

REVIEWS

Salutogenic nursing education: A summative review

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Abstract

Nursing is at a critical point with a global need to increase the number of nurses to provide healthcare. However it is difficult to fulfill that demand because of high attrition rates in nursing school and subsequent attrition in nursing within a few years after graduation. This summative review aims to synthesize salutogenic education research to identify methods suitable to promote retention and maintenance of nursing students in nursing education. Nursing school is inherently stressful often leading to attrition in nursing school. Often those student nurses who graduate are not well equipped to manage stress in the work environment; some leave the nursing profession early in their careers. Thus it is imperative for nursing educators to promote nursing student retention and nursing student wellness so that those students will remain in nursing after graduation.

Thirty-nine studies, were selected from peer-reviewed research published in English since 1979, based on inclusion criteria that sense of cohesion (SOC) is a variable with a nursing student, student or educational focus. Evidence indicates students with high SOC experience greater psychosocial functioning and that SOC is related to social dimensions of the learning environment. In addition, resilience is an important consideration since some students are able to “beat the odds” and develop high SOC and social functioning.

Consensus regarding academic success was not found; however, longitudinal studies suggest students with high SOC have long-term academic and employment success. Gender findings were mixed implying context is an important consideration. Multiple studies support the premise that higher SOC is associated with student perceptions of less stress, better health, wellbeing and better quality of life. There exists a large gap in the body of knowledge related to research of interventions promoting nursing student wellness using SOC. Further research is needed to determine how we teach and whether the integration of salutogenic concepts into nursing education can promote academic success in nursing students.

Key words

Nursing students, Retention, Attrition, Nursing education, Sense of coherence

1 Introduction

The registered nurse workforce had the highest job growth among other occupations^[1]. In the healthcare sector job growth is outpacing replacement and that trend is expected to increase for the next two decades^[2]. The 2011 increase in entry-level Baccalaureate programs is insufficient to meet the growing demand for nursing services predicated by a growing elderly population and the increased need to provide nursing care for millions who will acquire access to

healthcare with Congress' passage of the 2010 Patient Protection and Affordable Care Act^[1]. Therefore it is of paramount importance for nursing schools to investigate measures that will recruit, maintain and retain nursing students who can fill the ranks created by expansion of the registered nurse workforce, replacement of an aging workforce, and attrition of disillusioned nurses who leave the nursing profession early^[2, 3]. Those nursing students who have difficulty coping with multiple factors in nursing school become nurses who are at an increased risk for burnout leading to attrition in the profession^[4-6].

Nursing education is a stressful experience for some students. Recent studies identified both academic and clinical stress for nursing students. The stresses experienced by nursing students include sustainment of long hours of study, fear of failing and the death of a patient. Additional stress occurs in the clinical arena when nursing staff fails to welcome students as well as nursing students being reprimanded, by faculty, nursing staff, or physicians, in front of peers, staff, and patients. In addition to school concerns students have to manage family issues and financial burdens^[4, 5, 7]. Failure to address these issues presents a high cost to individuals and organizations. Therefore is important for nurse educators to explore a preventive model that may contribute to students developing coping skills that may significantly decrease the attrition rate among nursing students and subsequently nurses. Employing an asset-based approach, salutogenesis, emphasizing the "positive attributes of people is one recommendation to address health promotion among nursing students"^[8].

2 Significance

Salutogenesis, coined Antonovsky^[10] is the antithesis of pathogenesis; Antonovsky^[9] explored the healthy reactions of people exposed to stressful events. He defined salutogenesis as the study of how people stay well^[9]. A salient question for educators is to explore which variables in the student-learning environment are salutogenic^[11]. This question bears particular importance for nursing education since "nursing students encounter stressful situations of the kind that nurses do in practice" including patient deaths, conflicts with physicians, inadequate preparation for multiple and complex demands in clinical, lack of support from the faculty or preceptor and heavy work load^[12].

Progressively complex health care environments are by nature unpredictable, yet, they remain the mainstay of clinical learning for nursing students. Often, students learn in the line of fire facing clinical situations without the benefit of prior knowledge acquisition for successful emotion or problem-based coping. This educational method stands in stark contrast to the pedagogical concept of simple to complex learning. Those methods may contribute to nursing student vulnerability; uncertainty, overwhelming stress, and actual or perceived failure when nursing students encounter new and complex patient care situations. This may result in psychological harm and development of mal-adaptive coping, possibly extending into students' professional lives.

