

ACCEPTANCE AND COMMITMENT THERAPY FOR CHANGING BEHAVIORAL RISK FACTORS IN STROKE: A SCOPING REVIEW



<https://doi.org/10.56238/arev7n4-059>

Submitted on: 03/07/2025

Publication date: 04/07/2025

Ially Maria Lima de Assis¹, Fernanda Formiga Flávio², Luis Gonzaga Barata Coelho Junior³, Gessiliane Alves de Andrade⁴, Larisse Bezerra Silva⁵ and Maria Áurea Catarina Passos Lopes⁶

ABSTRACT

Cerebrovascular accident (CVA) is one of the main causes of global disability, and can be ischemic or hemorrhagic. Primary prevention aims to prevent the first event, while secondary prevention focuses on reducing the risk of recurrence. Interventions based on Acceptance and Commitment Therapy (ACT) have shown promise in promoting health-related behavioral changes, promoting greater psychological flexibility and adherence to healthy lifestyles, even in the face of emotional challenges. This study aims to document the current evidence on the applicability of ACT in lifestyle change related to behavioral risk factors for stroke. This is a scoping review with a qualitative exploratory approach, based on studies obtained through a search in virtual electronic databases. ACT, as part of third-wave therapies, has the potential to be effective in promoting health, increasing patients' quality of life, and contributing to stroke prevention strategies.

Keywords: Stroke. Lifestyle. Disease Prevention. Acceptance and Commitment Therapy.

¹Psychologist
School of Public Health of Ceará - ESP-CE
E-mail: iallymarialima@gmail.com
ORCID: 0009-0000-5031-0638

²Nurse
Federal University of Campina Grande
E-mail: fernanda.ff@isgh.org.br
ORCID: 0000-0003-0686-2712

³Biomedical
Catholic University Center of Quixadá
E-mail: Biomedicojr@hotmail.com

⁴Physiotherapist School of Public Health of Ceará - ESP-CE
Email: gessiliane.andrade@gmail.com
ORCID: 0000-0003-4054-753X

⁵Nutritionist
School of Public Health of Ceará - ESP-CE
E-mail: larissebezerra37@gmail.com
ORCID: 0000-0001-5902-2675

⁶Physical therapist
State University of Ceará
E-mail: macpl.fisio@gmail.com
ORCID: 0000-0002-0580-5639

INTRODUCTION

Stroke is one of the main causes of loss of functionality in the world. It is characterized as a category of cerebrovascular diseases caused by interruption of cerebral blood flow due to infarction, known as ischemic stroke or spontaneous hemorrhage (hemorrhagic stroke). There is also the classification of Transient Ischemic Attack (TIA), when symptoms last up to an hour and have complete remission (BRASIL, 2021).

In addition to the functional consequences, with more than 160 million years of healthy life lost each year due to stroke-related deaths and disabilities, stroke also represents a major cause of mortality, accounting for an average of 7 million deaths annually. In addition to mortality, the risk of stroke recurrence is significant. Evidence of this recurrence ranged from 5.7% to 51.3%, and it is more common in the atherosclerosis subtype of large arteries and in the cardioembolic subtype. Given this high risk of recurrence, prevention strategies become essential to reduce new episodes of the disease (FEIGIN et al., 2024; KOLMOS; CHRISTOFFERSEN; KRUUSE, 2021).

Given this scenario, the adoption of preventive measures becomes essential to minimize the incidence and recurrence of stroke. Primary prevention is called when interventions are performed in patients without previous stroke or TIA. Most patients survive a first ischemic stroke but face a high risk of recurrence. Secondary prevention, on the other hand, focuses on the mechanisms responsible for the initial incident and aims to reduce the chance of a new episode (CAPRIO; SOROND, 2019).

In this context, understanding the main risk factors involved in the development of stroke is essential for the implementation of effective prevention strategies. A global study on the impact of stroke concluded that 90.5% of the burden of the disease is related to modifiable risk factors, with 74.2% directly linked to behaviors such as smoking, inadequate diet, and sedentary lifestyle. Other risk factors include high blood pressure, a diet low in fruits and vegetables, high body mass index, smoking, environmental and household pollution, insufficient consumption of whole grains, high fasting blood glucose, and low physical activity (FEIGIN et al., 2016)

Thus, most occurrences of this disease could be avoided by a combination of healthy diet, physical exercise, blood pressure control, and the cessation of smoking dependence (KLEINDORFER et al., 2021). It is also important to note that prevention is more effective when lifestyle changes are made to reduce several important risk factors,

since cerebrovascular risk factors add up and can even intensify each other (LEENING; BERRY; ALLEN, 2016).

