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Author manuscript
Nurs Forum. Author manuscript; available in PMC 2023 January 01.

Published in final edited form as:
Nurs Forum. 2022 January ; 57(1): 201–210. doi:10.1111/nuf.12643.

Triangulation Approach to Developing, Evaluating, and Applying the Evolving Theory of Adolescent Acceptance of Asthma

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Abstract

Acceptance is a term used by healthcare professionals regarding patients' psychosocial adjustment to chronic conditions. This paper describes a triangulation approach, applied over 25 years, to develop and evaluate a theory of adolescent acceptance of asthma. The theory was used to guide development and evaluation of an education and counseling program focused on fostering acceptance. The approach was effective in (a) defining acceptance and isolating its attributes; (b) identifying its antecedents and consequences, and specifying relationships among them; (c) revealing overlooked variables and augmenting theory; and (d) using theory to guide development and evaluation of the self-management program.

Keywords

Theory Development; Concept Analysis; Statement Clarification; Theory Specification; Theory Augmentation; Theory-based Program; Lifespan Development; Ecological Perspective; Evidence-based; Patient Education

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Seven million (7–17%) children and adolescents in the United States aged 2–18 years are diagnosed with asthma and 4 million experience symptoms annually[1, 2]. They are admitted to hospitals in life-threatening situations, restricted from participating in normal life activities, and absent from school more than their peers[1–4]. Adolescents with asthma verbalized and demonstrated difficulty accepting asthma as a chronic condition due to its intermittent and reversible nature. During acute episodes of symptom exacerbation, adolescents reported experiencing a barrage of negative emotions, facing numerous

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Conflict of Interest: None Declared
Nursing Forum
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psychosocial challenges, and worrying about the stigmatization of the condition, especially in situations where symptoms and treatments conflicted with the normative behavior of healthy peers[5].

Healthcare professionals appreciate that asthma management is multi-factorial with patient, healthcare system, and biological factors impacting how well symptoms are controlled. Our research program focused on patient-level psychosocial factors of adolescents diagnosed with the condition. We sought to increase understanding of (a) the adolescent process of coming to accept asthma as a chronic condition requiring ongoing monitoring and management and (b) the impact of one's psychosocial acceptance on the use of effective asthma health behaviors, symptom control, use of healthcare services, and quality of life outcomes.

The purpose of this paper was to describe the triangulation approach we used over 25 years to develop and evaluate a theory of adolescent acceptance of asthma that was then used to guide development and evaluation of an education and counseling self-management program focused on fostering acceptance of asthma in students with asthma and members of their social network. Triangulation refers to the use of multiple methods to develop a comprehensive understanding of a phenomena[6, 7]. Our approach was effective in (a) defining acceptance and isolating its attributes; (b) identifying its antecedents and consequences, and specifying relationships among them; (c) revealing overlooked variables and augmenting the theory; and (d) using theory to guide program development and evaluation.

Methods

Accept and acceptance are terms used in relation to individuals' psychosocial adaptation or adjustment to chronic conditions and physical disabilities. When we began our research program in 1991, a clear understanding of the definition and use of the concept among adolescents with asthma was lacking. We used the following methods to increase understanding of adolescent acceptance of asthma: (a) a literature synthesis (1991–1993) and critique of related concepts (1992–1993), (b) a qualitative phenomenology study (1993–1994) that culminated in theory specification (1994–1995) and a series of instrumentation studies (1995–1999) to operationalize concepts contained in the theory, (c) theory evaluation and augmentation (1995–1999), and (d) theory-based program development (1997–2001) and evaluation (2001–2021). Table 1 provides an overview of our approach to theory and program development and evaluation. An overview of each method is described herein.

Literature Synthesis and Critique of Related Concepts

Our literature synthesis and critique of related concepts was conducted before the use of electronic databases was common. In consultation with health and social sciences librarians, we initially used textbooks, encyclopedias, thesauri, dictionaries, and catalogues to identify related search terms (e.g., acceptance, adjustment, adaptation, hope, transcendence, quality of life, thoughts, feelings, attitudes, beliefs, psychosocial coping, quality of life, or psychosocial and emotional well-being). Then, we pulled bound journals from the stacks. We paired the search terms with chronic condition and/or illness and physical disability as

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we reviewed the titles and abstracts of published articles to identify relevant resources. We used reference lists of existing articles to expand our search until no new citations were identified. We limited the search to 32 peer-reviewed research reports published in English. Thematic analysis was used to group content based on concepts, processes, populations, and contexts. In this section, we (a) present an historical overview of the concept of psychosocial acceptance of chronic conditions, (b) explore diverse perspectives of acceptance, (c) provide a synthesis of perspectives, and (d) differentiate acceptance from denial, resignation, and transcendence.