Nursing student retention is an issue of worldwide significance^[13-15]. This worldwide nursing shortage will require nursing programs to implement innovative methods to bolster student success through retention rather than relying on traditional methods such as refining admission criteria or dismissing students who may be perceived as not academically competitive as a result of the students' response to stress^[7].

McGregor^[16] highlights the fact that high levels of stress in nursing students have been reported for over thirty years and addresses faculty abuse of nursing students. Themes such as emotional distress, burnout, and nurse turnover rates are enduring themes in nursing literature and may well have origins during nurses' formative years in nursing school.

The significance of salutogenesis in nursing education is reflected in a "lifelong healthy learning concept" coined "healthy learning"^[17]. That conceptual view may usher in a promising direction toward addressing issues facing nursing education through methods of impacting student health, well-being, and achievement. Salutogenesis may also contribute to improving the nursing profession through its future leaders. The aim of this summative review is to synthesize research pertaining to salutogenesis in education and to identify potential implications for future nursing education research.

3 Search strategies

Initial database searches revealed few studies addressing salutogenesis in nursing education; therefore, the population was expanded to include students in general. This decision was made since the development of a sense of coherence (SOC) is inherent to all students and current nursing science cannot demonstrate empirical evidence that SOC sufficiently differs between nursing students and those of other disciplines. The literature search was conducted utilizing CINAHL, PubMed (Medline), PsycInfo, Health Instruments and Psychological Instruments, and Education Resources Information Center (ERIC) search engines from 1979 to 2011 and delimiters. The year 1979 was chosen to coincide with the publication of salutogenesis. Keywords included salutogenesis, sense of coherence, students and education, and nursing students with delimiters being research and peer reviewed articles in English. Keyword combinations yielded 68 articles in CINAHL, 7 in PubMed, 35 in PsycInfo and 4 articles in ERIC. Age was not limited because SOC develops throughout a person's lifetime, sound educational practices may be gleaned from findings influencing student SOC at differing ages and these early influences may have the ability to impact adult SOC. Articles were reviewed for content and a total of 39 articles were reviewed based upon the criteria that sense of coherence was a student variable and the research was student or education focused. During the search process overlap began to occur between databases and articles.

4 Theoretical framework

The name, salutogenesis, is derived from the Latin *salus* meaning health and the Greek *genesis* meaning origin. According to Antonovsky, SOC "is a way of seeing the world which facilitated successful coping with the innumerable, complex stressors confronting us in the course of living" ^[18]. While working with a group of holocaust concentration camp survivors, many of whom had remained healthy despite their traumatic experiences, Antonovsky questioned why some individuals remain healthy when confronted with hardship and extremely difficult life circumstances while others do not. Antonovsky's answer to the salutogenic question was the development of "sense of coherence". He employed a faceted-theoretical design in creating SOC; comprehensibility, manageability and meaningfulness are facets of an inter-related central core reflecting a global orientation toward health. "The components sound familiar to those who know coping literature, for they are close to concepts like optimism, will to live, self efficacy, learned resourcefulness hardiness, etc. "; however, it is "the combination of the cognitive, behavioral and motivational which is unique" ^[19]. Salutogenesis is defined as the "deeply meaningful... ability ...to... survive extremely bad experiences but through them to achieve greater strength, understanding and purpose" ^[20].

Comprehensibility represents the cognitive component of SOC; comprehensibility encompasses a belief that things happen in an orderly manner, a person scoring high on comprehensibility expects encountered stimuli to be predictable, ordered, and explicit rather than random or chaotic. Operationally manageability is defined as reflecting the behavioral component of SOC as well as the degree to which individuals perceive resources are available and adequate to meet demands imposed by a stressor or challenge. Those resources encompass ways to access ways to alleviate stress that is under the individual's own control or controlled by legitimate others, such as educators. Meaningfulness and its operational definition refer to the extent to which a person feels that life makes sense and that problems, challenges or demands are worthy of personal investment, commitment and engagement. Thus these components are viewed by a person with a high SOC as challenges to be met and can be likened to a survivor/achievement versus a victim mentality. Global resistance resources (GRRs) are another important component of salutogenesis. GRRs such as wealth, intelligence, social support or cultural capital are personal resources, that can be accessed or acquired, to be mobilized or acquired by people in addressing life's challenges ^[21] (pp938-939).

Salutogenesis is framed as a continuum from health to disease (pathogenesis) throughout life ^[22]. Suedfeld further explicates salutogenesis as "the ability to come out of a stressful experience with increased psychological strength with which to face future stressors" ^[20]. A "sense of coherence" (SOC) was one of the main structural factors identified in

individuals who managed to sustain a positive outlook in spite of encountering multiple severe life stressors. Subsequent studies lead to development of a model of SOC that includes a positive world view^[5].

