



Review

A concept analysis of routines for improving health behaviors

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ABSTRACT

Objective: Chronic disease patients often have unhealthy routines, especially when away from health care professionals. These patients need clear guidance about establishing and maintaining routines. This study aimed to synthesize a definition of the concept of routines for improving health behaviors based on its uses in the literature.

Methods: We searched CINAHL, Medline, Scopus, and Google Scholar from January to May, 2022 for articles that included definitions of routines in the context of improving health behavior. We applied no date restriction. The systematic analytic method and Rodgers' evolutionary concept analysis method were used. We charted the attributes, antecedents, and consequences of routines for improving health behaviors, analyzed their uses in the literature, and synthesized the results in a definition of the concept. **Result:** A total of 24 articles were included. Attributes of the concept were repeated patterns, controllable by the patient, goal-oriented health, and integration into an overarching lifestyle. Antecedents were individual characteristics and environmental factors. Consequences were psychological, physical, and social well-being at individual and environmental levels.

Conclusion: This clarified definition of routines for improving health behaviors will provide a starting point for future research and, eventually, a basis for clinical nursing interventions to support patients in developing and maintaining healthy routines to promote better patient outcomes.

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What is known ?

- The concept of routines for improving health behavior lacks definition, which limits our ability to understand how routines impact behavior change in nursing research and practice.
- Routines for improving health-related behavior are increasingly important as the burden of chronic disease continues to rise.

integrated into overarching lifestyles and can occur with or without social and/or family support.

- The consequences of routines for improving health behaviors are enhancing wellbeing at the individual and environmental levels.

What is new?

- Based on a systematic analytic method, we defined routines for improving health behavior as repeated, controllable, goal-oriented health activities that occur on their own or as

1. Introduction

A deeper understanding of routines encourages effective health care interventions to promote improved health outcomes. The word “routines” can be confusing and is used interchangeably with other related terms such as “habit,” “automaticity,” and “ritual” [1–3]. Furthermore, this terminology does not specify to which group it's referencing, whether it would be patients or nurses. This becomes even more problematic across diverse cultures and languages when the term ‘routine’ is not universally understood in translation. Authors rarely define the concept of routines for improving health behaviors but often use the term generically to describe regular activities, norms, or baseline variables (e.g., control

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variables for comparison purposes in experiments to determine how changes drive health outcomes) [3].

Routines are one part of health behavior and have been a target of change in interventions [1–3]. Though variously and vaguely defined, the idea of “routines” is frequently referenced in health science research as a) patients’ ordinary activities that play significant roles in determining behavioral characteristics, such as drinking patterns and social interactions [4–6]; b) routine clinical care, such as annual check-ups and preventative procedures [7]; and c) the scheduled tasks of nurses’ work, such as time-sensitive care and activities repeated during a regular nursing shift [8]. The lack of definitional clarity may complicate how the influences of “routinized” behaviors on health outcomes are evaluated [9]. Understanding the definition of routines is an essential step in health behavior science for developing and implementing successful health interventions to improve outcomes.

Successful health behavior interventions based on changing routines have been conducted to improve medication adherence, smoking cessation, diabetes self-care, and weight loss [3]. Meanwhile, unhealthy behaviors, such as frequently missing medication doses, overeating, and overuse of substances (e.g., alcohol, tobacco and illicit drugs), have been shown to play a role in poor health outcomes and increased mortality [10–13]. The effectiveness of routine change to improve health behaviors is especially critical for people with chronic disease, who often require long-term self-management. Chronic diseases are progressive or enduring diseases that are not passed from person to person [14]. Researchers reported that 60% of American adults have at least one chronic disease, and 12% of them have more than five chronic diseases [15]. The average annual healthcare cost of public insurance for a patient with more than five chronic diseases is \$20,763 [15]. In 2016, the total cost of healthcare focused on chronic diseases within the United States was \$1.1 trillion, approximately 20% of the United States’ gross domestic product [16]. This cost has continued to rise as the United States’ population becomes older, since age is a major risk factor for having a chronic disease [15]. The amount of money spent on healthcare related to chronic diseases is impacted by patient behaviors.

Self-management challenges for chronic disease patients largely stem from the heightened self-management burden, which makes patients more susceptible to developing unhealthy behaviors. For example, patients with diseases like diabetes or hypertension can have very complex medication and self-care routines (e.g., regular and often timed self-monitoring and administration of treatment, a specialized diet, and/or prescribed physical activity). Because these are chronic diseases, the routines have to be maintained for many years [17,18]. Unfortunately, self-care burden can lead to patients’ missing parts or all of their treatments, eventually causing complications that can increase healthcare costs. Because of the increased number of people with chronic disease and rising healthcare costs overall, it is now more important than ever for health researchers to clearly define routines and understand how routines function to facilitate effective self-management.

Despite the central role of routines in changing, sustaining, and/or eliminating health behaviors, we could locate only one previous study on the concept of routines. Published in 2007 by Zisberg et al. [3], that analysis addressed how the concept of routines has been used in occupational therapy, nursing, and psychology. They considered routines broadly, not focusing on routines in the context of health behavior change. An updated definition is necessary to improve our understanding, specifically as nurses, of the mechanisms by which routines can be manipulated to influence health outcomes through nursing intervention [19]. This will facilitate nurse researchers in developing and testing routine-focused solutions for patients and better enable them to interpret when, why,

and how those solutions work [20]. Eventually, a clearer conceptualization of how routines function to improve health behaviors will lead to better nursing practices and improved patient health outcomes.

The purpose of this study was to analyze the concept of routines for improving health behavior in the behavior change literature and to synthesize a unified, up-to-date definition to guide future development of interventions to help people achieve and sustain routines that support improved health behaviors and outcomes.