Acceptance was defined by Webster as the act of taking or receiving something offered with favorable reception or approval, the act of assenting or believing, to take formal acknowledgment of responsibility or consequences, to accommodate one's self to, and to believe[8]. The concept of acceptance relative to adjustment to chronic conditions was first discussed by Grayson, who wrote that finding the physical reason for a symptom did not exclude the psychosocial components associated with the diagnosis and identified acceptance as the psychological key to adjustment[9]. Grayson specified aspects of acceptance to include social and biopsychological integration. Social integration was evident when individuals possess a realistic outlook of what society enforces upon them. With biopsychological integration, individuals understood the nature of their condition and its origins, complications, and prognosis without any serious emotional symptoms.

A seminal development in understanding acceptance was achieved with Dembo, Levinton, and Wright's qualitative study of personal and social adjustment of veterans with physical disabilities[10]. Acceptance was conceptualized as a process of emotionally realizing the existence of other values and a transformation from comparative values to asset values whereby individuals come to value what they currently possess. Wright built on their initial work by (a) defining acceptance as a process of revaluation or value change related to both personal and social loss and (b) proposing two additional attributes which included the subordination of physique and the containment of condition effects[11].

The concept of acceptance sustained relevance over time as it related to other processes such as coping, spiritual well-being, harmonious interconnectedness[12], faith[13], hope[14, 15], and self-transcendence[16, 17]. Study populations in which coping was linked with acceptance included individuals living with a variety of chronic conditions[15, 16, 18–24]. Contexts linking acceptance to coping include altered body image[25–27], chronic pain[28], developmental delays[29], terminal illness[30], and alcohol and drug dependencies[31]. Acceptance was also examined in relation to healthcare decision-making regarding management and treatment options[32–34]. Table 2 provides definitions and attributes of acceptance represented in our literature set.

Diverse Perspectives of Acceptance

Acceptance was an elusive construct. The dimensions of acceptance were inconsistently described as developmental processes, psychological in nature, being objective and subjective, and having both situational and growth characteristics. Acceptance was viewed as a psychological antecedent to behaviors by some[22] and as behavioral dimensions by others[28]. When acceptance was viewed as a developmental process, terms to describe the

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process included: coming to terms with, dealing with, making sense of, taking possession of, embracing, or recognizing and understanding one's situation[10, 15, 16, 23, 35, 36]. Confusion about acceptance was further compounded when the concept was described as a dimension of other constructs. For example, acceptance was viewed as a component, element, stage, phase, step, dimension, or mode of adaptation, adjustment, coping, transformation, and transcendence [10, 16–18, 20, 21, 24, 28, 29, 31, 35, 36]. Components of acceptance were numerous and contradictory. The components or attributes were classified as (a) feelings, emotions, and attitudes, (b) thoughts and perceptions, and (c) behaviors. Given the conceptual confusion, we were not surprised that instruments used to operationalize acceptance failed to consistently measure the same construct. For example, the Acceptance of Illness Scale[23] measured the extent to which respondents were able to accept their condition without experiencing negative feelings. Alternatively, items in the acceptance subscale of the Ways of Coping Checklist[18] measured negative feelings of hopelessness and helplessness.

Synthesis of Perspectives

Despite the seemingly contradictory perspectives of acceptance, a universal sense of acceptance seemed to exist. To tap into this universal perspective, we examined the literature for commonalities, using as a starting point, results of a simultaneous clarification process[37]. The process distinguished acceptance from related concepts and proposed a definition as well as antecedents, critical attributes, and outcomes of acceptance. Acceptance was defined as a present-oriented activity requiring energy and characterized by receptivity toward and satisfaction with someone or something, including past circumstance, present situations, others, and the self. Antecedents of acceptance were proposed to include unresolved personal issues, pivotal life events, and motivation to change. Potential outcomes were proposed to include personal growth with increased perceptions of self-worth and a greater sense of awareness, elimination of tension and a freeing of energy, psychological and spiritual peace with a sense of being healed, some degree of self-transcendence, and feelings of connectedness.

From the literature set, we found that the process of acceptance implied change involving affective, cognitive, and behavioral responses through adaptation or adjustment to a life-altering event. Acceptance was an active perceptual, subjective process of coming to terms with, dealing with, making sense of, or taking possession of circumstances, limitations, or realities through a series of changes in values, attitudes, beliefs, and/or feelings serving as the enabling identification for behavioral changes, such as incorporating one's condition into one's life. Dimensions of acceptance were psychological and exhibited growth characteristics. Consistent attributes of acceptance were energizing, positive, and internalized feelings of uniqueness, freedom, inner peace, comfort, pride and joy, affirmation, worthiness, hopefulness, confidence, and empowerment.

