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Similarities between Antonovsky's Sense of Coherence and Adherence to Health-Related Recommendations

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Abstract

Purpose: Adherence to health-related recommendations and Antonovsky's "sense of coherence" (SOC) have both been shown to be salutary. The objective of the study is to identify correlates of adherence to COVID -19 vaccinations and compare these correlates with those reported for SOC.

Methodology: Patient population: all acutely admitted adults in the medical departments of a 400-bed Israeli hospital after exclusion of those with COVID -19. Data sources: Electronic hospital database with updated vaccination data for COVID -19 from the Ministry of Health. Dependent variable: vaccination status. Independent variables: Demographics, laboratory test results, and the Norton Scale (physical and mental status, activity, mobility, and incontinence).

Findings: Younger age, female gender, decreased hemoglobin and albumin, and frailty of patients were associated with no vaccination.

Recommendations: Correlates of adherence to COVID-19 vaccination are similar to those of SOC. Adherence to health recommendations may be a marker for SOC.

Keywords: *Salutogenesis, Sense of Coherence, COVID-19 Vaccination, Mortality, Efficacy of Vaccine, Healthy Adherer Effect, Retrospective Cohort Studies.*

1.0 INTRODUCTION

In 1987, Aaron Antonovsky argued that medicine should not ask why patients are sick, but why people remain healthy despite numerous environmental and hereditary threats to their health. He coined the term "salutogenesis" for the ability to cope with stressors and claimed that this ability is the individual's sense of coherence (SOC), which can be measured by a self-administered Orientation to Life Questionnaire. Since then, the SOC scale has been used in a large number of studies. Evidence suggests that SOC predicts disease progression and all-cause mortality in patients with breast cancer (Lindblad *et al,* 2018), self-rated improvement after anterior low-back fusion for painful low-back conditions (Santavirta *et al,* 1996) and subjective state of health (Suominen *et al,* 2001). However, salutogenesis has received little attention in practice, probably because SOC is difficult to test (Bauer *et al,* 2020).

Therefore, an effort has been made to find similarities between SOC and other health concepts, such as self-efficacy (Posadzki & Glass 2009). Another health concept is the "healthy adherer effect" (HAE). The HAE refers to the finding that adherence to placebos as well as drug treatment is associated with intended health outcomes such as lower mortality. In other words, HAE is a bias that causes health outcomes to be falsely attributed to drug therapy and that adherence to medical recommendations can be a salutary factor in itself. HAE was first reported in 1980 (Coronary Drug Project Research Group1980), and a 2006 meta-analysis confirmed that placebo adherence was responsible for about half of the reduction in mortality in randomized trials (Simpson *et al* 2006). More recently, influenza vaccination has been found to reduce mortality both during influenza and in the preinfluenza period (Jackson *et al*, 2006), and COVID-19 vaccination reduced non- COVID-19 in- hospital mortality rates (Benbassat *et al*, 2022). These results suggest that adherence to health-related recommendations is salutogenic, similar to SOC. In this work, we report that the correlates of adherence to COVID-19 immunizations are similar to those reported for SOC and suggest that adherence to health recommendations may be a marker of SOC.

2.0 METHODOLOGY

Patient population: We used data from a cohort of adults who were acutely admitted between January and October 2021 to internal medicine departments of Laniado Hospital, a 400-bed regional Israeli hospital. Those admitted to intensive care or cardiology were not included. Of these tadmitted to internal medicine departments, we excluded 315 patients with missing data for the Norton scale and 96 who were admitted for COVID -19 (mostly delta). Of the remaining 5369, 61.8% (n=3316) had been vaccinated before hospitalization.

Sources of Data: Data were obtained from the hospital's electronic database that included updated vaccination information from the Ministry of Health. COVID-19 was diagnosed by antigen testing (rapid microfluidic immunofluorescence SARS-CoV-2 Ag assay, Lumira Dx, Alloa, UK) and PCR testing (Xpert® Xpress SARS-CoV-2; Allplex™ 2019-nCoV Assay, Seegene Inc, Seoul, Republic of Korea).