2. Method

Rodgers’s [21] evolutionary method is an inductive approach that allows researchers to define concepts by analyzing how they are used over time and in diverse contexts. Rodgers’s method focuses on the attributes, antecedents, and consequences of a concept in its uses. The method stresses that these elements may differ according to time and context [22,23]. The contextual basis of a concept thus includes the antecedents and consequences but also the situational, sociocultural, and disciplinary contexts in which the concept has been applied [21]. We followed Rodgers’ six steps: a) identify the concept and surrogate terms; b) identify the setting and sample for data collection; c) label the attributes, antecedents, and consequences of the concept; d) analyze the characteristics as they are used in the articles; e) describe an exemplar of the concept, and f) identify implications for future concept development [21]. At the same time, we also utilized a four-stage systematic analytic method to enhance our quality of data synthesis [24]. First, we summarized a standard format for methodological information and concept outcomes of selected studies, including descriptive information (authors, date of publication, study design, sample characteristics, practice discipline such as nursing, occupational therapy, etc); and description of the study’s use of the concept using Rodgers’ framework (attribute, antecedents, consequences). Next, we compared the patterns of the extracted uses and definitions across sources. After this process, we identified key themes by grouping similar data that shared common characteristics. Lastly, we identified sub-groups of information within the key themes to identify important insights and findings. These themes and sub-groups were reviewed and discussed by all three authors, and reduced and synthesized into a provisional definition of routines for improving health behaviors.

2.1. Identifying the concept of interest

Following Rodgers, we first identified the concept of interest and possible surrogate and related terms to include in our literature search. Surrogate terms are simply different words for the same idea and are thus legitimately used in place of the concept term [22].

Related terms are terms that signify concepts that are closely related to the concept of interest but not close enough for one to be a surrogate term for the other. Related terms help illuminate key aspects of a concept by stressing the qualities the related ideas share [22] while also preserving distinctions. Related terms for the concept of “routines” include habits, automaticity, and rituals [1,25,26]. The terms are related because, as sources indicate, “habit” specifies thoughts, emotions, or behavioral tendencies that are formed subconsciously, without involving a purposeful arrangement of steps to reach a goal [27,28]. Though both habits and routines have something automatic about them, most sources understand routines to involve an element of directedness or purpose that might be less apparent in the concept of habit [3].

We identified automaticity and rituals as other terms closely related to routines. Anshel and Kang [27] describe automaticity as

self-regulated activities that are given minimal cognition. Others describe automaticity as behavioral responses to a cue that occur without detailed reasoning [29]. Sanders and Van Oss [30] sought to increase automaticity of medication-taking by embedding medication adherence activities (i.e., a pillbox or self-made adaptations) in patients' daily routines. Denham [26] used rituals and routines interchangeably. However, the two terms tend to differ as ritual refers to an event, occasion, or situation that has or is endowed with more than everyday significance [31]. In contrast, Markson and Fiese [32] utilized family rituals to improve asthmatic children's medication usages and symptoms and described family rituals as activities that ranged from religiocultural events, such as first communion and bat mitzvahs, to daily interaction events (e.g., dinner time) [32]. We would distinguish ritual as a formalistic and prescribed activities associated with a special event or situation distinct from the everyday, more integrated activities of routines. Though similar and sometimes interchangeable, ritual and routine are related not surrogate terms.

2.2. Sample for data collection

The first author searched CINAHL, Medline, Scopus, and Google Scholar from January to May, 2022. Articles were eligible if they a) addressed routines that were a form of activity to influence a health outcome; b) included a definition or description including some form of attributes, antecedents, and consequences of routines for improving health behaviors; and c) were available in the English language. No restriction was placed on the year of publication. We used keyword search terms "routine" (or "routines") and "improving health behavior," as well as related terms such as "habits," "automaticity," and "rituals." An example of a search string is: "(routine) AND (improving or enhancing or changing or optimizing) AND (health outcomes or health consequences or health impacts or health effects) AND (habits or rituals or automaticity)." Our research team made sure to retrieve related terms (e.g., habits) that were used interchangeably by researchers with routines rather than just used related terms so as not to miss any important characteristics of the concept.

2.3. Data analysis

The first author identified dominant, repeated patterns or themes related to the definitions, attributes, antecedents, and consequences of routines as they occurred in the selected articles [33]. All three authors reviewed the charted elements and together developed categories, reviewed examples for illustration, and worked as a team to shape a definition.

3. Results

The initial search result included 745 publications. The first author screened the titles and abstracts and removed duplicates and articles that did not provide a description or definition of routines. The first author reviewed 346 full-texts. After exclusion for non-topicality, 24 articles remained for analysis (Fig. 1). A total of 24 manuscripts that were analyzed reflected work in the disciplinary contexts of nursing ($n = 9$), psychology ($n = 5$), education ($n = 3$), general social science ($n = 3$), medicine ($n = 3$), and occupational therapy ($n = 1$). Study designs included case study ($n = 4$), descriptive quantitative ($n = 5$), mixed methods ($n = 1$), randomized controlled trial (RCT) ($n = 9$), quasi-experimental ($n = 2$), and qualitative ($n = 3$) research (Fig. 1). The outcomes of the 24 selected studies are focused on improving health behaviors, and the details of these outcomes are depicted in Table 1 and in Consequences below. Any definitions offered for the concept were

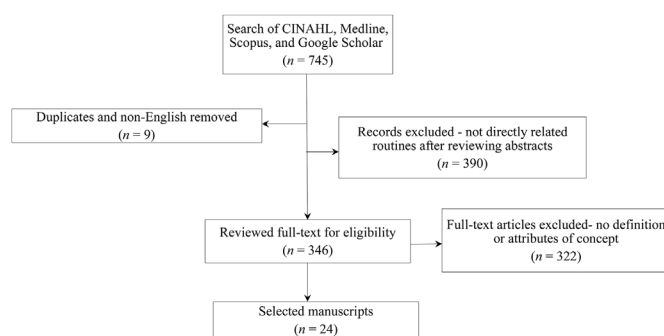


Fig. 1. Flow chart of literature search.

included in Table 2. Both Tables 1 and 2 detail the key findings of each selected article for analyzing the concept of routines.