In the last fifteen years “the concept of SOC has been well established” in health as well as work psychology^[20]. Multiple studies have tested effects of SOC in work environments as well as among nurses^[22-25].

Coping self-efficacy, i.e. the perception that one can handle specific demands of a situation, is strongly predictive of good outcomes^[26]. Those who evidence lower distress levels also report higher perceived control, self-esteem, trait hopefulness, future orientation, optimism and hardiness^[27]. In past studies, task coping (problem oriented) styles have been found to positively impact adaptation and health while emotional oriented coping negatively impacts adaptation and health^[27].

Recent research efforts have shifted to evaluating the ability to bounce back or recover from stress, developing measures to evaluate coping with stressors^[28]. The prevalence of positive outcomes and return to healthy function has been associated with individual characteristics (e.g., personality hardiness and resilience), socio-economic factors that buffer the impact of loss, community factors that provide for social support, prior experience as well as recovery support that provides for relief from the impact of stress. Holt and Rehg^[28] argue that the majority of turnover in nursing is related to either a response to a shock event, image violation, a misalignment of individual and organizational goals and values, or job dissatisfaction.

Family relationships are a dynamic component of the work-family relationship.³⁰ It is important to examine the impact of family on nursing student's satisfaction^[30]. The impact of family and the relationship of SOC in managing stress have been identified in multiple studies, underscoring Antonovsky's premise that family is a strong component of SOC^[31, 32].

There is very little research that addresses healthy coping measures employed by student nurses with their education and personal lives. Therefore it is of paramount importance for nurse educators and others to begin investigating how students cope with stress and what early interventions are effective in promoting healthy coping among nursing students.

5 Summary of research

Review of research revealed a wide variety of variables that were examined in relation to nursing student and student SOC. Thus, research question variables were systematically coded, organized by larger emerging themes for summarizing various study results and are presented in Table 1.

Table 1. Salutogenesis Summative Review Table

Author/s	Research Question	Population Sample (Size, Type) Design & Method	Data Collection/ Instruments	Analysis
Adams, T., et. al. (2000) ^[47]	What is the relationship between spiritual, psychological dimensions (SOC) of wellness and perceived wellness in a college student population?	SEM N=112 students at the University of Texas (Austin) 91 females (81%); 21 males (19%); Age range 16 - 58 years.	SOC-13 Chronbach's alpha 0.85. Life Purpose subscale from the Life attitude Profile Chronbach's alpha .87. Life orientation Chronbach's alpha .82. Perceived Wellness Survey Chronbach's alpha .91.	All values for goodness of fit exceeded .95 on the proposed model; chi square value for the alternate model does not fit the data; p=.000 Optimism and SOC influence well-being.
Berger, R., Sarid, O., Hurvitz, N. & Anson, O. (2009) ^[48]	What is the effect of an academic course on sense of coherence (SOC) and transitory mood states?	SEM Longitudinal pre-post- test descriptive correlation N= 80 second-year pharmacology students; 81% women; Age range: 20- 28 years	The Sense of Coherence Scale: Hebrew version. Cronbach's alpha was between .82 and .82 The Perceived Stress Scale translated for Hebrew by Drory (1989). Chronbach's alpha ranged between. 82 (T1, both groups) and .73 (T2 control group). The Profile of Mood States). Hebrew version validated by Hoffman, Bar-Eli, and Tenenbaum (1999). Administered times three times	None of the models satisfactorily fit the data.

(Table 1 continued on page 93)

