	29.9	56.7
Tertiary	7.6	6.6	2.3	5.6
Employment status (%)				
Employed	28.6	30.0	35.0	31.2
Unemployed	13.0	11.0	13.8	12.7
Out of the workforce	58.4	59.0	51.2	56.1
HH income per capita per year (%)				
Poorest 20%	15.2	18.7	36.1	22.6
Second 20%	19.2	21.8	20.8	20.5
Middle 20%	24.0	22.4	15.2	20.9
Fourth 20%	21.2	22.0	15.3	19.6
Richest 20%	20.4	15.2	12.6	16.5
Wellbeing characteristics				
Life evaluation score (mean; SD)	5.7; 2.3	5.7; 2.3	4.4; 2.9	5.3; 2.5

Affect balance (%)				
-100	0.7	0.7	1.2	0.8
-80	1.9	1.8	4.2	2.6
-60	2.5	4.4	5.1	3.9
-40	3.2	4.3	7.2	4.8
-20	4.5	6.1	9.6	6.6
0	7.3	7.7	13.3	9.3
20	9.1	9.1	11.7	9.9
40	12.6	13.0	10.7	12.1
60	14.5	16.5	11.5	14.1
80	19.2	16.6	13.6	16.6
100	24.6	19.9	12.1	19.2

Table 3 Multivariable regression model of food insecurity and life evaluation score, adjusting for socio-demographic and socio-economic factors, by political stability country groupings

Variable	**Arab region overall (N=6,923)**		**High political stability (N=2,932)**		**Medium political stability (N=1,864)**		**Low political stability (N=2,127)**	
	β	p-value	β	p-value	β	p-value	B	p-value
Food insecurity status								
Food secure	Ref	-	Ref	-	Ref	-	Ref	-
MFI	-0.74	<0.001	-0.74	<0.001	-0.99	<0.001	-0.41	0.031
SFI	-1.28	<0.001	-1.28	<0.001	-0.92	0.014	-1.30	<0.001
Age								
<19 years	Ref	-	Ref	-	Ref	-	Ref	-
>19 years	-0.36	<0.001	-0.40	<0.001	-0.35	0.006	-0.29	0.075
Sex								
Males	Ref	-	Ref	-	Ref	-	Ref	-
Females	0.39	<0.001	0.28	0.002	0.52	<0.001	0.44	0.005
Marital status								
Not with a partner	Ref	-	Ref	-	Ref	-	Ref	-
With a partner	0.12	0.267	0.06	0.693	0.15	0.448	0.11	0.539
Residence								
Rural	Ref	-	Ref	-	Ref	-	Ref	-
Urban	-0.002	0.983	0.06	0.536	-0.14	0.251	0.04	0.834
Educational level								
Elementary or less	Ref	-	Ref	-	Ref	-	Ref	-

	Secondary							
	Tertiary	0.25	0.004	0.18	0.157	0.25	0.158	0.26	0.098
		0.35	0.018	0.38	0.072	0.32	0.200	0.23	0.515
Employment status									
	Employed	Ref	-	Ref	-	Ref	-	Ref	-
	Unemployed	-0.24	0.039	-0.14	0.373	-0.75	0.001	0.13	0.554
	Out of the workforce	0.17	0.047	0.31	0.010	0.21	0.147	-0.09	0.615
HH income per year									
	Poorest 20%	Ref	-	Ref	-	Ref	-	Ref	-
	Second 20%	0.10	0.367	0.21	0.185	0.11	0.578	0.11	0.618
	Middle 20%	0.37	0.001	0.40	0.009	0.57	0.003	0.35	0.140
	Fourth 20%	0.62	<0.001	0.77	<0.001	0.75	<0.001	0.44	0.070
	Richest 20%	0.88	<0.001	1.08	<0.001	0.85	<0.001	0.84	0.003
Model R-squared		0.1930		0.2238		0.1523		0.1105	

Table 4 Multivariable regression model of association between affect balance and food insecurity, socio-demographic and socio-economic factors