3.1. Attributes

Attributes of a concept are features that all or most specimens of a concept will display. Having a clear idea of what comprises that collection of characteristics can allow the identification of the concept when it occurs [21]. The attributes or common features are not fixed and may change in time and differ across contexts or uses, but as a group they can provide a general outline of what defines the concept. We found that in the articles focused on healthy behaviors, routines had three primary attributes: a) repeated patterns, that are b) controllable by the patient, c) oriented to a health goal, and d) integrated into an overarching lifestyle (Fig. 2). These attributes are displayed in Table 1.

3.1.1. Repeated patterns

Seven articles depicted that routines involve repeated patterns of behavior that can be leveraged to improve health behaviors (Table 1). Four studies showed that repeating elements of routines enhances health behaviors. Specifically, one study showed routines must be initiated through repeated and frequent prompting [34]. They found that a repeated pattern was most successful for controlling activities, another attribute of routines (Fig. 2). Another study further supported this idea by emphasizing that routines have components that work on the basis of frequency [35]. Especially if desirable skills cannot be frequently practiced, it is hard to improve health behaviors. Several other studies emphasized the importance of group participation in adopting healthy repeated patterns because strong support from others contributed toward more successful health outcomes for the individuals [36,37].

In our study, repeated patterns are regarded as behavioral actions or elements that are repeated regularly or frequently in a specified timeframe. However, several studies focused just on repeating behaviors without a time component. For example, one study demonstrated that routines include certain activities or skills repeated over time but did not clarify exactly how often they are repeated [38]. Similarly, another study showed that heart failure patients had repeated medication non-adherence, which negatively affected their health outcomes but did not include a timeframe for how often medication non-adherence occurred [39]. In contrast, two studies have highlighted the importance of the time component when looking at the repeated characteristic of routines. The first of these studies emphasized that it is essential to repeat routine tasks daily to be successful in establishing and maintaining routines [40]. The other study pointed out that keeping consistent dinner routines is especially important for obesity prevention in children [37].

Table 1
Concept analysis of routines to improve health behaviors using Rodger's methods ($n = 24$).

Author/Location/Type of study	Population	Antecedents	Attributes	Consequences
Moore et al. [12]/USA/ Quantitative: RCT	Urban obese adolescents	Obese adolescents with unhealthy activities (e.g., lifestyles-diet, physical activity, sedentary behaviors, and stress managements) have an intention and motivation to lose weight.	Activities that are integrated into overarching lifestyles with a goal of targeting healthy weight reduced by using self-control and personal effort.	Improved individual physical wellbeing (e.g., reducing or maintaining healthy weight).
Anshel & Kang [27]/ USA/Descriptive	Faculty and staff from a university	Desire to change negative habits (e.g., poor social relationships, heightened stress, lack of respect and trust in others) that compromise good health and job performance.	Controllable repeated behavior by scheduling the new activities and developing a support system for carrying out new routines within the specific times with a goal of increasing positive activities.	Improved individual psychological wellbeing and participation in positive activities (e.g., less anger, improved sleep quality, more exercise, and less eating fast foods) with enhanced job performance.
Sanders & Van Oss [30]/ USA/Qualitative	Older adults	Older adults with problematic medication adherence	Changing activities with modification of external environment with a goal of improving medication adherence.	Improved individual physical wellbeing by enhanced medication adherence.
Markson& Fiese [32]/ USA/Quantitative: cross-sectional	Families who have children with asthma.	Asthma children with problematic family activities, highly motivated family to change their activities.	Coordinate good family activities as a protective factor against disease progress with a goal of preventing asthma (e.g., reducing stressful life events and family environments).	Improved family physical and psychological wellbeing with decreased anxiety and life-stressors in family.
Bambara et al. [34]/ USA/Case study	A 50-year-old patient with severe developmental disabilities	Patient who has challenging/problematic behaviors (e.g., aggression, self-injury, and noncompliance on non-preferred activities or events) from severe disability.	Controllable repeated activities by researchers with a goal of managing challenging behaviors.	Increased individual physical wellbeing and fewer problematic behaviors.
Jennings et al. [35]/ USA/Case study	Children	Developmental delay children with problematic activities (e.g., walking, communication, and self-feeding).	Outcome related, transdisciplinary repeated activities by family, and social support with a goal of improving developmental skills (e.g., dance to music, playing at splash table, dressing up, walking, putting away toys, and washing hands).	Improved individual and family wellbeing and increased developmentally appropriate activities (e.g., walking, communication and self-feeding).
Stiebel [36]/USA/ Quantitative: Quasi- experimental	Parents in facilitating augmentative & alternative communication	Parent who had poor communication skills and struggling relationships with children.	Controllable repeated daily activities with a goal of enhancing communication skills and relationships between parents and children.	Improved family wellbeing and child's problematic behaviors.
Taveras et al. [37]/USA/ Quantitative: RCT	Parents of 2–5-year-old children	Low-income community children who have high risk of obesity.	Consistent and controllable activities with a goal of reducing risk of obesity and being overweight.	Improved individual physical wellbeing, family wellbeing, reducing child's obesity risk and overweight prevention.
Hwang et al. [38]/ Taiwan, China Quantitative: RCT	Children with or at risk for developmental delay	Children with or at risk for developmental delay (e.g., delayed fine motor, gross motor, communication skills compare to the same age group)	Controllable repeated activities with family support with a goal of improving the developmental skills.	Improved family wellbeing, and child's self-care and social functions.
Barnason et al. [39]/ USA/Pilot RCT	Older adults who had heart failure.	Poor motivation to use medication and less enabling resources, and perceived needs for medication adherence.	Coordinate repeated lifestyle activities by enabling resources and to counsel the participant on the perceived needs for medication adherence with a goal of increasing medication adherence.	Increased individual physical wellbeing (higher levels of medication adherence).
Daley et al. [40]/USA &India/Mixed methods	Adults with autism spectrum disorders in India	Patients who have autism spectrum disorders have challenging daily routines (e.g., waking up, eating breakfast, going out activities).	Repeated daily activities that are sustainable with family support with a goal of improving deficit social behavior (e.g., scheduling events that fit all family members).	Improved family wellbeing, lowered burden to parents, and increased emotional satisfaction for family.
Buschbacher et al. [42]/ USA/case-study	Child with complex disabilities	Patient who has autism spectrum disorders and Landau-Kleffner syndrome with problematic behaviors (e.g., tantrums, severe hyperactivity, aggressions, and sleeplessness).	Controllable activities by family support with a goal of improving problematic behaviors (e.g., using photo cards, social story readings, choice boards, and transition warnings).	Improved family wellbeing, reduced problematic behaviors, and increased positive parent-child interactions.
Mahoney & Perales [45]/USA/ Quantitative: pretest-posttest	Children with autism spectrum disorders	Children with decreased level of cognitive functioning from autism spectrum disorders and pervasive developmental disorders	Controllable activities with family support with a goal of improving deficit social behavior (e.g., social play, vocalization activity, communication, and trust training with family members).	Improved family wellbeing, and children's social interactions and social-emotional functioning.
Bekelman et al. [46]/ USA/Qualitative	Low-income families with pre-school children	Low-income families with obese children motivated to change their family eating habits.	Controllable repeated activities by family support with a goal of healthy eating activities (e.g., valuing family togetherness at mealtime, ensuring intake of an adequate volume and variety of food).	Enhanced family wellbeing and improved consistent participation in positive daily activities (eating healthy dinner together with family).

