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Sense of coherence in Crete and Sweden: key findings and messages from a comparative study

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Introduction

Following the publication of the Seven Countries Study (1), nutritional habits and life style characteristics of the Mediterranean population have attracted increasing interest from a public health perspective. The study demonstrated a particularly low incidence of coronary heart disease (CHD) among males from Southern Europe, with Cretans presenting the lowest morbidity and mortality rates. This finding has been attributed to the Mediterranean diet, ever since (2). Adherence to a diet rich in dietary fibre and monounsaturated fats is associated in the literature with reduced rates of all-cause mortality and positive health effects even among individuals diagnosed with coronary heart diseases and cancers (3, 4).

A research project in primary health care was established in 1988, in the rural area of Spili in Crete, aiming to monitor the health status of the population. The project, mainly targeting cardiovascular disease, has been active over the last 20 years. Originally considered to represent a cardiovascular “low risk” population, Spili surprisingly demonstrated a rather unfavourable risk factor profile with a high prevalence of smoking, alcohol intake and a relatively high prevalence of hypertension, diabetes, obesity and hypercholesterolemia (5). However, CHD prevalence remains impressively low in the area. Aiming to interpret our findings, we formulated a hypothesis stating that other determinants, namely the closely knit social network and social coherence of the local community, may also be cardio protective (5,6).

The concept of “sense of coherence” (SOC) was introduced in 1987 from Aaron Antonovsky to describe a dispositional orientation, “a way of seeing the world”, which is presumed to enhance health (7). Instead of trying to discover why people fall ill, he focused on what keeps them healthy. According to his theory there

are three components within the construct, namely comprehensibility, manageability and meaningfulness, possessing health-promoting effects. Evaluation of SOC is achieved through a guided 29-item (13-item for the short version, respectively mentioned as SOC-29 and SOC-13 in the literature) questionnaire that has proved applicable across cultures and has been successfully translated, validated and used in more than 30 languages and countries today (8). Higher SOC scores have been associated with reduced risks for overall mortality and cardiovascular disease (9).

Given the above knowledge and the interest that the Cretan population presents, we decided to investigate SOC in a well defined rural population and compare it to a reference population from northern Europe. This study reports on the results of the first implementation of SOC in rural Crete and discusses the findings, with a view to the potential impact on primary care delivery in rural Crete.

Materials and methods

This study forms part of a follow-up project initially established in 1988 in the rural area of Spili, in Crete. Population characteristics and the scope of the initial study are described elsewhere (5). During the re-evaluation we aimed to examine all participants of the initial study still living in the area (n=248). Data were obtained from n=200 subjects (91 males and 109 females) aged 28-92 years old, resulting in a second phase participation rate of 80.7%. The SOC scales (both the SOC-29 and SOC-13 forms) were recorded for n=175 (87.1%) of the participants. The Greek version of SOC was used (10). Cretan data were compared to those of a Swedish regional population that were available from a cross-sectional survey covering the 45-69-year-old age group. Aiming to match the two populations in terms of age and sex we identified the corresponding age group from Spili and found 78 Cretans (28 males

and 50 females) to be eligible. Each participant from Spili was randomly, in terms of age and sex, matched with two individuals from the Swedish database creating a Swedish reference group of n=156 subjects (56 males and 100 females). The short form SOC-13 was available in the Swedish cohort and our comparative study used SOC-13 data.

All data were statistically analysed using the SPSS 13.0 programme (SPSS Inc., Chicago, IL, USA). Significance of mean differences in SOC was estimated using 95 % CI and the 2-sided ANOVA-test. A P value less than 0.05 was considered as statistically significant. The study was approved by both the Research Ethics Committee of the University Hospital of Heraklion, Crete, Greece as well as the Research Ethics Committee at Linköping University, Sweden.

Results

The mean values of the sense of coherence measurements (SOC-29 and SOC-13), as well as the 95% confidence intervals, for the Spili group are presented in Table 1. Table 1 presents cumulative statistics for the whole population examined in the period 2000-2001. Comparing the SOC scores among males and females, there is a statistically significant difference ($p < 0.0001$), with men reporting a higher sense of coherence than women, regardless of the form of the questionnaire used (SOC-29 or SOC-13).

The mean age and the standard deviation (SD) for both the Cretan and Swedish group was 57.9 ± 7.6 years, constituting of 35.9% males and 64.1% females. Table 2 presents a comparison of the SOC-13 scores recorded in the Cretan and the Swedish population respectively. It should be noticed that only data referring to the 45-69 years old age group were recorded in this table. Cretan women seem to score

significantly lower than their Swedish counterparts ($p < 0.0001$), while Cretan men tend to report a higher SOC compared to their matched Swedish reference population ($p = 0.07$).

No statistical differences in the SOC scores recorded were observed for the Swedish reference population, among males and females (data not shown in tables).

Discussion

The low incidence of CHD among Cretan residents, compared to their Northern European counterparts has guided the implementation of the current study to highlight the issue of SOC as a possible contributory factor. Independently, although the results of this study remain inconclusive in terms of a potential association between SOC and CAD, the study presents certain findings which could be of value to wider readership. Of particular interest, is the fact that Cretan women obtained lower SOC scores than Swedish women, which is an issue worthy of further investigation. It is possible that a larger sample size may have provided different results, or that there might be other contributory factors which could explain this difference. However, it is probable that differences between Sweden and Greece cannot be explained by the obvious socioeconomic differences between the two European populations, since there is evidence that people from various cultures may attain similar levels of Sense of Coherence (11).