Therefore, there is a need for studies that seek effective treatment and health promotion measures aimed at behavioral modifiable risk factors, given their percentage in the repercussion of stroke globally. Despite the proven existence of benefits in health-related behavioral change, such factors remain poorly controlled among stroke survivors (FEIGIN et al., 2016). The most recent guidelines for primary or secondary prevention highlight that lifestyle changes need more than pamphlets and that programs that include theoretical habit change models, proven techniques, and multidisciplinary support are needed (KLEINDORFER et al., 2021).

Acceptance and Commitment Therapy (ACT) is one such approach, known as belonging to the third wave of cognitive behavioral therapies. It is a promising resource for a number of different contexts that promote the improvement of Quality of Life (QoL) through intervention on the construct of psychological flexibility, including health-related behavioral change. The goal would be to start and maintain a new lifestyle so that there is consistency with the patient's personal values even if unpleasant sensations occur (ZHANG et al., 2018).

The premise of these interventions for health behavior change is that, by relating differently to their internal experiences — accepting them without judgment instead of avoiding them — the individual can develop greater behavioral flexibility. This implies engaging adaptively in behaviors that are more appropriate to the context, prioritizing responses to long-term contingencies rather than short-term ones (BREWER et al., 2011).

From the accomplishment of this study, it is expected to contribute to a better understanding of the therapeutic possibilities of ACT within the scope of the behavioral health standard for professionals in the area. Therefore, the relevance of research investigating effective approaches aimed at modifiable behavioral risk factors is highlighted, considering their significant influence on the occurrence of stroke on a global scale. Thus, the objective is to document the current evidence about the applicability of ACT in lifestyle changes related to modifiable stroke risk factors.

2 METHODOLOGY

This study is a scoping review with a qualitative exploratory approach, based on studies obtained through a search in virtual electronic databases. The scoping review is

appropriate because it is a rigorous and transparent way of mapping, summarizing and disseminating the findings of a broad theme of study such as the one proposed (ARKSEY; O'MALLEY, 2007).

The construction of the research strategy was based on the PCC strategy and corresponds to Population, Concept, and Context (ARAÚJO, 2020). According to the author, this strategy fits well with the scoping review methodology because it makes it possible to create an overview of the researched theme. The basis for answering the research question, then, was built from the following process: identification of the theme; selection of hypotheses; elaboration of a research question through the adapted PCCo strategy; establishment of inclusion and exclusion criteria; search, categorization and evaluation of the works included in the scoping review; interpretation of the results; presentation of the review carried out and synthesis of knowledge (ARAÚJO, 2020).

The research question follows the acronym PCCo. The "P" element refers to the lifestyle associated with modifiable risk factors for stroke. The "C" covers interventions based, in whole or in part, on Acceptance and Commitment Therapy for behavioral lifestyle change. The "Co" stands for disease prevention and health promotion.

The product of this methodological procedure consisted of the following guiding questions: How can ACT act to change lifestyle? How can ACT contribute, then, to primary and secondary stroke prevention?

After consulting the health terminologies, the descriptor databases of the BIREME Virtual Health Library (VHL) (DeCS) were used. The DECS/MESH descriptors used in the research were described below:

Table 01. Search strategy creation process. Quixeramobim-CE, 2025.