Table 1 (continued)

Author/Location/Type of study	Population	Antecedents	Attributes	Consequences
Grossoehme et al. [47]/USA/Qualitative	Children who have cystic fibrosis	Cystic fibrosis children with problematic family routines (e.g., skipping treatments)	Controllable activities to manage symptoms of cystic fibrosis with a goal of relieving symptoms of disease.	Improved family wellbeing, cystic fibrosis management, and parental competence.
Rhee et al. [48]/USA/Quantitative: cross-sectional	Family with adolescents with asthma	Negative perceptions and attitudes towards medications and healthcare workers that compromise asthma condition.	Manageable behaviors by family support with a goal of improving treatment adherence (e.g., enhancing family relationships from having regular mealtime, and holiday gatherings).	Improved family wellbeing and improved asthma treatment adherence.
Matteson-Kome et al. [49]/USA/Quantitative: Pilot RCT	Inflammatory bowel disease patients	Nonadherent inflammatory bowel disease patients	Activities that are integrated into overarching lifestyles with a goal of enhancing medication adherences.	Improved individual physical wellbeing (specifically from increased medication adherence).
Russell et al. [50]/USA/Quantitative: RCT	Kidney transplant recipients	N/A	Activities that are integrated into overarching lifestyles with a goal of improving medication adherence.	Improved individual physical wellbeing (e.g., increased medication adherence, better lab values and lower infection rates).
Russell et al. [51]/USA/case study	Older adult who had kidney transplant	N/A	Activities that are integrated into overarching lifestyles with a goal of improving medication adherence.	Improved individual physical wellbeing (e.g., increasing medication adherence by 32.4%).
Russell et al. [52]/USA/Quantitative: RCT	Adult kidney transplant recipients	Kidney transplant patients who are not adherent with medications.	Activities that are integrated into overarching lifestyles with a goal of improving medication adherence.	Improved individual physical wellbeing and enhanced health outcomes e.g., improved creatinine/blood urea nitrogen values, infection rates, acute/chronic rejection rates, and death rates).
Günther et al. [53]/Germany/Quantitative: RCT	Pregnant women	Pregnant women who did not have prenatal education with motivation to have a healthy baby.	Activities that are integrated into overarching lifestyles on prenatal dietary behavior with a goal of reducing excessive gestational weight gain.	Increased individual physical wellbeing and reduced the proportion of women with excessive gestational weight gain.
Webel et al. [54]/USA/Quantitative: Pilot RCT	Human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) patients	HIV/AIDS patients with unhealthy activities (e.g., discontinuous sleep duration, and reduced sleep time than recommended).	Activities that are integrated into overarching lifestyles with a goal of improving sleep hygiene.	Improved individual physical wellbeing and sleep efficacy and quality of life for HIV/AIDS patients.
Albin et al. [57]/USA/Descriptive	Family of children with developmental disabilities with severe problematic behaviors	Children who have developmental disabilities alongside problematic family activities (e.g., having trouble with getting up and off to school, dinner time and going to bed).	Manageable behaviors by family support and manipulation of ecological variables, as well as setting events with a goal of improving developmental skills.	Improved family wellbeing (enhanced quality of life for both family and child involved).
Walsh et al. [62]/Australia/Quantitative: cross-sectional	Nursing student	Student nurses with unhealthy (smoking) behavior	Manageable unhealthy activities (smoking) with a goal of smoking cessation.	Improved individual physical wellbeing and increased confidence level to educate patient about smoking cessation.

Note: AIDS = acquired immune deficiency syndrome. HIV = human immunodeficiency virus. RCT = randomized control trial.

3.1.2. Controllable by the patient with or without support

Thirteen articles demonstrated the controllable activities aspect of routines and their potential manipulability to improve health (see Table 1). Controllability in this context specifically refers to a patient's agency in initiating and continuing an activity rather than its control by external sources (e.g., health care professionals, equipment). This includes the patient's management, choice, coordination, and selection of activity. Controllable activities often coincide with a participant's daily scheduled events. For example, one study described routines as controllable activities of daily living that are embedded in mealtime, wake-up, and sleep time to enhance medication adherence [30]. These controllable activities lead to an increase in healthy behaviors because they put patients' motivations and intentions to use and emphasize their autonomy.