Differentiating Acceptance from Other Concepts

Terms commonly linked with acceptance include denial, resignation, and transcendence. Distinguishing these concepts was imperative.

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Denial and Acceptance—Often when individuals are thought to be *not accepting*, they are labeled as *in denial;* as a result, people assume denial to be the opposite of acceptance. Psychoanalytic theory posed that individuals dealt with unacceptable realities by denying their existence[38]. As one of several defense mechanisms used to reduce anxiety by distorting or falsifying reality; denial was defined as an unconscious way of excluding intolerable thoughts or feelings from the mind. When people think of acceptance, they often reflect on the work of Kubler-Ross[39] who labelled acceptance as the final stage of grief. Whereas grief acceptance and acceptance of a chronic condition contain relief from inner turmoil of emotions, Kubler-Ross considered acceptance of death and dying to be a separation or detachment from the world and all meaningful relationships that allowed for one's closure in the circle of life. Wright considered denial in direct opposition to admitting or acknowledging a condition exists, and viewed resignation as the opposite of acceptance[11].

Resignation and Acceptance—Wright wrote about resignation and acceptance as opposites on a continuum[11]. Resignation was viewed as bowing down, uncomplaining, and being limited, whereas acceptance was feeling all right, not devaluing, and being free of limitations. Wright identified essential values of acceptance and successful adjustment to one's condition to include life assets, abilities, self-respect, mastery of skills, personality above appearance, and ability over achievement.

Resigning one's self to versus accepting what is and what will be were components of creating health in adults with chronic conditions[21]. Evidenced by feelings of helplessness, hopelessness, depression, and despair; resignation was a negative state of limited health in which individuals struggled with limitations and were frustrated with healthcare services. Acceptance was evident when balance was achieved despite limitations, aspirations were realized, needs were satisfied, challenges were positively responded to, and expectations were reframed to encompass a balance between want to do and can do.

Although not overtly defined[18], acceptance was one of three emotion-focused coping modes of women receiving treatment for cancer. Six items, grouped under the factor of acceptance, in the Ways of Coping Checklist, implied hopelessness, helplessness, passivity, and lack in faith more representative of resignation than acceptance[18]. This passive view of acceptance was echoed when acceptance was labeled as the second phase of asthma self-regulation[35]. Acceptance, when dealing with the seriousness of the health-threatening condition, was evident when individuals responded reactively, rather than preventively, and were resigned to the recurrence of symptom exacerbations.

Acceptance and Transcendence—Roe believed individuals who were accepting of their treatment plan felt better off or advantaged[34]. Individuals felt they benefited from their life experiences with their conditions. Webster's defined transcendence as rising above the ordinary to find higher meaning and purpose in life's experiences[8]. Women with cancer expressed acceptance of one's situation led to self-transcendence[16]. Acceptance was defined as changing one's attitude toward the condition. With acceptance, transcendence became possible. Self-transcendence was indicated by (a) increased valuing of the self with a sense of being healed and (b) expressed feelings of tranquility, lightness, floating, and being uplifted. With transcendence, women felt a new sense of purpose in assisting others. Reed

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supported this view of self-transcendence as the expansion of one's conceptual boundaries inwardly through introspective activities and outwardly through concern for others[17]. Traits of self-transcendence in individuals included compassion, creativity, intuitiveness, receptivity, and spirituality. The literature synthesis and critique of related concepts revealed little was known about the adolescent process of coming to accept a chronic condition and revealed the need for a qualitative phenomenology study.

Phenomenology and Theory Specification

The purpose of our phenomenology study was to increase understanding of the adolescent lived experience of coming to accept asthma as a chronic condition[40]. Adolescents who were identified by healthcare professionals as accepting participated in open-ended interviews. Findings revealed the essential structure of adolescent acceptance of asthma and provided the foundation for theory specification. Concepts were identified and defined and relationships among the concepts were posed. In this section, we describe the results of an iterative process of integrating existing theory with qualitative data to specify the conceptual model of adolescent acceptance of asthma. Specification of the model was essential to establishing the significance of acceptance as a concept and process, and for guiding development of interventions to foster acceptance.