	P	C	Co
Extraction	Lifestyle associated with Risk Factors	Acceptance and Commitment Therapy	Disease Prevention and Health Promotion
Conversion	Weight Reduction Programs (DECS); Obesity (DECS); Overweight (DECS); Diet Therapy (DECS); Obesity Management (DECS); Intuitive Eating (DECS) Smoking Cessation (DECS); Tobacco Use Cessation (DECS); Tobacco Consumption Reduction (DECS); Tobacco Use Cessation (DECS); Physical Exercise (DECS); Hypertension (DECS); Diet for Diabetics (DECS); Pre-Diabetic Status (DECS); Weight Reduction Programs (MESH); Obesity; Overweight (MESH); Diet Therapy (MESH); Obesity Rehabilitation (MESH); Intuitive eating (MESH); Smoking cessation (MESH); Smoking reduction (MESH); Tobacco Use Cessation (MESH); Exercise (MESH); Physical Activity (MESH); Hypertension (MESH); Diet, Diabetic (MESH); Prediabetic State (MESH).	Acceptance and Commitment Therapy (DECS); Acceptance and Commitment Therapy (MESH)	Primary prevention (DECS); Secondary prevention (DECS); Disease Prevention (DECS); Health Promotion (DECS); Health-Related Behaviors (DECS); Lifestyle (DECS); Healthy Lifestyle (DECS); Quality of Life (DECS); Primary Prevention (MESH); Secondary Prevention (MESH); Preventive Medicine (MESH); Health Promotion (MESH); Health Behavior (MESH); Behaviour Change (MESH); Life Style (MESH); Healthy Lifestyle (MESH); Well-being (MESH); Quality of Life (MESH).
Combination	((Weight Reduction Programs) OR (Obesity) OR (Overweight) OR (Diet Therapy) OR (Obesity Management) OR (Intuitive Eating) OR (Smoking Cessation) OR (Tobacco Consumption Reduction) OR (Tobacco Use Cessation) OR (Physical Exercise) OR (Hypertension) OR (Diabetic Diet) OR (Pre-Diabetic State) OR ((Weight Reduction Programs) OR (Obesity) OR (Overweight) OR (Diet Therapy) OR (Obesity Rehabilitation) OR (Intuitive eating) OR (Smoking cessation) OR (Smoking reduction) OR (Tobacco Use Cessation) OR (Exercise) OR (Physical Activity) OR (Hypertension) OR (Diet, Diabetic) OR (Prediabetic State))	((Acceptance and Commitment Therapy) OR (Acceptance and Commitment Therapy))	((Primary Prevention) OR (Secondary Prevention) OR (Disease Prevention) OR (Health Promotion) OR (Health-Related Behaviors) OR (Lifestyle) OR (Healthy Lifestyle) OR (Quality of Life)) OR ((Primary Prevention) OR (Secondary Prevention) OR (Preventive Medicine) OR (Health Promotion) OR (Health Behavior) OR (Behaviour Change) OR (Life Style) OR (Healthy Lifestyle) OR (Well-being) OR (Quality of Life))

Use	((Weight Reduction Programs) OR (Obesity) OR (Overweight) OR (Diet Therapy) OR (Obesity Management) OR (Intuitive Eating) OR (Smoking Cessation) OR (Tobacco Reduction) OR (Tobacco Use Cessation) OR (Physical Exercise) OR (Hypertension) OR (Diabetic Diet) OR (Pre-Diabetic State) OR (Weight Reduction Programs) OR (Obesity) OR (Overweight) OR (Diet Therapy) OR (Obesity Rehabilitation) OR (Intuitive eating) OR (Smoking cessation) OR (Smoking reduction) OR (Tobacco Use Cessation) OR (Exercise) OR (Physical Activity) OR (Hypertension) OR (Diet, Diabetic) OR (Prediabetic State)) AND (Acceptance and Commitment Therapy) AND (Prevention OR (Secondary Prevention) OR (Disease Prevention) OR (Health Promotion) OR (Health-Related Behaviors) OR (Lifestyle) OR (Healthy Lifestyle) OR (Quality of Life)) OR (Primary Prevention) OR (Secondary Prevention) OR (Preventive Medicine) OR (Health Promotion) OR (Health Behavior) OR (Behaviour Change) OR (Life Style) OR (Healthy Lifestyle) OR (Well-being) OR (Quality of Life)
-----	--

Source: The authors.

The search was carried out using the following databases: Medical Literature Analysis And Retrieval System Online (MEDLINE); Portal of Electronic Journals of Psychology (PePSIC); PsycINFO / American Psychological Association (APA); Scientific Electronic Library Online (SciELO) / COCHRANE BASE (EMBASE).

The inclusion criteria established were studies that encompass the theme under study: Use of Acceptance and Commitment Therapy for lifestyle change related to modifiable risk factors for stroke (smoking, inadequate diet and low level of physical activity) (FEIGIN et al., 2016). The articles available in full, published in the last 5 years that had a type A and B level of evidence according to BRASIL (2014) were included. This period was established with the adopted theoretical framework: POWERS et al. (2019). Studies published in Portuguese, English or Spanish that answered the research question were also included.