In the case of minors, parents or guardians may act to control a child's routines by framing and presenting the minor's available choices [41]. For example, while parents or guardians control mealtime, television watching, and bedtime on an overarching level, they might present their child with photo cards, exemplary or interactive stories, choice boards, and/or transition warnings that allow for increased feelings of agency [42]. Parents or guardians

may utilize these and/or other educational resources to control health activities, resolve misunderstandings, and reinforce change [43]. Children with developmental issues can sometimes struggle to adjust their routines to new stages of development (e.g., walking, self-feeding, communication skills). The children's parents or guardians can smooth these transitions by using educational resources to understand their child(ren)'s specific needs at every stage [35,38,44,45]. Stiebel [36] found that parents of children with autism spectrum disorders benefitted from using educational resources to change their children's mealtime and bedtime routines (e.g., using picture cards to encourage healthy choices).

While the controllability of an activity by a patient, parents, or guardians is part of what centrally defines that activity as a routine for improving health behavior, controllable activities are rarely performed in isolation. An important aspect of controllability is it being grounded in a context of family and/or social support. Thirteen articles focused on how controllable activities that make up routines were enhanced, facilitated, or made possible by family support [32,35,36,38,40,42,44–48] or social support [34,35,39]. Three articles presented family support as imperative for families with children who have illnesses such as cystic fibrosis [47], asthma

[32,48], autism spectrum disorders and Landau-Kleffner syndrome [42]. In another study, educational resources supplemented family and health care team support in helping patients control daily activities around meals, sleep, and screen time with the goal of achieving a healthy weight for their child [37]. One study demonstrated how family support facilitated control of health behaviors in children with autism spectrum disorders, specifically through regularly scheduled use of social play, vocalization activities, communication, and trust training [45]. Other researchers have explored the positive role of family support in the daily process of working toward the attainment of educational goals by adult patients with a developmental delay or disability [35,44,45]. Though

less frequent in the articles we reviewed, social support beyond the family has also been identified as a factor in achieving control over health behavior in routines. Bekelman et al. [46] found that social and economic resource support from health care professionals (e.g., case-workers, social-workers, behavior change therapists) reinforced the routine activities of low-income families with over-extended parents to encourage children’s healthy eating behaviors.

3.1.3. Oriented to a health goal

All 24 articles included orientation toward a specific health goal in their use of the concept of routines to improve health behavior (Table 1). A health goal is a desired outcome related to a health

Table 2
Articles selected for analysis (n = 24).

Author	Type of routine/Field of study	Exemplary quotations
Moore et al. [12]	Daily, lifestyle environmental routines in nursing	Routines for improving health behaviors are “re-designing (activities) to promote healthier lifestyle choices ... (for) the desired behavior change, reducing the need to rely on memory, self-control, personal effort, or motivation. In other words, when environmental routines are designed to promote healthier behavior choices, one is less dependent on personal levels of motivation and more likely to succeed despite wavering motivation.” (p. 578)
Anshel& Kang [27]	Lifestyle routines in psychology	Routines for improving health behaviors are “often performed automatically that ... are given minimal cognition ... health-enhancing routines (are) replacing negative habits.” (p. 111)
Sanders & Van Oss [30]	Daily, weekly, monthly routines in occupational therapy	Routines for improving health behaviors are “the efficiency of regular performance.” (p. 92)
Markson& Fiese [32]	Family routines, and rituals in psychology	Routines for improving health behaviors are “the regularity of an activity ... (that is) organizing family life, (and their family is) responsible for planning and carrying out the activity, and what roles are assigned ... (for) family health.” (p. 472)
Bambara et al. [34]	Daily, self-care routines in education	Routines for improving health behaviors are “meaningful (process and) ... multiple opportunities must be available throughout the day, embedded within and across daily activities.” (p. 186)
Jennings et al. [35]	Daily, family routines in education development	Routines for improving health behaviors are “the most effective framework to support and sustain early intervention activities ... within natural environments for young children.” (p. 14)
Stiebel [36]	Daily routines in psychology	Routines for improving health behaviors are applying “a set of problem-solving skills across their daily routines.” (p. 160)
Taveras et al. [37]	Daily routines in medicine	Routines for improving health behaviors are “regular family (activities) ... for obesity prevention such as eating the evening meal as a family, obtaining adequate nighttime sleep, and having limited screen-viewing time.” (p. 418)
Hwang et al. [38]	Daily routines in medicine	Routines for improving health behaviors are “activities with temporal regularity ... (that) reflects common (health) goals of the family ... in the current environment.” (p. 3113)
Barnason et al. [39]	Daily routines in nursing	Routines for improving health behaviors are “daily (activities) to incorporate chronic disease management ... (and) enhance medication use ... ” (p. 850)
Daley et al. [40]	Daily routines in social science	Routines for improving health behaviors are a scheduled pattern of behaviors and “a coping strategy ... (and) daily activities ... (to enhance) social and intersubjective awareness ... (within) cultural beliefs.” (p. 143)
Buschbacher et al. [42]	Lifestyle routines in education	Routines for improving health behaviors are “(activities that) interfered with the family’s engagement and social interaction with one another ... (to improve) challenging behavior(s).” (p. 27)
Mahoney & Perales [45]	Daily routines in social science	Routines for improving health behaviors are “family action plans ... (that) could incorporate into their interactions with their children.” (p. 81)
Bekelman et al. [46]	Daily, family routines in nursing	Routines for improving health behaviors are “regular parental offering(s) ... are positively associated with children’s (health) quality.” (p. 1346)
Grossoehme et al. [47]	Daily, family routines in psychology	Routines for improving health behaviors are “engaging in various health-related behaviors throughout the day, development of a daily routine that successfully merges the many treatment-related tasks with other family and daily activities is key to effective management of the illness ... (and) routine(s) involve communication, commitment, and continuity.” (p. 126)
Rhee et al. [48]	Family routines in nursing	Routines for improving health behaviors are “nurturing ... effective problem-solving ... and making lifestyle changes, that align with medical and health advice to achieve optimum health outcomes.” (p. 2)
Matteson-Kome et al. [49]	Lifestyle routines in nursing	Routines for improving health behaviors are “daily habit to target for medication taking ... and help foster change in their personal systems to enhance adherence.” (p. 41)
Russell et al. [50]	Daily, lifestyle routines routines in nursing	Routines for improving health behaviors are “activities or habits around medication taking times ... such as (leaving medications) close to the coffee pot, television remote control, toothbrush, or car keys (to enhance) adherence.” (p. 3, 9)
Russell et al. [51]	Daily, lifestyle routines in nursing	Routines for improving health behaviors are “life forms, life cycles ... (that have) key to medication taking success.” (p. 174)
Russell et al. [52]	Lifestyle routines in nursing	Routines for improving health behaviors are “maintaining ... habits and linking medication taking with other behaviors ... to enhance medication self-management.” (p. 4)
Günther et al. [53]	Lifestyle routines in medicine	Routines for improving health behaviors are “integrating lifestyle(s) ... by offering daily ... regular physical activity, healthy diet ... (to) monitor gestational weight gain.” (p. 2)
Webel et al. [54]	Daily, lifestyle routines in nursing	Routines for improving health behaviors are “(activities) to assist individuals and their families to focus on changing the daily systems in their lives that affect health behaviors.” (p. 86)
Albin et al. [57]	Daily, family routines in social science	Routines for improving health behaviors are “activities ... or one’s family lifestyle (that has) contextual fit refers to the congruence or compatibility that exists between specific features and components of a behavioral support plan and a variety of relevant variables relating to individuals and environments.” (p. 82)
Walsh et al. [62]	Lifestyle routines in nursing	Routines for improving health behaviors are “the course of action ... to manage prospective situation (involved self-efficacy) ... that is related to ... (their) attitudes (for the) smoking cessation.” (p. 182)