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Author/s	Research Question	Population Sample (Size, Type) Design & Method	Data Collection/ Instruments	Analysis
Adams, T., et, al. (2000) ^[47]	What is the relationship between spiritual, psychological dimensions (SOC) of wellness and perceived wellness in a college student population?	SEM N=112 students at the University of Texas (Austin) 91 females (81%); 21 males (19%); Age range 16 - 58 years.	SOC-13 Chronbach's alpha 0.85. Life Purpose subscale from the Life attitude Profile Chronbach's alpha .87. Life orientation Chronbach's alpha .82. Perceived Wellness Survey Chronbach's alpha .91.	All values for goodness of fit exceeded .95 on the proposed model; chi square value for the alternate model does not fit the data; $p=.000$ Optimism and SOC influence well-being.
Berger, R., Sarid, O., Hurvitz, N. & Anson, O. (2009) ^[48]	What is the effect of an academic course on sense of coherence (SOC) and transitory mood states?	SEM Longitudinal pre-post- test descriptive correlation N= 80 second-year pharmacology students; 81% women; Age range: 20- 28 years	The Sense of Coherence Scale: Hebrew version. Cronbach's alpha was between .82 and .82 The Perceived Stress Scale translated for Hebrew by Drory (1989). Chronbach's alpha ranged between. 82 (T1, both groups) and .73 (T2 control group). The Profile of Mood States). Hebrew version validated by Hoffman, Bar-Eli, and Tenenbaum (1999). Administered times three times	None of the models satisfactorily fit the data.
Carmel, S. & Bernstein, J. (1990) ^[53]	Will positive linear correlations occur between perception of stressors and trait anxiety and negative linear correlations occur between perception of stressors and sense of coherence?	Descriptive correlation 131 medical male and female students	Sense of Coherence scale Socio-demographics: age, sex, marital status, if parent is a physician, army service and year of study. Hebrew version of the State-Trait Anxiety Inventory	Strong negative relationship between SOC and A-trait
Bernstein, J. & Carmel, S. 1991	Do trait anxiety and the sense of coherence change over time in the same way for both genders?	Descriptive correlation.	Sense of Coherence scale-29 Stage 1 (orientation): N=93 (58 & 35 women) Stage 2(first year of studies): N= 85 (53 men & 32 women) Stage 3 (second year of studies), N= 68 (43 men & 25 women). Socio-demographic characteristics: age, sex, marital status, if one parent is a physician, or in the army service and class year ; Hebrew version of the Trait Anxiety Inventory (Spielberger et al., 1970; Teichman, 1978)	Correlations between stressors and personality evident in orientation and first year however correlations disappeared in second year Rotated varimax factor analysis to analyse stressor items; three items excluded because of loadings
Branholm, L., Fugl-Meyer, A. & Frolunde, A (1998). ^[52]	What are the relationships between life satisfaction, sense of coherence, locus of control and social desirability in the lives of the occupational therapy students?	Non-experimental design and descriptive study. N= 71 female occupational therapy students; age range 19-40. Comparison group N= 651 women (492 non-students and 159 students) age range 18-40	SOC-29 Locus of Control Scale (Swedish version). Social Desirability Life Satisfaction Questionnaire	SOC positively correlated to social desirability satisfaction social $r=.31$; $p<0.05$
Cilliers (2003) ^[39]	Determine the relationship between burnout and salutogenic functioning, specifically SOC, hardiness, & learned hopelessness	N=105 nurses Correlations, Exploratory and confirmatory factor analysis	SOC	test-retest reliability coefficient 0.9; $p<0.05$
Cohen, M., Ben-Zur, H., & Rosenfeld, M. (2008) ^[54]	Is higher SOC related to lower test-anxiety and does higher SOC predict higher levels of performance on the examination? Do coping strategies partially mediate the effects of SOC on test anxiety and test performance, and does test anxiety partially mediate the effects of SOC and coping on test performance?	N= 216 first-year Social Work, Nursing, Communication Disorders, Occupational Therapy, and Human Services undergraduates at a major university in Israel with (86.6% women; Ethnicity Jewish (72.7%) or Arab (27.3%); 78.4% born in Israel. 40.3% worked average of 16.21 hours/week. Descriptive correlational study. Hierarchical regressions	Demographic questionnaire SOC-13 Chronbach' s alpha .81 Coping was measured using a Hebrew version of the Short COPE Scale 30-item (Carver, Scheier, and Weintraub, 1989) Test Anxiety Hebrew version (Zeidner, 1995) Chronbach's alphas.89, .86, and .93, respectively.	Test Performance was measured by end-of-term examination grade and transformed into a Z score. Hypothesis 1 confirmed however, SOC did not predict performance as hypothesized. Hypothesis 2 "mostly" confirmed Hypothesis 3 not confirmed Correlation between the subscales ($r = .69$, $p = .0001$)
Feldt, Kokko, Kinnunen ^[23]	What is the association of family background (child centered care, parent socioeconomic status) successful adolescence, career orientation and later SOC in adults	N= 259 (133 men and 126 women) Longitudinal (ages 14, 27, 36, 42) SEM, multi-comparison Semi-structured interviews	SOC-13. Cronbach's alpha of 0.85 Men-0.84 women	Fully estimated model for goodness of fit $\chi^2 (53)+62.98$ p.,164 CFI 0.97 SOC $R^2=0.08$

(Table 1 continued on page 94)