Variable		**Arab region overall (N=6,968)**		**High political stability (N=2,941)**		**Medium political stability (N=1,865)**		**Low political stability (N=2,162)**	
		β	p-value	β	p-value	B	p-value	β	p-value
Food insecurity status									
	Food secure	Ref	-	Ref	-	Ref	-	Ref	-
	MFI	-22.03	<0.001	-19.70	<0.001	-21.23	<0.001	-21.70	<0.001
	SFI	-33.88	<0.001	-34.18	<0.001	-36.10	<0.001	-31.82	<0.001
Age									
	<19 years	Ref	-	Ref	-	Ref	-	Ref	-
	>19 years	-7.99	<0.001	-8.38	<0.001	-8.18	0.005	-6.70	0.010
Sex									
	Males	Ref	-	Ref	-	Ref	-	Ref	-
	Females	-2.83	0.044	-1.96	0.351	-6.19	0.025	-1.19	0.641
Marital status									
	Not with a partner	Ref	-	Ref	-	Ref	-	Ref	-
	With a partner	-0.60	0.760	2.59	0.454	0.25	0.953	-2.93	0.299
Residence									
	Rural	Ref	-	Ref	-	Ref	-	Ref	-
	Urban	-1.49	0.332	-0.76	0.747	-1.43	0.609	-3.07	0.281
Educational level									
	Elementary or less	Ref	-	Ref	-	Ref	-	Ref	-
	Secondary	4.15	0.020	0.58	0.838	2.67	0.499	8.28	0.002

Tertiary								
	1.64	0.613	1.85	0.706	2.79	0.630	-9.46	0.166
Employment status								
Employed	Ref	-	Ref	-	Ref	-	Ref	-
Unemployed	-8.73	<0.001	-3.82	0.317	-19.05	<0.001	-5.92	0.117
Out of the workforce	4.65	0.006	8.05	0.003	8.48	0.010	-1.60	0.574
HH income per year								
Poorest 20%	Ref	-	Ref	-	Ref	-	Ref	-
Second 20%	1.78	0.410	-1.11	0.750	2.42	0.578	6.04	0.087
Middle 20%	6.75	0.002	5.25	0.136	8.70	0.039	7.60	0.073
Fourth 20%	7.14	0.001	5.53	0.119	7.47	0.086	12.00	0.001
Richest 20%	8.52	<0.001	3.58	0.352	12.70	0.008	15.31	<0.001
Model R-squared	0.1904		0.0986		0.1326		0.2626	