Editorial articles or personal opinions, abstracts of meetings, articles of independent review of the design, as well as other non-peer-reviewed publications were excluded; incomplete publications that do not have clear outcomes regarding the topic under study and paid studies that are not available for free in full. Studies whose outcome was directed to the age group of children or adolescents or to a group with a specific medical diagnosis other than obesity, diabetes, or cardiovascular disease (medical conditions associated with stroke) were also excluded.

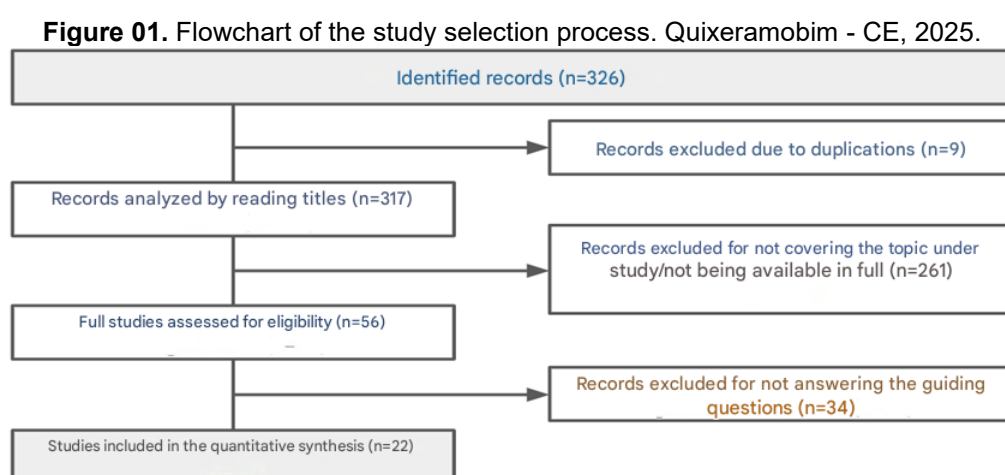
Initially, the protocol of this scoping review was recorded, as it is a complex study, which involves the development of stages with independent evaluation. This research had a development protocol registered at the OSF/Center for Open Science (COS): <https://doi.org/10.17605/OSF.IO/4FG9K>.

Next, the data extraction stage of the primary studies was carried out, using a collection instrument (URSI, 2005). Through the adaptation of this original instrument, the main aspects of this review were highlighted. It is noteworthy that this research did not require consideration by the Research Ethics Committee (REC) because it is a bibliographic study. The original ideas of each author were referenced, so that the references used correspond to the content cited.

Subsequently, following a deeper reading of the studies, files were made to identify the concepts and key definitions brought by the articles for more support and quality to this research, thus producing two key tables for the analysis of what was found. One detailing the main characteristics of each study analyzed and the other describing the interventions performed.

RESULTS

From the search in the databases, 326 articles were located. Subsequently, the studies that were in duplicate ($n=9$) were removed by reading their respective titles. Next, the abstracts of the articles were read and they were excluded ($n=261$), as they did not fit the theme under study or were not available in full. Records that did not answer the study's guiding questions were also excluded ($n=34$). There are then 22 articles left for qualitative analysis (figure 01).



Source: The authors.

Regarding the databases used, it was found that 86.3% ($n=19$) of the studies located were identified in the PubMed database, while 13.63% ($n=3$) came from EMBASE. In terms of geographic distribution of publications, the United States stood out as the

country with the highest number of published studies (68%; n=15), followed by the United Kingdom (13%; n=3), Italy (9%; n=2) and China (4.54%; n=1). With regard to the years of publication, there is a decreasing distribution, with a higher concentration of studies published in 2022 (31.81%; n= 7).

The results presented highlight the effectiveness of ACT-based interventions, especially in terms of participant engagement and measurable behavioral changes. Studies evaluating smoking cessation apps have reported high engagement rates and significant improvements in abstinence rates among users. Telephone coaching interventions have shown potential to promote weight loss, although preliminary data indicate that consistency in follow-up is a critical factor. In addition, the patterns of use of these tools indicate a growing acceptance of digital approaches, reinforcing their role as viable and effective strategies.

Considering the importance of maintaining behavioral patterns of healthy habits, the follow-up time of the results analyzed in this research is highlighted. Among those analyzed, 63% (n= 15) had outcomes analyzed within twelve (12) months after the intervention. A study, conducted by Lillis et al. (2021), which sought to compare an intervention with ACT and another with Emotion Regulation and Control for the maintenance of weight loss, distinguished itself by analyzing results 24 months after the intervention. The study with the shortest follow-up time was by Spatola et al., (2024), with only six (06) weeks of analysis.