Table 1. (continued)

Author/s	Research Question	Population Sample (Size, Type) Design & Method	Data Collection/ Instruments	Analysis
Kuuppelomaki, M. & Utriainen, P. (2003) ^[56]	(1) What kind of SOC do health care, business and technology students show at the beginning of their studies at polytechnic and how are smoking, drinking and physical activity associated with the strength of SOC? (2) How does the SOC of health care students at polytechnic change during the course of their studies and how is smoking, drinking and physical activity associated with the change?	N= 287; 93 healthcare students, 128 business students and 66 technology students of, 68% women, 32% men. 94% age range 18–24 Longitudinal, descriptive and correlational study. Multivariate analysis	Sense of Coherence: Cronbach's alpha of 0.88 Health items were pilot-tested with five health care students.	Change in health care participants at T2 SOC $p<0.036$ Level of significance set at $p<0.05$
Okumara, Suzuki, Bai & Mukajawa (2012) ^[7]	Aim to investigate factors influencing stress coping ability (SOC) among nursing students.	N=210 2 nd to 4 th year nursing students (ages 19-22) 44 males & 166 females Survey voluntarily completed at end of class	SOC -13 (Japanese version developed by Yamazaki, 1998)	Significant differences found in SOC: $p<0.001$: Difficult experiences have meaning; prospects for the future are bright; I feel stressed and I was seriously ill $p<0.05$: I can do most anything if I put my mind to it; we can encourage each other; I am satisfied with my current situation; I was able to enter my desired university
Sarid, et al (2010) ^[57]	Investigate the impact of cognitive behavioral interventions on nurses' SOC, perceived stress, and mood states	36 nurses in two groups. Treatment group = 20, control group 16. Pre-posttest design with control ; ANCOVA	SOC	Alpha control group 0.72 Alpha treatment group 0.75
Sarid, O., Anson, O., Yaari, O. & Margalith, M. (2003) ^[57]	Are coping resources related to humoral reaction induced by academic stress?	N= 54 female nursing & physiotherapy students Age range: 20-25 years descriptive and correlational study.	Sense of Coherence -13. (SOC) Cronbach's alpha 0.75 Questionnaires were completed immediately after each saliva sample donation. . Personality traits: Social resources: (Butow et al., 2000; Henderson et al., 1980), Situational variables: State anxiety questionnaire Cronbach's alphas -0.90. Scale of Psychological Distress (SPD; Ben-Sira, 1982), Health practices —information regarding seven daily habits, Cronbach's alphas: t1-0.55, t2-0.68, t3-0.66, and t4-0.61. Current health status Saliva samples tested for presence of EBV and HCMV specific salivary IgG and IgA antibodies at the four study points	Cronbach's alphas at the four study points were: t1-0.55, t2-0.68, t3-0.66, and t4-0.61.–
Strauser, D. & Lustig, D. 2003 ^[49]	Is there a significant and positive relationship between sense of coherence, work personality and work competencies? Does sense of coherence account for a portion of the variance in work personality, work goals and work competence?	N= 145 age range age 18 to 58 85% female. Ethnicity: 54% Caucasian, 40% Black, with 2% Asian and 2% Native American. Descriptive correlational study.	SOC 29 item. Chronbach's alpha .86-.96. Work Personality Profile Self-Report (WPP-SR; Bolton, 1992) Chronbach's alphas: .93, .88, .85, .80 and .84 respectively.	Work goals develop and become crystalized prior to graduation Alpha level established at 0.05 Multivariate analysis: $P=.000$, $F=6.157$ (5, 139) $=.82$, eta squared=.18 Stronger SOC developed better work habits, relationships with peers and supervisors and ability to adapt to work role

(Table 1 continued on page 95)

Table 1. (continued)