F. Figure

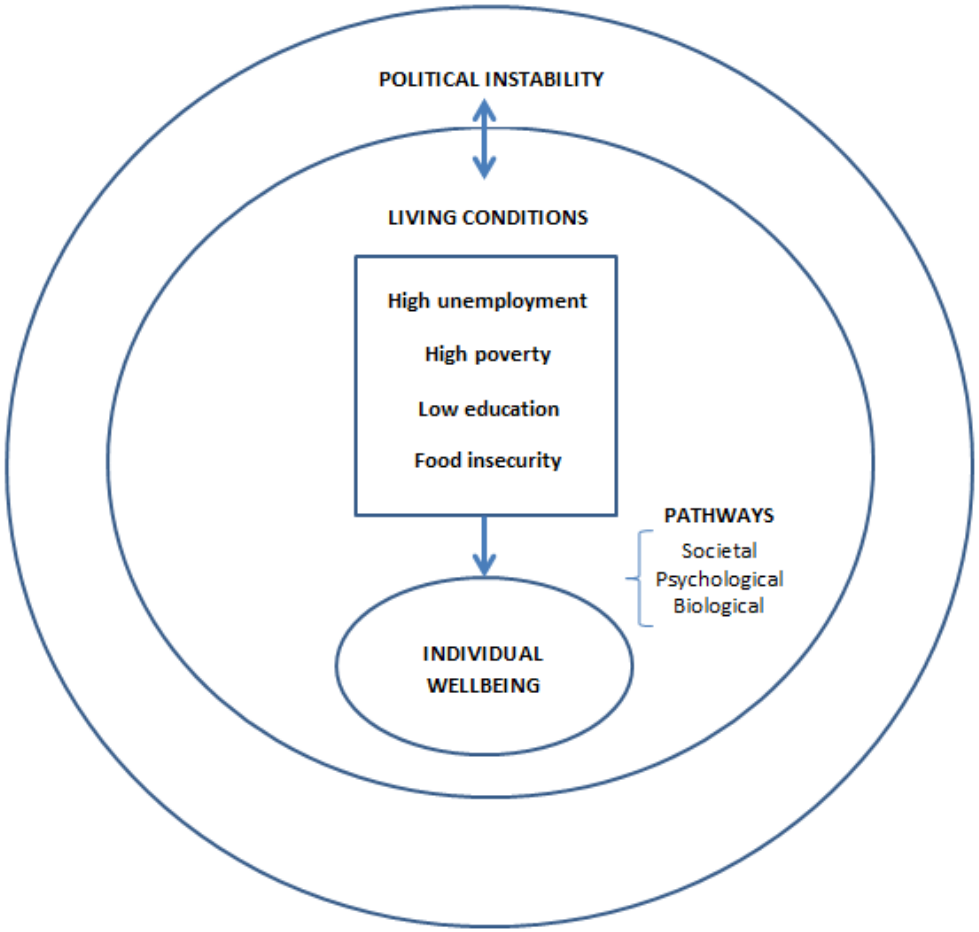

Figure 1. Conceptual model for associations of living conditions with individual wellbeing in a context of political instability (adapted from Frongillo et al (13) and Breisinger et al (2))

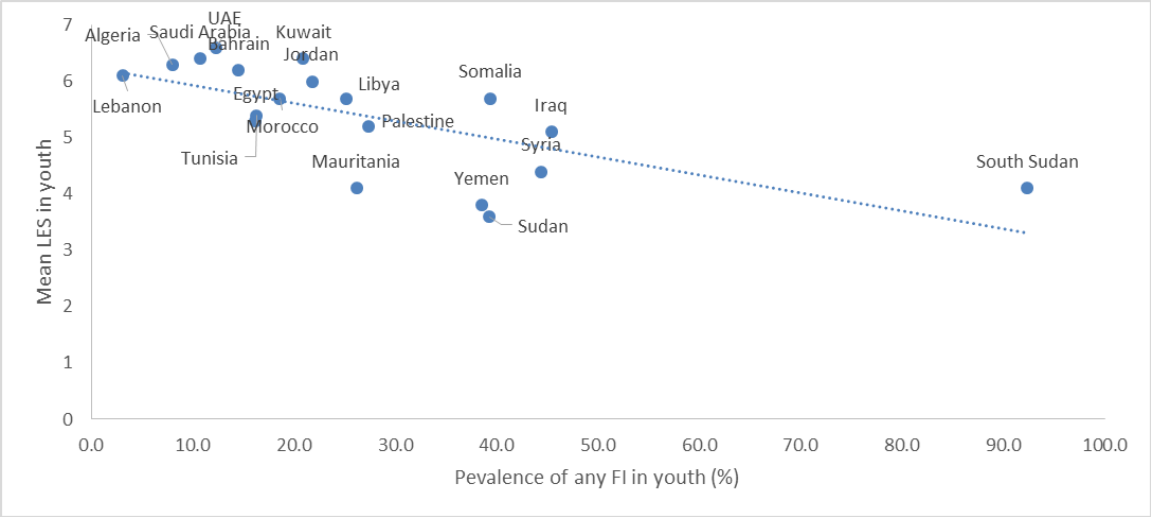

Figure 2.a Mean life evaluation score (LES) by prevalence of food insecurity (FI)