A further interesting finding was revealed in terms of significant differences in the recorded SOC scores among men and women of this particular rural area in Crete. Gender differences in SOC scores, with males demonstrating a higher SOC have been reported in the literature before, although the gender effect seems to be small in most

of the studies (8). No such differences were observed for the Swedish reference population and this is in accordance with other reports from northern Europe (12). Therefore, the striking gender difference in SOC scores recorded in Cretans, raises an issue for further discussion. Over recent years, Cretan women have become more actively involved in employment while retaining the demanding role of raising children and taking care of the household. The combination of a modern, western, post-industrial life style along with expectations of preserving Cretan culture and traditions may be reflected in the low SOC scores reported by this particular group. SOC may be further depleted by the inadequate supportive network in Greece (lack of day care centres, insufficient legislation for employed mothers). An earlier study by Pallant et al (13), identified no gender differences for SOC-13 scores, within the population studied. However, differences between men and women were recorded with respect to the strength of relationships between SOC and other measures. As such, gender differences may be explainable on the basis of differences in physical and psychological health, personality and dispositional coping (13). Furthermore, the current study represents a follow-up to a project established in 1988 wherein Cretan women were identified as having higher BMI, more hypertension, and a greater prevalence of diabetes, although their smoking habits and alcohol consumption was lower than in Cretan men. Therefore, various factors may have contributed to a lower SOC in Cretan women, and a higher SOC in Cretan men, which is worthy of further research.

The low SOC scores recorded for Cretan women, also raises concerns with regard to the issue of a potential increase of psychiatric morbidity in the area, leading to a high impact on primary care services, which implies changes to the local health care system and in the professional continuous training of local general practitioners.

Although the ability of SOC to drive an individual towards the health end of a health/disease continuum is not well documented, its effect on psychiatric morbidity is more efficiently supported (14, 15).

SOC has been extensively used in research, mainly in Northern and Western European countries, and its predictive validity is well discussed. In a study by Eriksson and Lundin (16), a stronger SOC was associated with a reduced risk of developing post-traumatic stress symptoms in survivors of a major disaster. It has also predicted a better outcome following major surgical procedures such as those performed in patients with morbid obesity (17) or multiple orthopaedic injuries (18). The validity of SOC has been documented among drug-users identifying the need for additional life-saving psychological support (19). Moreover, a large scale study performed in the UK, which followed general practice patients for a period of 6 years, revealed that a strong SOC was associated with a 30% reduction in mortality from all causes, cardiovascular disease and cancer, independent of age, sex and prevalent chronic disease (9).

The current descriptive study cannot determine the extent to which SOC may be a predicting factor in the low prevalence of CHD amongst Cretan males, an issue that has been raised in previous reports (5,6). Therefore, explanations for the low incidence of CHD in Cretan males remains unclear, and is possibly due to the interaction of a number of contributory factors including the Mediterranean diet, sense of coherence, the close knit community and other psychosocial and physical factors. Genetic predisposition cannot be excluded and there is evidence that it can have converging effects with other established exposures (20). The involvement of a larger population sample where genetic predisposition, psychological and biological factors

could be studied together may be beneficial to the further exploration of SOC findings in relation to coronary artery disease in rural populations.

In conclusion, although this study is inconclusive concerning the relationship of SOC to the prevalence of CHD, the higher scores achieved by Cretan men indicate that this issue is worthy of further research. Future investigation into the health impact of SOC, together with exploration of various cultural/traditional factors not covered by this measure could be of value to primary care physicians located in rural Crete. Furthermore, the study introduced certain issues worthy of future research, with regard to the low SOC scores achieved by Cretan women. This latter finding could have implications for primary care settings, in terms of addressing well-being and psychosocial issues in women living in rural Crete. Issues concerning the extent to which health assets such as high sense of coherence, tight social networks and social coherence in the local community could be preserved, even in rural societies undergoing social changes, could be explored in well designed inferential studies.

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Table 1: SOC scores (mean values and 95% confidence intervals) for males and females in the village of Spili in Crete

	SOC-29	SOC-13
	(mean, 95% CI)	(mean, 95% CI)
Total (n=175)	140.5	63.2
Males (n=78)	150.1 (145.5-154.7)	68.4 (65.8-71.0)
Females (n=97)	132.7 (128.6-136.8)	59.0 (56.8-61.1)
p-value	<0.0001	<0.0001

SOC: Sense of coherence, CI: confidence intervals

Table 2: Comparison table of SOC-13 scores (mean values and 95% confidence intervals) for two matched, in terms of age and sex, populations in Spili – Crete and Sweden

	SOC-13		
	mean score	95% CI	p-value
Spili (total, n=78)	61.5	58.5-64.5	0.001
Sweden (total, n=156)	67.5	65.6-69.4	
Spili males (n=28)	71.0	66.0-76.0	0.07
Sweden males (n=56)	66.1	63.1-69.0	
Spili females (n=50)	56.2	53.3-59.1	<0.0001
Sweden females (n=100)	68.3	65.9-70.8	

SOC: Sense of coherence, CI: confidence intervals