Author/s	Research Question	Population Sample (Size, Type) Design & Method	Data Collection/ Instruments	Analysis
Thorell-Ekstrand & Bjorvell, 1993 [58]	How do the nursing students rate the amount of received theoretical education about nursing process related issues? Are the students' self-rated Self Control and Sense of Coherence related to their preparedness for clinical nursing training? What were the nursing students' attitudes it independence in clinical training?	N= 95 nursing students (12% males & 88; female age 18) enrolled in one of three units of the Stockholm College of Health and Caring Sciences. Descriptive Correlation Multivariate analysis	Questionnaire III: SOC-29; Chronbach's alpha .70 Questionnaire I (17 items educational factors related importance for training in different phases of the nursing process). General social influences age, parents' profession, previous experience & motivation for choosing nursing Questionnaire II: Self-Control Schedule measuring self-control important for independent learning to enhance nursing students' learning and clinical practice.	P=,0.05 for prior health experience and preparation for clinical training No significant correlation between SOC and Self-control Schedule (p=0.13)
Virtanen, P. & Koivisto, A-M (2001) [60]	Questions: Does this "salutogenic resource" attain its "adult" level during the period of entry into the labour market also among those studying to a relatively high age? Does the development of SOC depend on employment prospects?	N=189 architecture students (57 % men) & (43% women) Control: N= 638 medical students (43%) men and 57% women from five medical facilities. Longitudinal study (1994-1998) with four mailed surveys to a closed cohort.	Strain Resistance Resources SOC-13 General Health Questionnaire (GHQ)	Annual differences in SOC and GHQ between professions and gender were assessed using two sample <i>t</i> test with Bonferroni correction p=,0.01

5.1 Research synthesis

Despite a wide variety of variables being investigated in relation to SOC, common findings across studies emerged with psycho-social-emotional aspects and adaptation to stress encompassing the vast majority of SOC research. Multiple study results provide evidence of SOC's ability to mediate or moderate stress, psychological symptoms and depression^[6, 12, 17, 33]. Coping skills are an essential GRRs for students adapting to stress and evidence suggest students with higher SOC tend to use healthier coping methods such as problem focused coping rather than avoidance coping. Salutogenic theory posits people with high SOC would tend to view difficulties as challenges rather than stressors. Study results show persons with high SOC tend to perceive less stress or perceive stress differently than those with weak SOC.

Humans are by nature social creatures and our evolution, development and success are inseparably intertwined in our ability to form social bonds. Findings among studies support the interrelatedness of SOC and social functioning. Persons with high SOC tended to have more stable social skills, attachment and relationships with peers, teachers, colleagues and authority figures as well as having more ethnic and racial diversity in their social lives. Generally speaking, people with higher SOC tended to have higher social functioning and were more successful in endeavors. This suggests social relationships may serve as a resource for which people with higher SOC can mobilize in meeting demands and achieving their goals^[55-57].

Several studies produced similar findings about conditions such as coping methods, social support and less anxiety^[13-15]. Other studies support the hypotheses that conditions such as coping methods, social support and less anxiety are conditions that influence students obtaining better grades. Longitudinal and studies utilizing structural equation modeling (SEM) could show relationships where those having high SOC were more successful^[48, 49, 55, 60].

Relatively few studies specifically address cultural considerations and its influence on SOC. While few, consensus among studies indicates certain cultural groups may be particularly vulnerable to changes in SOC. Those students, from vulnerable cultural groups may include recent immigrants limited either by language or cultural practices or those students

who face real or perceived discrimination, may be at risk for low SOC. The cultural variable may have an effect on the student's level of health, mental wellbeing, quality of life, or possibly academic success.

Gender differences are addressed by multiple studies; however, results vary from study to study. There is evidence that gender differences may tend to diminish longitudinally. Context appears to be an important factor^[7, 58, 60].

Few studies specifically address employment; however, the student-learning environment can be viewed as a work environment. The work environment is a complex concept and multiple variables interact in concert contributing to students' achievement and eventual entry into the labor market. Previously discussed facets such as psychological health, coping with stress, social skills and interpersonal relationships are particularly relevant and share commonalities with work specific research. Longitudinal studies and those utilizing SEM are consistent in that they show patterns of life promoting SOC tends to culminate in career stability or higher levels of success. High SOC has been shown to be a critical resource in dealing with uncertainty at any stage in life^[34, 35, 50].

Health and quality of life represent the ultimate goal of salutogenesis. A variety of student populations have been examined and studies concur that increased SOC is associated with perceptions of health, a sense of wellbeing and quality of life. Common findings among studies indicate strong SOC is associated with well-being and health in psychological and the social-emotional health dimensions as measured by perceptions and health symptom complaints. Studies using student samples demonstrate consistency with larger societal populations^[43, 45, 60].