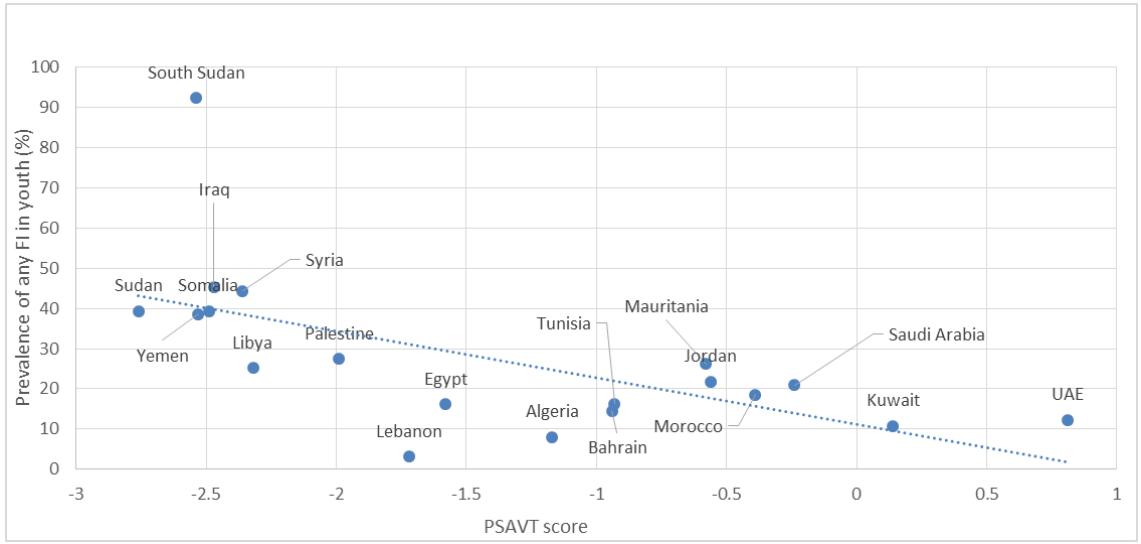

Figure 02.b Prevalence of food insecurity (FI) in youth by political stability (PSAVT) score