Chart 2, presented in full below, describes the main characteristics of each study analyzed.

Table 02. Characterization of the localized studies. Quixeramobim-CE, 2025.

AU TOR, YEAR	CO UNT RY	DESIGN OF STUDY	BA IF OF DATA	METHODS	KEY FINDINGS
(BRICK ER et al., 2020)	This of Uni Of	Stratified, double- blind, individuall y randomiz ed clinical trial	MEDLI NE	It evaluated 2,415 adult smokers. They were divided into two groups: one with ACT-based smoking cessation (n=1,214) and the other in USCPG (n=1,201) with 3-, 6-, and 12-month post-randomization follow-up.	Compared to a USCPG-based smartphone app, an ACT-based smartphone app was more effective for smoking cessation and thus may be an impactful treatment option.

(BRICKER et al., 2021)	This of Uni Of	Stratified, individually randomized, two-arm pilot trial	MEDLINE	It compared ACT (n=53) with TCP (n=52) using 25 telephone coaching sessions (15-20 min) over 12 months. Weight was measured at baseline and at 3-, 6-, and 12-month post-randomization follow-ups.	The conclusion of the study was preliminary evidence that ACT telephone coaching can be effective for weight loss.
(BRICKER et al., 2022)	This of Uni Of	Randomized double-blind stratified two-arm clinical trial	MEDLINE	1,170 adult smokers of at least 10 cigarettes/day were recruited to evaluate the 30-day PPA at 12 months. Participants received five sessions of ACT or QL by phone, nicotine patch (4 weeks), and gum/lozenge (2 weeks). Outcomes were measured during the intervention period.	Those in the ACT group found the treatment more helpful for quitting smoking compared to the QL group. Although both groups showed similar rates of smoking cessation throughout the year, the ACT group showed a trend toward a greater reduction in the number of cigarettes smoked per day.
(CATTIVELLI et al., 2021)	Italy	Individually Randomized Clinical Trial	EMBASE	One hundred and fifty-five adults (mean BMI 43.8) participating in a multidisciplinary weight-loss rehabilitation program were randomized into two conditions: ACT and CBT. Measurements were taken at the beginning and end of the intervention and after 6 months.	Patients who received the ACT intervention were more likely to achieve a weight loss $\geq 5\%$ from baseline to follow-up and to maintain weight loss after discharge. The ACT intervention was therefore effective in maintaining weight loss over time.
(KAREKLA; SAVVIDES; GLOSTER, 2020)	This of Uni Of	Randomized Pilot Clinical Trial	MEDLINE	Smokers with no immediate interest in quitting were recruited. Of the 105 participants, 84 completed online questionnaires. They were randomized to six sessions of an ACT-based avatar intervention (Flexiquit; 49 people) or to a waiting list (35 people). Key outcomes included smoking cessation and number of cigarettes per day; the secondary ones, nicotine dependence, intention to quit and self-efficacy. Outcomes were measured at the beginning and end of the intervention and 6-month follow-up.	28.57% of participants in the treatment condition versus 11.43% in the wait-list control group were abstinent in the post-treatment condition. An avatar-led digitized ACT smoking cessation intervention results in high smoking cessation rates and has a high potential for applicability, especially among the hard-to-reach young adult smoking population.
(LEVIN et al., 2021)	This of Uni Of	Pilot Randomized Controlled Trial	EMBASE	A sample of 79 overweight/obese adults was randomized to receive the 8-week ACT on Health program plus weekly telephone coaching or to a waitlist.	Participants in ACT showed greater improvement than the waiting group in HEI and in almost all eating behaviors, weight, mental health, self-stigma, and psychological inflexibility. There was no impact on physical activity. After 8