indicator. In the articles we analyzed, routines for improving health behaviors included health goals such as improving medication or treatment adherence [30,39,48–52], meeting healthy weight targets [12,37,46,53], managing symptoms of chronic diseases such as autism spectrum disorders and acquired immunodeficiency syndrome [32,34,40,42,47,54], and improving children's developmental skills [35,36,38,44,45].

3.1.4. Integrated into an overarching lifestyle

Eight studies highlighted integration into lifestyle as a key attribute of routines for improving health behavior (Table 1). *Lifestyle* can be defined as the way in which a person or group lives in specific environments. The integration of activities into a lifestyle involves *embeddedness*, which can be defined as the depth, reach, and frequency of an activity in a person's way of living. Embedded activities are thoroughly and globally adopted in a person's environment, and they can change depending on an individual's life situation. For example, pregnant women's healthy diets, regular physical activities, and self-monitoring (e.g., weight and blood pressure monitoring) are routines woven into these pregnant women's lives temporarily [53]. Importantly, the integrated aspect of routines also means they can be impacted by environmental factors, such as having less supportive caregivers, discordant relationships with health care workers, and/or cultural beliefs that conflict with a biomedical model [12,50,51,54]. Manipulating or adjusting to these and other environmental factors is one way to facilitate change in routines that support healthy behaviors within overarching lifestyles [55,56].

3.2. Antecedents

Antecedents place a concept into a temporal context by referring to the preconditions or precursors of that concept [21]. Routines for improving health behavior are frequently preceded by problematic activities or unhealthy routines that require management and/or replacement. Such behaviors have been described as regular disruptive activities [34,40,57] and unhealthy lifestyles [12]. These precedent activities or routines may be influenced by individual factors (e.g., age, predisposed health conditions, motivation and intention, and level of cognitive function) and/or environmental factors (e.g., distance to health care, lack of support in the social environment, cultural considerations, and social expectations) (Table 1 and Fig. 2).

Age is a key antecedent or precondition of routines to improve health behaviors. Six studies showed that age (individual factor) is especially important when children are trying to form healthy

routines; these studies involved parents introducing healthy routines to children who were living with chronic diseases. It was found that children typically need more support than adults in sticking to their routines. In five studies, the individual factors of motivation and intention were identified as the most influential antecedents of routines for improving health behaviors (Table 1). Low motivation and lack of intention were described in three studies as preconditioning barriers to health and openness in situations where new routines would improve health outcomes [12,39,53]. Such findings highlight the value of leveraging patients' desires to participate in managing their diseases.

Interestingly, motivation and intention were effective antecedents for improving health behavior in studies involving participants who had a genetic or epigenetic predisposition to specific conditions (e.g., asthma, inflammatory bowel disease, and cystic fibrosis). Researchers noted that these patients often cultivated the necessary motivation and intention for successful routine integration over time and often with the guidance and support of family [32,47,49]. While a certain level of preparedness is a positive antecedent for healthy routines, those who are unexpectedly thrown into a new situation may struggle to adapt. In the context of sudden and major life changes, such as divorce [58], loss of a loved one [59], and/or losing a job, patient motivation and intention proved much less effective [60].

Seven articles focused on an individual's cognitive functioning as an antecedent to routines for healthy behavior. In these studies, declines or impairment in cognitive function could predispose individuals to unhealthy behaviors and routines (Table 1). One study found that in older adults routines were affected (e.g., skipped medications and missed follow-ups) by cognitive impairment and depression, which led to worsened health outcomes [30]. A similar pattern applied to children and adults with developmental disabilities. Some sources showed that a lack of cognitive understanding of the actions involved in a routine, due to developmental disabilities, was associated with patients' struggling to adopt and/or maintain healthy routines [44].