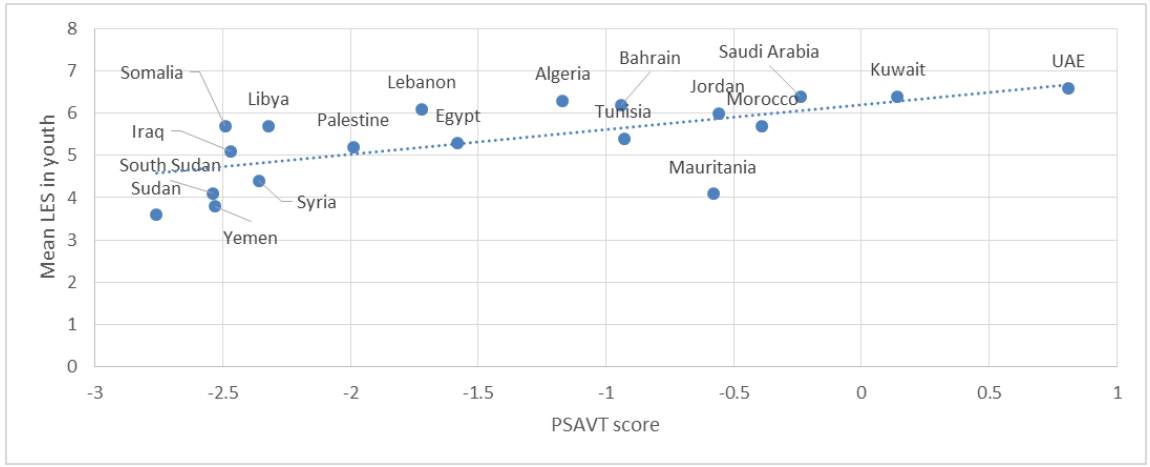

Figure 2.c Mean life evaluation score (LES) by political stability (PSAVT) score

H. Online-Only Supplementary Material

Appendix 1: Characteristics of youth in weighted country samples

Variable	Algeria	Bahrain	Egypt	Iraq	Jordan	Kuwait	Lebanon	Libya	Mauritania	Morocco
Food security status										
Food secure (%)	92.0	85.5	83.8	54.6	78.2	89.2	96.9	74.8	73.8	81.4
Moderately FI (%)	7.4	10.1	8.7	21.5	14.2	6.0	2.8	15.6	16.3	16.3
Severely FI (%)	0.7	4.4	7.5	23.9	7.6	4.8	0.3	9.6	9.9	2.3
Socio-demographic characteristics										
Age (median; [IQR]) (years)	20.6 [18,23]	20.3 [18,23]	19.0 [17,21]	20.6 [19,23]	19.1 [17,21]	19.6 [17,22]	19.7 [18,22]	20.7 [19,23]	19.1 [17,21]	19.5 [17,22]
Sex (%)										
Male	47.5	48.6	54.7	52.2	62.4	55.0	50.6	53.1	49.9	50.5
Female	52.6	51.4	45.3	47.8	37.6	45.0	49.4	46.9	50.1	49.5
Marital status (%)										
Not with a partner	88.6	81.5	83.3	58.1	92.7	84.8	94.9	82.0	88.4	85.6
With a partner	11.4	18.5	16.7	41.9	7.3	15.2	5.1	18.0	11.6	14.4
HH size (median; [IQR])	5.7	6.4	5.2	8.5	6.6	6.7	5 [4,6]	7.8	8.8	6.0

(Individuals)	[4,7]	[4,8]	[4,6]	[5,10]	[5,8]	[4,8]		[5,9]	[7,10]	[4,7]
Residence (%)										
Rural	17.0	47.7	64.0	41.8	29.5	13.9	39.9	23.0	73.8	61.1
Urban	83.0	52.3	36.0	58.2	70.5	86.1	60.2	77.0	26.3	39.0
Socio-economic characteristics										
Educational level (%)										
Elementary or less	56.6	5.0	26.4	56.2	11.7	3.7	17.6	4.5	54.0	54.9
Secondary	42.5	79.0	68.8	39.3	82.4	83.6	72.2	81.1	45.8	40.5
Tertiary	0.9	16.1	4.8	4.5	5.9	12.7	10.3	14.4	0.2	4.7
Employment status (%)										
Employed	23.2	N/A	25.6	43.3	26.4	N/A	43.0	55.0	18.1	17.3
Unemployed	16.8		6.7	13.9	14.8		7.7	12.0	10.5	12.4
Out of the workforce	60.0		67.6	42.8	58.8		49.3	33.0	71.4	70.3
Wellbeing and perception characteristics										
Life evaluation score (mean; SD)	6.3; 1.7	6.2; 2.1	5.3; 2.3	5.1; 3.2	6.0; 2.4	6.4; 2.2	6.1; 2.0	5.7; 2.5	4.1; 1.7	5.7; 2.0

Variable	Palestine	Saudi Arabia	Somalia	South Sudan	Syria	Sudan	Tunisia	UAE	Yemen
Negative Experience Index (%)									
0	51.8	33.7	42.7	14.6	48.2	39.2	59.1	21.9	56.9	52.5
20	23.8	23.2	23.7	13.7	20.8	19.1	16.1	30.5	16.2	17.2
40	10.4	16.5	11.1	11.8	10.8	17.2	11.2	20.5	15.0	12.5
60	10.5	13.8	9.9	21.8	7.3	12.9	7.3	8.7	7.5	6.5
80	1.1	8.1	4.2	17.4	6.8	8.5	4.4	11.6	3.1	5.7
100	2.4	4.8	8.4	20.8	6.0	3.2	2.0	6.7	1.3	5.6
Positive Experience Index (%)									
0	5.5	1.5	3.7	7.6	2.6	1.2	2.2	0.2	0.8	1.8
20	7.5	7.5	8.6	16.0	8.0	5.1	10.7	9.3	3.2	8.0
40	15.8	14.9	14.1	16.6	6.8	8.9	10.4	14.0	11.9	11.8
60	14.5	15.2	17.8	20.8	17.0	12.8	16.3	23.4	15.0	15.2
80	23.6	27.4	28.3	20.1	23.9	31.2	18.8	29.7	21.7	23.1
100	33.2	33.6	27.6	18.9	41.7	40.8	41.6	23.3	47.4	40.1