				Outcomes were measured at the beginning and end of the intervention and there was an 8-week follow-up.	weeks, most of the improvements were maintained, except in the HEI.
(LEVIN et al., 2022)	United Kingdom	Randomized controlled clinical trial	MEDLINE	A sample of 102 adults interested in improving their diet and physical activity was randomized to an HBT, HBT+ACT app, or waitlist condition. Outcomes were measured at the beginning and end of the intervention and there was an 8-week follow-up.	Participants rated the usability of the apps positively, but showed mixed satisfaction. Both HBT and HBT+ACT reduced sedentary behavior compared to the waiting list, and HBT+ACT increased cognitive restriction in eating relative to HBT. None of the apps improved other health behaviors. The results indicate partial benefits of the ACT Matrix for physical activity, with limited overall impact.
(LILLIS et al., 2021)	This of Uni Of	Pilot Randomized Controlled Trial	MEDLINE	N = 188 participants received a 12-week online weight loss intervention and N = 102 who lost $\geq 5\%$ were then randomly assigned to either a 1-day, 5-hour ACT workshop, Self-Regulation (SR) or no workshop (Control) with 3 months of limited email follow-up. Assessments were conducted at baseline, 3, 6, 12, 18, and 24 months post-intervention.	ACT had greater overall weight loss when compared to Control. Post hoc analyses showed that ACT had significantly greater weight losses than Control among those with the lowest initial weight loss, and significantly greater weight loss than SR among those with the highest initial weight losses (10%+).
(MAK; LEUNG; LOKE, 2020)	China	Clinical Trial	MEDLINE	Participants were recruited from six primary health care centers. A total of 144 were eligible and randomized to the intervention group (ACT) (n = 70) and control group (n = 74). Evaluations were performed at baseline and 3, 6, and 12 months after the intervention.	The current study found that the brief ACT intervention failed to produce a significant quit rate, but it was promising in terms of eliciting cognitive changes, greater psychological flexibility, and more confidence in quitting cigarettes, when compared with the use of self-help materials.
(MCCLURE et al., 2020)	This of Uni Of	Clinical Trial	MEDLINE	Participants (n = 450) were recruited and randomized to either ACT-based group counseling or a CBT-based group program with matched attention. All were prescribed nicotine patches for 8 weeks. Assessments were conducted at baseline and 1 week, 6 months, and 12 months after intervention.	Group-based ACT and CBT had similar long-term dropout rates in this randomized trial. Group-based ACT is a reasonable alternative to group-based CBT for smoking cessation.
(MUELLER et al., 2022)	United Kingdom	Randomized controlled clinical trial	MEDLINE	Adults with a BMI ≥ 25 kg/m ² were randomized to intervention on the SWiM-C platform or to a standard wait-list counseling group. Participants completed online	SWiM-C improved several psychological determinants of successful weight management and had a protective effect on well-being during the pandemic. However, differences in weight and some other

				outcome assessments at baseline and after 4 months.	outcomes were compatible with no effect of the intervention, suggesting that further refinement of the intervention is needed.
(MUELLER et al., 2023)	United Kingdom	Twelve-month follow-up of a randomized clinical trial	MEDLINE	Participants (≥ 18 years, body mass index ≥ 25 kg/m ²) were randomized (196 to standard counseling and 192 to ACT-based intervention). Participants filled out online questionnaires at baseline, four months, and twelve months later.	SWiM-C improved eating behaviors, experiential avoidance, and physical activity. Further refinement of the intervention is needed to ensure significant effects on weight before implementation in practice.
(O'CONNOR et al., 2020)	This of Uni Of	Pilot Trial Randomizations of the Controlled	MEDLINE	150 adults smoking 10 or more cigarettes per day were randomly assigned to groups of TCP, ACT, or ACT combined with the smartphone app. Measures of smoking status and ACT processes were obtained at baseline, after treatment, and at the 6-month follow-up.	The ACT Group did not show significant improvements in mental health or ACT processes relative to the CPT Group at post-treatment or follow-up.
(POTTS ; KRAFFT; LEVIN, 2020)	This of Uni Of	Pilot Trial Randomizations of the Controlled	EMBASE	Eligible participants (n=55) were randomized to either the ACT Self-Help Book plus telephone coaching intervention (GSH-P; n=17), ACT Self-Help Book plus email prompts only (GSH-E; n=20), or a waitlist condition (n=18), with online self-report assessments at baseline and post-treatment (8 weeks).	Participants reported high satisfaction and engagement with ACT's self-help book, with no differences between email (GSH-E) and phone (GSH-P) support. The GSH-P showed greater improvement in healthy eating and overall physical activity, but no group topped the waiting list in self-reported BMI, emotional eating, and a second measure of physical activity. The results indicate that ACT's self-help book with email reminders can reduce weight stigma and can improve health behaviors, while phone coaching offers additional benefits.
(SANTIAGO-TORRES et al., 2021)	This of Uni Of	Clinical Trial Randomizations of the	MEDLINE	Participants were randomized to receive either iCanQuit (n = 437) or QuitGuide (n = 460) for 12 months. The primary endpoint was the 30-day PPA of a complete case self-reported at 12 months. Secondary outcomes were 7-day PPA, smoking cessation and multiple imputation, prolonged abstinence, and cessation of all tobacco products at 12 months.	The iCanQuit smartphone app was more effective and engaging for smoking cessation among low-income adults than a USCPG-based smartphone app. A nationwide spread trial of iCanQuit is warranted to determine if iCanQuit can alleviate cessation-related disparities among low-income adults.
(SANTIAGO-TORRES et al., 2022a)	This of Uni Of	Clinical Trial	MEDLINE	Cessation, ACT-based process changes, engagement, and satisfaction were compared between American Indian and Alaska	In a national sample with high data retention and participant engagement, this is the first study to show that a digital intervention can be effective in helping American Indians and Alaska