5.2 Theoretical and conceptual issues

Relationship to nursing. Sullivan^[35] appraised the salutogenic model to assess its usefulness in nursing^[40]. In 1993, Sullivan^[34] identified the salutogenic model as a new approach for nurses to inquire "into the health promoting function of psychological variables as modifiers of the impact of environmental stress" and recommended empirical studies to provide evidence-based clinical practice and acknowledged that nursing's focus on health promotion is synonymous with the salutogenic paradigm^[34, 35]. Although she evaluated the model in relationship to nurses providing patient care, her results can be readily applied to nursing students^[36]. Several studies identified a relationship between SOC and the ability to manage stress in the environment^[37-39]. Organizational research investigating the relationship of burnout, work stress, and salutogenesis in nurses recommended that efforts should be made within organizations to implement methods to incorporate salutogenic measures when nurses in the organization experience burnout^[52]. Current literature suggests that many new nurses exit the profession after two years and a high turnover rate after the first two years of employment^[6, 29, 30, 35, 36]. This may be indicative of a failure to address or provide nursing students with the means to enhance their SOC. At risk nursing students may be responsive to mentoring and knowledge of the benefits of a salutogenic focus^[40]. Cleveland State University School of Nursing^[41] implemented a course that demonstrates the nursing students' ability to recognize and address different stressors inherent to the nursing school environment. The identified stressors in that course were, a) "changes in the students' immediate world" such as diminished time with family because of time constraints for clinical and studying, b) "intrapsychic conflict" for example studying for an exam instead of attending a family social event, c) conflict derived from social relations (students vs. faculty), and d) unexpected experiences of other members of the class such as someone whose academic progress is impeded leading to academic dismissal^[42].

Antonovsky^[5] describes sense of coherence as a "global orientation" (p. 19) and created his theory using a faceted design method and presents some methodological considerations for researchers when using SOC as an independent variable. Many studies use specific trait or characteristics such as coping style along side the globally oriented SOC scale as independent variables examining their effect on a dependent variable such as academic performance^[34]. As a GRR or promoter of SOC, positive coping style was correlated with SOC and better test performance; however, SOC did not correlate to improved test performance^[18]. SOC may have contributed, but a more specific coping style may have captured variance. One study defined SOC as coping and this is inconsistent with salutogenic theory since coping is a GRR rather than being synonymous with SOC. Another study examined how a phenomenon correlated with individual SOC subscales

and correlations were found between all subscales. This method is inconsistent with Antonovsky's design and these findings are not surprising since these subscales, by design, are inter-correlated as global measurement containing different facets rather than independent subscales. Evidence does suggest the factorial structure of the SOC scale is not completely understood and Eriksson & Lindstrom^[21] note factor analysis results from studies have reported a one factor design, others have failed this confirmation and one supported a three factor solution. Variations amongst studies may point to a contextual aspect of SOC.

Another consideration relates to SOC development that occurs over time and cross-sectional studies may not fully capture changes from a snapshot view and reflect the complexity human changes regarding SOC and its influence. Some cross-sectional studies could not correlate higher grades with higher SOC; however, longitudinal studies and those using SEM have demonstrated success in students with higher SOC. Studies employing SEM have found both direct and indirect effects of SOC and these latent effects may explain variability of results between study designs^[48, 49].

The original SOC scale is composed of 29 five-facet items using a 7-point semantic differential scale with two anchoring phrases^[19]. Subscales consist of 11 items measuring comprehensibility, 10 measuring manageability and 8 addressing meaningfulness as previously operationally defined. Thirteen items are negatively designed and thus, require recoding. Scores are summed for the entire instrument with higher scores indicating higher SOC. A variant of the 29-item scale is the SOC thirteen which is a shortened version. These two scales have generated scales for children and have been translated into many languages. Chronbach's alphas for the SOC-29 were consistently above .80 ($m=.895$, $n=9$) and the SOC-13 was the most frequently used having a majority of reliabilities above .80 ($m=.813$, $n=13$). The children's SOC scale was used three times with reliabilities ranging from .75 to .85 ($m=.80$). Reliability results from studies reviewed, English and non-English translation inclusive, are consistent with those reported by Eriksson & Lindstrom^[22] and Antonovsky^[19] and provides further evidence that the SOC scale is a reliable instrument across varying populations and cultures.

6 Implications for research

Salutogenesis bears relevance to nursing education; however, nursing students remain a vastly understudied population and many gaps in the body of knowledge exist. First, studies examining the effects of educational interventions on SOC and its development toward improving health and well being in students are severely lacking and represents a next phase in SOC research.

Being different, such as cultural, gender, or minority differences, within a profession may create a situation of vulnerability where educational strategies can assist students toward developing necessary GRRs, such as coping or social networks, to support student adaptation and success. As SOC develops, students may gain necessary resilience to face educational and professional. Little research salutogenic exists that addresses the potential vulnerability of diverse groups within nursing schools; however, Lam's^[44] study highlights the detrimental effects of being different.