Concept Clarification

Guided by a lifespan development perspective[41], findings of our phenomenology study revealed the essential attributes of acceptance proceeded along a growth continuum from resignation to acceptance increasing in complexity, differentiation, and specialization while increasing in hierarchical integration and organization[40]. Resignation was defined as reluctance to take possession of one's chronic condition. Essential attributes of resignation included (a) relinquished control to condition imposed limitations, (b) isolation from family, friends, and others with similar experiences, (c) resistance to learning and sharing experiences with others, and (d) inattentiveness to symptoms and treatments. In contrast, acceptance was defined as taking possession of the chronic condition. Essential attributes or structural components of acceptance included: (a) taking control over condition-imposed limitations, (b) connectedness with family, friends, and others with similar experiences, (c) openness to learning and sharing experiences with others, and (d) vigilance in the need to be ever watchful and prepared for symptoms. Table 3 contains a *created model case* of adolescent acceptance of asthma with all essential attributes represented.

Theory Specification

The acceptance of asthma conceptual model which depicted how adolescents accept asthma as a chronic condition requiring ongoing monitoring and management was specified[40]. Acceptance was viewed as a process and an outcome. Antecedents of acceptance included (a) awareness of symptoms, (b) acknowledgment of a condition with reception of the diagnosis and prescription for treatment, (c) information and advice-seeking about the condition and management plan, (d) self-appraisal and reappraisal through a reasoning process, and (e) formation of attitudes and beliefs about the self and the condition allowing for acceptance. Consequences of acceptance included improved symptom control and

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quality of life as evidence by full participation in life activities. Individual, disease, and environmental characteristics that influence children as they grow and develop through the process are indicated.

Theory Evaluation and Augmentation

Our logical next step was theory testing. We identified, selected, and/or developed instruments to operationalize concepts contained in the conceptual model. Three existing instruments were selected to operationalize (a) individual characteristics related to one's self-perception of competence and global self-worth[42, 43], (b) environmental influences related to one's perceived social support from parents, friends, teachers, and classmates[44], and (c) disease characteristics related to one's level of symptom control[45]. We developed two instruments based on extensive reviews of asthma literature: Knowledge of Asthma Survey[46, 47] and General Health History Survey[46–48]. We extracted statements and themes from our qualitative interviews to create three instruments: Acceptance of Asthma Questionnaire[46, 48, 49], Beliefs about Asthma Questionnaire, and Participation in Life Activities Scale[3, 4]. Findings of a series of instrumentation studies guided revisions to improve the psychometric properties of the acceptance and beliefs questionnaires over time. Table 4 presents model concepts, definitions, attributes, and instruments used to operationalize the concepts.

Using instruments demonstrating internal consistency reliability and construct validity, we engaged in preliminary theory testing that resulted in modification of our conceptual and operational models[46]. We augmented the models to include the variable asthma health behaviors. Figure 1 depicts the augmented conceptual model. An observational checklist[50] was developed to measure use of effective asthma health promotion, risk reduction/ prevention, and episode management behaviors based on recommendations contained in the National Asthma Education and Prevention Guidelines[51–54] and an extensive review of asthma management literature.

Although reasoning about asthma symptom management was identified as an essential part of the process of coming to accept asthma as a chronic condition[40], more information was needed to operationalize the concept. Findings of a second qualitative think-aloud study were used to develop the Reasoning about Asthma Scenarios[55]. We later added the Asthma Control Test[56] as a valid measure of asthma control.

With reliable and valid measures, a latent variable model was specified to explore (a) how students come to accept asthma and self-management of their condition, (b) the interaction of individual characteristics, condition or disease characteristics, and environmental influences on the process, and (c) the impact of the process on distal clinical and functional outcomes of asthma control, quality of life including school attendance, and the appropriate use of healthcare services. Theory testing revealed a good fit between the data and the specified model[48].

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Theory-based Program Development and Evaluation

The National Asthma Education and Prevention Guidelines[51–54] specified that a successful asthma management plan should include educating students and their caregivers about the condition and its management and recommended expanding education beyond healthcare settings to school and community settings. To meet this aim, we used concepts and processes of the acceptance of asthma model to guide development and evaluation of a multi-component school- and community-based academic asthma health education and counseling self-management program, *Staying Healthy–Asthma Responsible & Prepared*™ (SHARP)[57].

Findings of our qualitative studies and preliminary school-based assessments indicated that the program should target students with asthma enrolled in grades 4–6 and members of their social networks. We designed SHARP to provide anticipatory guidance to students using strategies to engage them to better understand and manage their condition prior to (a) moving from elementary to middle or junior high school and (b) transitioning from parent or caregiver management to self-management. We worked in collaboration with school personnel who served on curriculum boards to develop the program that was delivered during instructional time by trained, certified elementary school teachers using integrated modules aligned with science, technology, engineering, and mathematics (STEM) curriculum focused on healthy lungs for life[58]. See Figure 2 for a depiction of how SHARP integrates into the adolescent latent variable acceptance of asthma model.