Food security status									
Food secure (%)	72.6	79.1	60.6	7.6	55.6	60.7	83.7	87.7	61.4
Moderately FI (%)	21.3	13.1	14.0	15.2	32.2	24.4	7.1	6.1	31.4
Severely FI (%)	6.1	7.7	25.4	77.3	12.3	14.9	9.3	6.1	7.2
Socio-demographic characteristics									
Age (median; [IQR]) (years)	18.9 [17,21]	19.9 [18,22]	18.9 [17,21]	19 [17,21]	19.3 [17,22]	20.0 [18,22]	20.3 [18,23]	20.2 [18,23]	19.1 [17,21]
Sex (%)									
Male	59.7	55.8	52.0	48.3	47.8	51.3	47.0	60.8	47.2
Female	40.3	44.3	48.0	51.7	52.2	48.7	53.0	39.2	52.8
Marital status (%)									
Not with a partner	89.0	84.0	74.0	64.6	59.2	80.0	94.0	89.8	74.4
With a partner	11.0	16.0	26.0	35.4	40.8	20.0	6.0	10.2	25.7
HH size (median; [IQR]) (Individuals)	7.4 [6,9]	6.9 [4,8]	7.5 [6,9]	7.5 [5,10]	8.1 [5,10]	6.3 [4,8]	5.9 [5,7]	5.5 [3,7]	9.7 [6,12]
Residence (%)									

Rural	31.0	16.4	55.2	90.7	69.2	53.6	31.9	22.6	79.9
Urban	69.0	83.6	44.8	9.3	30.8	46.4	68.1	77.4	20.1
Socio-economic characteristics									
Educational level (%)									
Elementary or less	10.8	9.7	76.9	86.7	67.5	47.1	27.8	3.7	56.8
Secondary	87.0	82.7	21.5	13.4	31.5	40.8	69.5	70.2	42.7
Tertiary	2.2	7.6	1.6	0.0	1.0	12.2	2.6	26.1	0.6
Employment status (%)									
Employed	21.2	46.5	30.2	53.9	24.3	29.0	24.0	43.1	22.0
Unemployed	13.4	12.9	22.9	8.0	8.0	12.6	16.9	11.8	15.3
Out of the workforce	65.4	40.6	46.9	38.1	67.8	58.5	59.0	45.2	62.8
Wellbeing and perception characteristics									
Life evaluation score (mean; SD)	5.2; 2.4	6.4; 2.3	5.7; 2.1	4.1; 3.1	3.6; 2.9	4.4; 2.7	5.4; 1.9	6.6; 2.1	3.8; 2.3
Negative Experience Index (%)									
0	36.8	37.2	53.1	20.5	7.6	38.6	42.0	33.8	47.5

20	20.0	20.5	16.1	16.6	18.1	13.4	21.3	20.3	20.6
40	17.7	15.1	9.3	23.5	30.1	15.9	17.6	19.5	13.7
60	11.3	13.5	6.0	16.1	30.0	12.3	10.3	12.3	8.4
80	7.9	8.1	4.3	12.7	11.6	8.1	5.5	9.4	6.9
100	6.5	5.5	1.3	10.6	2.5	11.7	3.3	4.6	3.0
Positive Experience Index (%)									
0	3.5	3.0	2.8	8.9	14.3	26.8	7.1	1.6	6.4
20	11.3	6.8	4.4	11.1	29.1	20.9	11.9	3.5	13.8
40	16.5	12.8	6.0	16.3	34.5	10.8	11.8	7.2	13.4
60	15.0	16.2	15.5	18.9	15.8	13.6	17.2	15.7	16.3
80	25.1	30.1	39.6	22.6	5.5	15.7	26.3	31.1	24.1
100	28.5	31.1	31.7	22.3	0.9	12.3	25.8	40.8	25.9

Appendix 2: Results from bivariate analyses

Bivariate regression analyses of life evaluation score on FI, socio-demographic and socio-economic characteristics, overall and by political stability groups