Males represent a growing minority that has long struggled against stereotypes patient rejection, gender bias in nursing education such as societal gender bias, or expectations^[44-46]. Another gap exists for examining how minority groups achieve success and whether SOC has an effect on retention, progression and the long-term success of minorities in nursing education and the profession. Interestingly, groups of students with learning disabilities were found to be resilient and educators should be mindful of this when proposing research regarding "at risk" students. Longitudinal studies and more sophisticated designs such as structured equation modeling that critically examine direct and latent effects on student SOC or SOC on student success would be useful to fill the gaps in knowledge^[23, 48, 49].

The clinical environment and clinical preparation represents a variety of stressors for students who may not possess the needed coping and critical thinking skills required to comprehend and manage complex situations and achieve a

meaningful learning experience. Further study is needed to examine the effect of SOC on students transitioning into the clinical setting.

There is a growing body of research examining complex interactions between the mind and body via the hypothalamic-pituitary-adrenocortical axis (HPA) ^[50]. A second gap in the literature concerns bio-measures such as cortisol response to acute and chronic stressors and how these interrelate with SOC. It is plausible to infer healthy students would be more inclined to succeed. Only one identified study that addressed biomarkers and SOC ^[47]. Therefore, investigating patterns of stress hormone secretion and feedback in relation to changes in SOC may elicit valuable insights toward how SOC relates to the HPA in chronic student stress.

Finally, the third gap relates to a lack of knowledge of SOC in nursing students; little is known about SOC in nursing students as compared to multiple studies of nursing as well as other disciplines. A popular axiom states nursing requires a special kind of person that may relate to a life orientation. Many students choose nursing for altruistic reasons relating to the SOC concept of meaningfulness ^[59]. Nursing is a stressful profession requiring multiple skill sets and learned principles being applied differently in endless contexts among various people. This seems to relate both to manageability and comprehensibility. One study found that health care students' SOC grew during education whereas some studies in medical students found SOC decreased ^[51, 59]. Examining the concept of professional fulfillment as a GRR in building SOC is worthy of investigation and may support the use of hospital based clinical learning from a salutogenic perspective.

7 Summary

The question in nursing education is not what or where we teach; rather, the salutogenic perspective offers insights regarding how we incorporate and apply health promotion for student nurses in nursing education.

Educational research needs to investigate the effects of stress in nursing school on nursing students' SOC; however, evidence from larger student populations are a significant starting point from which to guide future salutogenic research in nursing education. Development of interventions such as social support networks, student support counseling, helping students self identify stress and encouraging students to develop coping skills to manage stress are feasible but are not currently being utilized in most nursing programs. Antonovsky ^[19] states, "What matters is that one has had the life experiences which lead to strong SOC" (p. 15). Facilitating "healthy learning" and health promotion with a focus on asset recognition through the use of salutogenesis offers an organizing framework for directing educational interventions to assist students in their SOC development ^[8, 17]. Sophisticated analysis methods will enable researchers to gain insights concerning nursing students' SOC and further support evidence-based education. Theoretically guided evidence-based education promoting comprehensibility, manageability and meaningfulness in nursing students' educational experiences may improve their health, well-being, retention, and success.

As stated in the introduction, many issues face nursing education and promoting strong SOC may assist student nurses' coping and adaptation to the stress of nursing school. Cultural diversity will present challenges for nursing education to address such as first generation college students, males, students from educationally underserved areas and a vast array of cultural beliefs, behavior and practices. For example, the ability of a nursing student to make a difference in their patients' lives may have a buffering effect on the stresses of nursing school via meaningfulness ^[59]. Attempts to improve an individual's sense of coherence would have to consider exploration of the environmental milieu into.

Nursing and medical schools in Europe and medical schools in the United States have investigated the use of salutogenesis with students however; there is a dearth of information on nursing schools in the United States ^[4, 5, 7, 12, 17, 46, 51, 60]. The literature emphasizes the use of small groups that include mentoring. Perhaps investigating the implementation of salutogenesis into small clinical groups, during post conference, may be an opportunity to include nursing students in the United States.

Additionally, nurses are often stressed and busy in the clinical environment; how nursing students are accepted and incorporated into the clinical environment by nurses may offer valuable insights into how the concept of belongingness helps to build SOC and how SOC relates to nursing education and nursing students' clinical performance^[48]. Enculturation of belongingness in the student nurse population may have a positive impact within the nursing community after nursing students graduate. Investigations of the implementation of salutogenesis into nursing school curricula may promote the health of student nurses as well as provide insight into ways that enhance retention of nursing students.

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