Using an ecological perspective and community-based participatory approach, we then partnered with a diverse, transdisciplinary team of community members, healthcare professionals, and school personnel in evaluation and refinement of SHARP using a series of five clinical trials[47, 49, 50, 57, 59]. We used concepts and process contained in the acceptance of asthma model to confirm SHARP's (a) feasibility for community members, school personnel, and students and their caregivers[57], (b) benefits and efficacy in improving and sustaining proximal cognitive, behavioral, and psychosocial outcomes as well as clinical and functional symptom control and participation in life activities outcomes[57, 59], (c) effectiveness on proximal cognitive, psychosocial, and behavioral outcomes[47, 49, 50], and (d) impact on distal asthma control and quality of life outcomes[57, 59].

Discussion

Our triangulation approach to increasing understanding of and addressing adolescent psychosocial acceptance of asthma as a chronic condition requiring ongoing monitoring and management was described. Our literature synthesis and critique of related concepts revealed little was known about the adolescent process of coming to accept asthma as a chronic condition and indicated the need for qualitative work. Findings of our phenomenology study revealed the essential structure of the adolescent process of coming to accept asthma and when depicted became the conceptual model that served as the basis for specification of an operational model in preparation for theory testing. Theory testing resulted in augmentation of the conceptual and operational models that later served as the foundation for development of a multi-component asthma health education and counseling

self-management program. The theory- and evidence-based SHARP program for students with asthma enrolled in grades 4–6 and members of their social network was deemed to be highly effective in improving cognitive (i.e., asthma knowledge and reasoning about asthma management), psychosocial (i.e., acceptance of and beliefs about asthma), behavioral (i.e., use of effective asthma health promotion, risk reduction, and episode management behaviors), symptom control, and quality of life (i.e., participation in life activities and school attendance) outcomes.

Our triangulation approach was effective in defining the concept of acceptance and isolating its attributes; identifying its antecedents and consequences, and specifying relationships among them; revealing overlooked variables and augmenting the evolving theory; and using theory to guide program development and evaluation. Clarifying the concept of adolescent acceptance of asthma facilitated communication and promoted understanding among healthcare professionals and between health care professions and adolescents coming to terms with their condition. The theory provided (a) an optimistic, affirming, and supportive holistic approach for healthcare professionals when they are assessing, diagnosing, planning, and intervening with children and their families and (b) an alternative, anticipatory, multi-faceted process for identifying individual and population needs of children and adolescents with asthma and members of their social network. The model can be used to advance evidence-based practice. Instruments operationalizing concepts and processes can be used to assess and plan for intervention as well as evaluate the benefits, effectiveness, and impact of the interventions. SHARP is a highly effective theory-based program that healthcare providers, school personnel, and community members can use to intervene with individuals and populations in school and community settings.

Acknowledgments

Sources of funding:

- National Institutes of Health, Individual National Research Service Award, Pre-doctoral Nursing Fellowship, National Institute of Nursing Research, Department of Health and Human Services, *Adolescent Acceptance of Chronic Illness,* F31 NR06898–01, The University of Arizona College of Nursing
- National Institutes of Health, Institutional National Research Service Award, Postdoctoral Nursing Research Fellowship, National Institute of Nursing Research, Department of Health and Human Services, *Health Promotion Risk Prevention,* T32 NR07073–06, The University of Michigan School of Nursing
- Michigan Department of Education State Teen Health Center Grant, Jackson, MI
- Office of the Vice President for Research (OVPR) Faculty Grant, The University of Michigan, Ann Arbor, MI
- National Institutes of Health, National Institute of Nursing Research (Primary), National Heart Lung & Blood Institute, National Institute of Allergy & Infectious Diseases, and National Institute of Child Health & Human Development (Dual), Department of Health and Human Services, *Staying Healthy-Asthma Responsible & Prepared,* R21 NR009517–01, Michigan State University, East Lansing, MI
- National Institutes of Health, National Institute of Nursing Research (Primary), National Heart Lung & Blood Institute, National Institute of Allergy & Infectious Diseases, and National Institute of Child Health & Human Development (Dual), Department of Health and Human Services, *Comparison of Asthma Programs for Schools,* R01 NR010544–01, Clinical Trials NCT01625364, University of Texas at Austin, Austin, TX
- Mary & Carl Gulbrandsen Chair in Pediatric Nursing Funds, University of Wisconsin-Madison, Madison, WI