Variables	**Overall (N=8,166)**			**High political stability (N=3,190)**			**Medium political stability (N=2,247)**			**Low political stability (N=2,729)**		
	β*	95% CI	p-value	β	95% CI	p-value	β	95% CI	p-value	β	95% CI	p-value
FI status												
Food secure	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Moderately FI	-1.22	-1.40; -1.04	<0.001	-1.09	-1.37; -0.81	<0.001	-1.56	-1.92; -1.21	<0.001	-0.48	-0.82; -0.15	0.005
Severely FI	-1.68	-1.91; -1.45	<0.001	-1.73	-2.14; -1.32	<0.001	-1.38	-2.08; -0.69	<0.001	-0.87	-1.21; -0.53	<0.001
Age												

<19 years	Ref*	-	-	Ref	-	-	Ref	-	-	Ref	-	-
>19 years	-0.25	-0.38; -0.11	<0.001	-0.33	-0.53; -0.14	0.001	-0.22	-0.45; 0.001	0.001	-0.10	-0.38; 0.17	0.462
Sex												
Males	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Females	0.28	0.14; 0.41	<0.001	0.21	0.02; 0.4	0.033	0.60	0.38; 0.83	<0.001	0.21	-0.07; 0.49	0.135
Marital status												
Not with a partner	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
With a partner	-0.39	-0.58; -0.20	<0.001	-0.14	-0.45; 0.16	0.359	0.09	-0.25; 0.42	0.615	0.00	-0.31; 0.32	0.978
Total HH size**												
1 ind.	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
2 to 4 ind.	-0.13	-0.76; 0.49	0.680	-0.02	-0.76; 0.73	0.961	1.22	-0.04; 2.48	0.059	0.04	-1.51; 1.58	0.964
5 to 6 ind.	-0.09	-0.71; 0.53	0.774	-0.01	-0.74; 0.72	0.979	1.20	-0.06; 2.46	0.061	0.04	-1.50; 1.57	0.963

≥7 ind.	-0.74	-1.36; -0.12	0.019	-0.61	-1.34; 0.11	0.098	0.71	-0.55; 1.97	0.271	-0.14	-1.65; 1.38	0.860
Residence												
Rural	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Urban	0.85	0.71; 0.98	<0.001	0.95	0.75; 1.14	<0.001	0.09	-0.14; 0.33	0.430	0.57	0.27; 0.86	<0.001
Educational level												
Elementary or less	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Secondary	1.00	0.85; 1.16	<0.001	1.08	0.85; 1.31	<0.001	0.23	-0.10; 0.57	0.176	0.34	0.07; 0.61	0.013
Tertiary	1.39	1.14; 1.65	<0.001	1.54	1.16; 1.91	<0.001	0.38	-0.07; 0.82	0.095	0.61	-0.01; 1.23	0.053
Employment status												
Employed	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Unemployed	-0.38	-0.61; -0.14	0.002	-0.41	-0.75; -0.07	0.018	-0.95	-1.42; -0.48	<0.001	-0.02	-0.44; 0.41	0.931
Out of the workforce	0.24	0.08; 0.40	0.003	0.21	-0.03; 0.44	0.078	0.38	0.11; 0.65	0.006	-0.14	-0.44; 0.17	0.380

HH income per year												
Poorest 20%	Ref	-	-	Ref	-	-	Ref	-	-	Ref	-	-
Second 20%	0.39	0.17; 0.61	0.001	0.51	0.19; 0.83	0.002	0.35	-0.02; 0.72	0.067	0.13	-0.33; 0.59	0.576
Middle 20%	0.59	0.38; 0.81	<0.001	0.61	0.30; 0.93	<0.001	0.69	0.32; 1.06	<0.001	0.35	-0.08; 0.78	0.107
Fourth 20%	0.93	0.72; 1.14	<0.001	0.93	0.64; 1.22	<0.001	1.11	0.75; 1.47	<0.001	0.55	0.11; 0.98	0.014
Richest 20%	1.39	1.19; 1.60	<0.001	1.65	1.37; 1.93	<0.001	1.28	0.92; 1.64	<0.001	0.93	0.51; 1.35	<0.001

**β: Regression coefficient, Ref: Reference group*

***1 ind: single-person HH; 2 to 4 ind: HH of 2 to 4 individuals; 5 to 6 ind: HH of 5 to 6 individuals; ≥7 ind: HH of 7 or more individuals*