Variables: The dependent variable was vaccination status; the independent variables were those listed in Table 1. The Norton Scale is a marker of patient frailty that includes five domains: physical condition, mental condition, activity, mobility, and incontinence (Norton 1962). The scale has been shown to be associated with mortality in hospitalized patients (Natanzon *et al* 2020; Leshem- Rubinow *et al* 2013).

Analyses: Odds ratios were determined by univariate logistic regression analyzes. Ethical approval: The local hospital ethics committee (0034-20-LND) approved the study without informed patient consent. All decisions of the local ethics committee are reviewed and approved by the Israeli Ministry of Health.

3.0 FINDINGS

Younger age, female gender, decreased hemoglobin and albumin, permanent urinary catheter, and poor scores in mobility, incontinence, physical condition, mental status, and activity were associated with nonvaccination (Table 1). Similar to these findings, SOC has been reported to increase with age across the lifespan (Eriksson *et al* 2005) and in men (Anson et al 1993) and to decrease in patients with Parkinson disease (Pusswald *et al* 2012) and disease in general (Nilsson et al 2003). Therefore, our results suggest that adherence to health recommendations might be an indicator of SOC.

To date, the only evidence suggesting an association between SOC and adherence to health-related recommendations is the finding that SOC was associated with tobacco use among adolescents (Glanz *et al* 2005). In addition, a 2009 exploratory synthesis of SOC and Bandura's beliefs in one's own efficacy detected mutual themes and similarities between the two concepts: they are both salutogenic, determinants of health behavior and associated with Health Promotion and Disease Prevention (Posadzki and Glass 2009). We hypothesize that SOC, HAE and self-efficacy are related and may represent different facets of the same trait.

The strength of the present study is the use of government registries for assessing adherence; other methods, such as self-report, are less reliable (Lam and Fresco 2015). The limitations of this study are, first, the use of data from a single hospital. Second, there are alternative explanations for some of our findings: Less mobile individuals may have been less likely to participate in vaccination, whereas the higher vaccination rates among older individuals could be due to their possible preferential vaccination.

Nevertheless, these limitations do not invalidate our recommendation for further research on the association between SOC and adherence to health recommendations. It is possible that a response to the question "Do you usually follow your doctor's recommendations?" could improve the validity of the Life Orientation Questionnaire.

Table 1: Scores Assigned to Age and Laboratory Variables in 5369 Hospitalized Adult Patients at a Regional Hospital in Israel and their Association with Nonvaccine Status

	Score				Odds ratio for non-vaccine status
	1	**2**	**3**	**4**	
Age groups(years)	<40	40-59	60-79	≥80	0.84 (0.79-0.89)
Female	No	Yes			1.12 (1.00-1.12)
Hemoglobin (gm/dL	≥12.0	10.0-11.9	<10.0		1.09 (1.01-1.17)
Albumin(gm/dL)	≥ 3.5	3.0-3.4	<3.0		1.47 (1.34-1.61)
Creatinine (mg/dL)	<2	≥ 2			0.84 (0.72-0.99)
Glucose (mg/dL)	<150	150-199	≥200		1.02 (0.95-1.1)
Permanent catheter	No	Yes			1.28 (1.01-1.61)
Mobility	Full	Slightly impaired	Limited	Immobile	1.12 (1.06-1.18)
Incontinence	None	Occasional	Usual urinary	Urinary & fecal	1.08 (1.04-1.13)
Physical condition	Good	Fair	Poor	Very bad	1.40 (1.29-1.53)
Mental condition	Alert	Apathetic	Confused	stuporous	1.16 (1.07-1.26)
Activity	Ambulant	Walks with help	Chair bound	Bedfast	1.11 (1.06-1.16)

Competing Interests:

JB, PF, and ZS declare no competing interests. This study did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors

Authors' Contribution

Drs Froom and Benbassat conceived the study; Drs Shimoni and Froom retrieved and analysed the data, and all of us organized the findings into a scientific assay.

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