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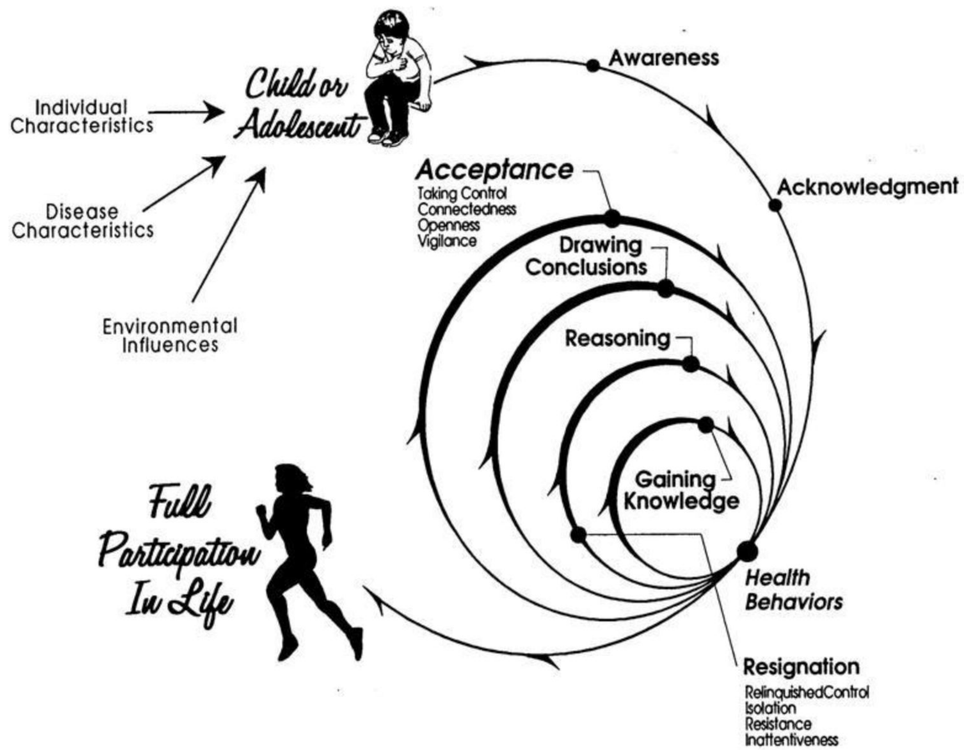

Figure 1.

Augmented Child and Adolescent Acceptance of Asthma Conceptual Model

Note. Illustration of 'Child with Asthma' used with permission given by M. Middleton from Rogers, M. & Middleton, M. (1987). *Luke Has Asthma, Too*. Waterfront Books: Burlington, VT. Model adapted from "*Adolescent Acceptance of Asthma: A Phenomenological Study*," by E. K. Kintner, 1997, *Journal of Asthma*, *34*(6), p. 552. Copyright 1997 by Marcel Dekker, Inc.

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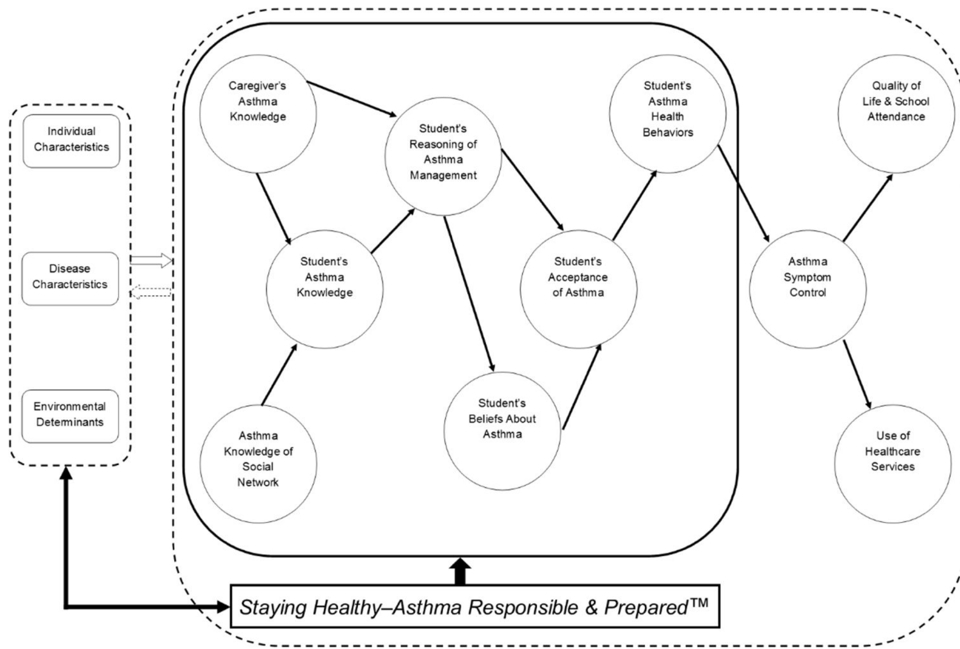

Figure 2.