A number of articles focused on how environmental factors influenced or precipitated health-promoting routines. Proximity to health care was one such environmental factor. Our definition of proximity to health care is the distance a patient must travel from where they live to access appropriate health care. Proximity to health care can be a particular challenge for people living in rural areas or other places where health care distant or difficult to reach [12,52]. Socioeconomic status was a factor in managing families' routines for improving health behavior in several studies [12,37,45,46]. Low socioeconomic status was cited as a social-

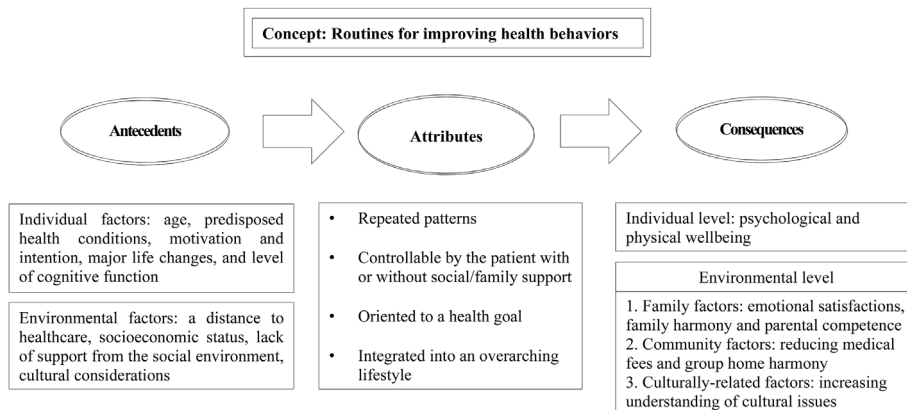


Fig. 2. Model of routines to improve health behaviors.

environmental condition of increased risk of obesity in children due to limited resources, including the time to maintain family routines [46]. An example of this is a low income family with parents who have to work long hours and therefore cannot create a stable family dinner routine. This instability leads to a child's developing unhealthy eating habits which contributes to obesity. Cultural environments, too, could precede or occasion routines. One study described how parents' cultural beliefs (e.g., preference to delay medical care, lack of awareness about certain conditions, strong beliefs about alternatives to biomedical treatment) affected routines of families caring for children with autism spectrum disorders [40]. In such cases, cultural factors served as the conditions in which routines for improving healthy behavior were adopted, changed, and/or further individualized.

Antecedents of routines to improve health behaviors were both individual and environmental and included age, motivation and intention, predisposed health conditions, major life changes, and level of cognitive functioning. Environmental factors included distance to health care, socioeconomic status, lack of support in social environment, and cultural considerations.

3.3. Consequences

A concept's consequences are the results of the concept itself in various situations [21]. Routines for improving health behaviors exert consequences at an individual level, family level, and community level (Table 1 and Fig. 2). Six articles demonstrated outcomes of an individual's physical wellbeing, while five studies described enhanced emotional connection and improvement in children's mental health as effects of routines to improve health behaviors (Table 1). Specifically, studies demonstrated that managing routines provides opportunities for healthy changes in children's developmental skills [35,36,45,46], chronic disease management [32,40,47,54], medication and treatment adherence [30,32,39,48,49,51,52], and smoking cessation [61,62].

Seven studies described outcomes of well-managed routines in family units, including increased sense of harmony and emotional satisfaction in the family (Table 1). One study demonstrated that well-managed routines could increase emotional satisfaction for families of children with autism spectrum disorders [40]. The other study showed that family routines allowed children to develop better self care and social functioning over a shorter duration of time [38]. Mahoney and Perales [45] confirmed that family-supported routines enhanced the social interactions and social-emotional functioning of children with autism spectrum disorder. Lastly, routines aimed at improving healthy behaviors improved community-level wellbeing by enhancing group home harmony [34], increasing understanding of cultural issues [40], and reducing medical fees [50–52].

In short, healthy routines exerted consequences across individual and environmental levels. At the individual level, routines to improve health behavior led to improvements in patients' psychological and physical wellbeing. At the environmental level, routines to improve health behavior showed effects at both the family level (e.g., increased family harmony and parental competence) and the community level (e.g., lower medical fees, and increased group home harmony). Another environmental effect was an increased understanding of culturally-related factors among both family and community members.

3.4. Definition

Routines to improve health behavior have been defined in diverse ways, including a scheduled, recurring pattern of behaviors [40], a set of habits or activities revolving around medication

adherence [13], and/or an effective framework for sustaining intervention activities [35]. These definitions often take shape according to the type of routine on which they focus. Daily routines were the most frequent type of routine, occurring in 62.5% (15/24) of the selected articles; family routines were described in 25% (6/24), and integrated lifestyles were described in 41.6% (10/24) (see Table 2). Most definitions for the concept of routines that are used in reference to daily routines point to controllable activities and/or manipulable daily events; these types of routines are typically used with children or patients with chronic health issues [34–38,40,44,46,47]. Definitions of family routines are usually similar to those of daily routines, with more emphasis in the former on the family unit making collective changes to behavior. In these cases, routines often serve as a coping mechanism for the whole family, rather than simply for the patient [40]. Meanwhile, routines for integrated lifestyles tended to be defined by modifications to patient environments and changes to problematic health activities and were more common in sources addressing adults with chronic diseases [12,27,42,49–54,62].

Based on our review of routines for improving health behaviors, we synthesized the following definition: *Routines for improving health behaviors are repeated, controllable activities that are integrated into a patient's overarching lifestyles (with or without social/family support) in coordination with and preconditioned by individual and environmental factors to achieve health goals and improve outcomes (affecting both individual and environmental wellbeing).*

4. Discussion

Despite the importance of routines for health behavior change [1], few theories or models have developed the concept of routines for improving health behaviors with any particularity. That lack of conceptual development may explain the relative scarcity of empirical studies that identify, measure, and/or address routines in behavior change. In studies that do address routines to improve specific health behaviors, only rarely do authors clarify what they mean by routines. The lack of definition may hamper efforts to design targeted interventions as well as explain why routines are effective. The studies that come closest to defining the concept of routines still lack clear connections to previous behavior theories and/or theoretical frameworks.