Child and Adolescent Acceptance of Asthma and SHARP Operational Model

Note. Adapted from "*Feasibility and Benefits of a School-based Academic and Counseling Program for Older School-Age Students with Asthma*," by E. Kintner, G. Cook, A. Allen, L. Meeder, J. Bumpus, & K. Lewis, 2012, *Research in Nursing & Health*, *35*(5), p. 3. Copyright 2012 by Wiley Periodicals, Inc.

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Table 1

Overview of an Evolving Program of Research and Theory of Acceptance of Asthma

Dates	Activities
1991–1993	Extensive review of asthma literature. Little was known about the psychosocial impact of asthma on children and adolescents from a developmental perspective.
1992–1993	Concept analysis and statement clarification. Little was known about the child/adolescent experience of coming to acceptance a chronic condition.
1993–1994	Qualitative phenomenology study. The essential structure of the adolescent process of coming to accept asthma was revealed. Concepts were identified and defined.
1994–1995	Theory development. Relationships among concepts were specified based on the extensive review of asthma literature, concept analysis and statement clarification process of acceptance, and findings of the qualitative study.
1995–1996	Series of instrumentation studies. Face and content validity; internal consistency, test-retest stability, and ability to capture change over time; and construct validity of six newly developed measures designed to operationalize concepts contained in the model were confirmed.
1995–1996	Preliminary theory testing. Lack of direct relationship between concepts contained in the knowledge of asthma and acceptance of asthma models was revealed.
1996–1997	Theory augmentation. Based on an extensive review of the literature and content contained in the NHLBI expert panel guidelines, the concept of asthma health behaviors was added.
1997–1998	Instrumentation study. An instrument measuring the frequency in use of effective asthma health promotion, risk reduction, episode management, and medication administration behaviors was developed and evaluated.
1997–1998	Qualitative think a-loud study. Fifth grade students used knowledge gained through personal experience to share what they would do in response to familiar and unfamiliar, and simple and complex created scenarios.
1998–1999	Instrumentation study. An instrument operationalizing the concept of logical reasoning about asthma symptom management was developed and evaluated.
1998–1999	Theory testing. The latent variable acceptance of asthma structural equation model was evaluated.
1994–1999	Program development. The academic asthma health education and counseling self-management SHARP program was developed, and pilot tested.
2001–2016	Program evaluation. The multi-component school- and community-based program was evaluated using a series of four clinical trials.
2017–2021	Program translation, dissemination, and implementation. Materials were translated into other languages (e.g., Spanish and Mandarin). The SHARP public and restricted access websites were launched, the implementation toolkit was compiled, and the branded product was packaged.

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Table 2

Definitions and Attributes of Acceptance of Chronic Conditions

Author	Definitions of Acceptance	Attributes of Acceptance
Grayson, 1950[9]	The psychological key to physical rehabilitation.	Social Integration termed the "reality principal". Biopsychological Integration relating to "body image".
Dembo et al., 1956[10]	A process of value changes.	Enlargement of scope of values. Transformation from comparative values to asset values.
Wright, 1960[11]	A process of revaluation or value change involving both personal and social loss.	Enlargement of scope of values. Transformation from comparative values to asset values. Subordination of physique. Containment of disability effects.
Felton et al., 1984[24]	A step in the adaptation process for patients with end stage renal disease.	Recognition and understanding of condition-imposed limitations. Recognition and understanding of condition-imposed losses.
Wing, 1995[31]	Embracing a new identify, deciding to become sober, and establishing recovery goals.	Assuming personal responsibility. Developing an accurate perception of reality. More internally focused and less externally driven.
Seideman & Kleine, 1995[29]	Segmented embracing of information about the condition as truth.	Understanding evolving ramifications of reality.
McWilliam et al., 1996[21]	Emotional balance is achieved despite limitations	Aspirations are realized. Needs are satisfied. Challenges are positively responded to. Expectations are reframed to encompass a balance between want to do and can do.
Kintner, 1997[40]	A process and outcome of desiring and taking possession of one's chronic condition.	Taking control over illness-imposed limitations. Feeling connected with the illness, family, friends, and others. Openness to learning about and sharing the illness. Vigilance to the illness and the need to anticipate, watch, and prepared for exacerbation.
McCraken et al., 1999[28]	Behavioral dimensions of adjustment in individuals with chronic pain	Acknowledging the pain. Giving up unproductive attempts to control pain. Acting as if pain does not imply disability. Ability to commit efforts toward living a satisfying life.

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Table 3

A Created Model Case of Adolescent Acceptance of Asthma with All Attributes Represented

AJ is a 16-year-old high school student diagnosed with severe persistent asthma requiring daily use of inhaled bronchodilator and anti-inflammatory agents, along with a program of desensitization. During periods of acute exacerbation associated with weather changes and respiratory infections, AJ requires bursts of oral corticosteroids. AJ's home was altered to decrease exposure to potential environmental stimuli known to exacerbate symptoms. Following initial awareness of symptoms and acknowledgment of the condition by healthcare professionals, AJ began the process of acceptance. Through a series of changes in values, attitudes, and beliefs, AJ came to terms with the condition. With acceptance, AJ expressed positive feelings of uniqueness, freedom, inner peace, comfort, pride, joy, affirmation, and worthiness. AJ was hopeful about the future. Confident in self-management abilities, AJ felt responsible and empowered. AJ wanted to learn as much as possible about the condition. AJ felt connected to others experiencing similar life experiences and expressed the need to share the condition with others. AJ was protective of the condition in the need to be watchful, ready, and prepared to act should symptoms arise.

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Table 4

Acceptance of Asthma Model Concepts, Definitions, Attributes, and Instruments Used to Operationalize Them

Concepts	Definitions	Attributes	Instruments
Cognitive: Student & Caregiver Asthma Knowledge	Information pertinent to the chronic condition gained either through study or experience[46, 48]	Anatomy, Pathology, Symptoms, Stimuli, Severity, Treatments, Management	Knowledge of Asthma Survey[46, 47]
Cognitive: Reasoning about Asthma	Process of reflective, introspective thinking through which situations are examined and options are considered[46, 48, 55]	Simple, Complex, Familiar, Unfamiliar Logical Reasoning	Reasoning About Asthma Scenarios[55]
Psychosocial: Beliefs about Asthma	Conclusions, ideas, feelings, attitudes or opinions embraced after a period of examination and consideration[46, 48]	Nature of Asthma, Future Uncertainty, Hope for Control, Need for Education	Beliefs about Asthma Questionnaire[49]
Psychosocial: Acceptance of Asthma	Desiring to take possession of one's chronic condition versus resignation or expressed reluctance to take possession[46, 48]	Vigilance, Taking Control, Openness, Connectedness	Acceptance of Asthma Questionnaire[49]
Behavior: Asthma Health Behaviors	Risk reducing, episode managing, and health promoting activities influential in effectively controlling of one's chronic condition[48]	Health Promotion, Medication Use, Risk Reduction/Prevention, Episode Management	Asthma Health Behavior Survey[50]
Condition/Disease Characteristics: Asthma Severity Asthma Control	Relative trouble, difficulty, effort, or struggle involved in controlling symptoms of the chronic condition	Symptom Frequency, Stimuli Exposure, Sleep Disturbance, Medication Use, Corticosteroid Use, Exercise Limitation	General Health History Survey[46, 47], Severity of Illness Rating Scheme[45], Asthma Control Test[56]
Use of Healthcare Services: Office, Urgent Care & Emergency Room Visits & Hospital Stays	Professional assistance required in managing asthma	Ambulatory Office, Urgent Care & Emergency Room Visits, Overnight Hospital Stays	General Health History Survey, Access & Satisfaction with Healthcare Survey[46–48]
Quality of Life: Participation in Life Activities, School Attendance Record	Unrestricted involvement in chosen pursuits, such as sports, clubs, interests, and hobbies [46, 48] including school attendance	Planning for, Interference with, & Restriction from Participation; School Attendance Record	Participation in Life Activities Scale[3, 4]
Individual & Environmental Influences	Intra- and extra-individual contextual factors with potentials to motivate one's thoughts, feelings, beliefs, and behaviors[46]	e.g., Age at Diagnosis, Time since Diagnosis, Grade in School, Family SES, Self-Perception, Perceived Social Support	General Health History Survey[46, 47], Self-Perception Profile[43], Social Support Scale[44]