This gap is important for two reasons. First, understanding the definition of routines is the first step in building a strong theoretical foundation. Second, lacking a definition of routines leaves ambiguity in the results of the studies in terms of how or why interventions had effect. For example, two studies were able to help participants make changes in their behaviors by manipulating routines [52,54]. However, in neither study did the authors define routines explicitly or examine what components or aspects of routines might differentially have influenced outcomes. Nor did the studies view routine as an aspect of a theory in which the concept of routines was explicitly defined. Lacking a clear definition of what routines are in the context of interventions makes it more difficult to adapt, apply, or evaluate the findings. Such examples underscore the need for a clearly defined concept of routines to guide behavior health interventions in other health care settings including occupational therapy and physical therapy which use routines frequently to analyze patients' behaviors. By using a standardized definition of routines across the diverse health care disciplines, health care professionals can offer more seamless care to patients who are seen in multiple health care settings.

Our study tried to address this gap in conceptualization by developing a usage-based definition of routines with a goal of providing better behavior-focused interventions in nursing and other related health care area. As depicted in Fig. 2, the antecedents

and consequences of routines are encompassed within ecological factors, which represent the multilevel systems involved in patients' daily lives. These systems can be patient-related, family-related, community-related, and/or culturally-related environments that influence the patient [12]. This concept of multilevel influences can be expanded by using Bronfenbrenner's ecological system theory, which explains influences of diverse environments on human development. Our definition of routines includes these multilevel systems that allow researchers and nurses to better understand routines and apply this new knowledge into their practice with consistent and clear framework.

4.1. Future implications in nursing research and practice

Routines for improving health behaviors impact chronic disease individuals with and without self-care. Implementing appropriate interventions is essential to promoting healthy behaviors in patients. Due to an increased chronic disease burden and an aging population, understanding healthy routines that promote wellness and enhance patient quality-of-life should be a major concern for health care professionals, especially nurses [63,64]. Even though there was a concept analysis of general routines published earlier than our research study, the earlier publication did not specify how a definition of routine can be helpful specifically in the nursing and behavioral healthcare disciplines in detail.

Nurses are uniquely positioned to guide and support patient behavior for improving health outcomes through interventions that support the development of healthy routines. While developing and tailoring successful interventions to enhance health outcomes is often left to nurse researchers, our research has shown that understanding the concept of routines for improving health is invaluable for all nurses in practice. Our definition can be part of building effective nursing interventions that are flexible and easily transferrable to help people with diverse backgrounds in various clinical settings to improve health behavior, and realize positive health outcomes.

4.2. Exemplar

Amy is a recently divorced 50-year-old Asian woman who was diagnosed with diabetes type II about a year ago (antecedent: individual factors). She predicted that she would have diabetes one day since both her parent suffered from diabetes (antecedent: individual factors). Amy was a medication non-adherent patient and that behavior worsened when the pandemic emerged because she had less access to professional and social support (antecedent: environmental factors). Amy, who lives in a rural area with poor broadband access and lacks computer skills, had difficulty accessing online meeting sessions offered by her health care team during the early pandemic (antecedent: individual factors). Amy's nurse referred her to a public health nurse and provided online education and resources. At first, Amy was not happy about these changes in her life, but she scheduled her first online appointment and created a calendar reminder in her phone to remind her when to schedule future check-ins (attribute: repeated; controllable with social support). Amy also made a goal to walk 30 min on her lunch break every day, and meet her daughter for a healthy dinner every Tuesday (attribute: integrated into life; goal-oriented). Amy's hemoglobin A1C has been 6.5 for the past 3 months (consequences: individual physical wellbeing), and she feels much less stressed than before (consequences: individual psychological wellbeing). Her family has noticed her changing outlook and has started to include her more in social events (consequences: environmental level and family wellbeing).

Amy's exemplar describes a woman who struggled with a recent

chronic disease health diagnosis, resulting from individual and environmental factors adopted routines (with helpful nursing intervention that led to improved health and wellbeing for her and her family. Though the exemplar does not exhibit all the features of the concept of routines for improving health behaviors, it highlights the central attributes of integrated repeatable, controllable, and goal-oriented activities with key antecedents and consequences.

5. Conclusion

The concept of routines for improving health behavior has lacked clear definition in the existing literature. Even so, researchers use the term *routine* to refer to regular practices or baseline variables in experiments without conceptualizing how the variables function as routines. Using a systematic analytic method, we synthesized a definition of routines for improving health behaviors as repeated, controllable, goal-oriented health activities that occur through conscious effort on the part of the patient and integration into their overarching lifestyle to achieve health goals and maximize health outcomes. This definition acknowledges how ecological factors influence the antecedents and consequences of attributes at the individual, family, and community levels. Our study makes a significant contribution in that it clarifies routines for use by nurses and nurse scientists. In particular, a stronger definition of routines is likely to be essential to nursing in coming decades since they are particularly well-positioned for coaching and guiding patients living with chronic diseases. This grounded definition will be useful to nurse researchers as well, as part of building effective nursing interventions to help people improve health behavior, and realize positive health outcomes.

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Declaration of competing interest

There are no conflicts of interest.

Data availability statement

Data sharing not applicable to this review article as no datasets were generated or analyzed during the current study.

CRediT authorship contribution statement

Sunny Y. Ruggeri: Conceptualization, Methodology, Investigation, Formal analysis, Data curation, Funding acquisition, Writing - original draft, Writing - review & editing. **Amanda Emerson:** Conceptualization, Methodology, Validation, Resources, Writing - review & editing. **Cynthia L. Russell:** Conceptualization, Validation, Supervision, Resources, Writing - review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ijnss.2023.06.004>.

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