				Native participants from iCanQuit (n=89) and QuitGuide (n=80) enrolled in the iCanQuit study. The primary outcome was 30-day, self-reported, full-case point prevalence abstinence. The follow-up times were 12, 6 and 3 months.	Natives quit smoking.
(SANTI AGO-TORRES et al., 2022b)	This of Uni Of	Clinical Trial	MEDLINE	We determined the acceptability and efficacy of an ACT-based smartphone app (iCanQuit) relative to a USCPG smartphone app (QuitGuide) for smoking cessation among rural participants (n=550) enrolled in the two-arm randomized iCanQuit trial. Participants randomized to receive iCanQuit or QuitGuide reported abstinence from 30 days randomized enrolled.	The findings suggest that iCanQuit had significantly higher short-term abandonment rates, descriptively higher long-term abandonment rates, and operated through its hypothetical mechanisms of action relative to QuitGuide. Larger studies in the future are needed to better evaluate the effectiveness and dissemination methods of the iCanQuit app for smoking cessation among rural U.S. adults across the country.
(SANTI AGO-TORRES et al., 2022c)	United States	Clinical Trial	MEDLINE	Secondary analysis of a two-arm randomized trial with 12-month follow-up. Participants were randomized to receive either iCanQuit (n = 274) or QuitGuide (n = 280) for 12 months. Smoking cessation outcomes were measured at 3, 6, and 12 months. The primary outcome was the 30-day self-reported complete case PPA at 12 months.	Among Black adults, a smartphone app based on acceptance and commitment therapy appeared to be more effective and engaging for quitting smoking than the QuitGuide app based on the United States Clinical Practice Guidelines.
(SANTI AGO-TORRES et al., 2022d)	This of Uni Of	Secondary analysis of a randomized trial	MEDLINE	A total of 316 black adult smokers received access to WebQuit or Smokefree for 12 months. Participants reported 30-day and 7-day abstinence from smoking at 3, 6, and 12 months. Treatment involvement was objectively measured and compared.	WebQuit participants engaged more with their website and quit smoking at a slightly higher rate relative to Smokefree participants, although not significant. The findings suggest high acceptability of ACT-based digital interventions to enable Black adult smokers to engage with and sustain behavior change.
(SANTI AGO-TORRES et al., 2023a)	This of Uni Of	Clinical Trial	MEDLINE	Adult participants (n=1452) who are highly dependent on nicotine received either the iCanQuit or QuitGuide app for 12 months. Cessation outcomes were self-reported 30-day PPA of nicotine-containing tobacco products at 3, 6, and 12 months after randomization.	Among nicotine-dependent adults, an app-delivered ACT-based intervention was more engaging and effective than a USCPG-based intervention for the cessation of nicotine-containing tobacco products.
(SANTI AGO-TORRES et al., 2023b)	This of Uni Of	Pilot Trial Randomized	MEDLINE	Comparison of 12-month smoking cessation rates	E-cigarette use while simultaneously receiving an app-based smoking

TORRES et al., 2023b)	Of	s of the Controlled		between participants who used e-cigarettes on their own (n=465) versus those who did not (n=1097). The primary endpoint of cessation was the self-reported PPA of 30 days at 12 months.	cessation intervention was associated with a lower or no improved likelihood of quitting smoking cigarettes compared with no use. Future behavioral treatments for smoking cessation should consider including information about the potential consequences of e-cigarette use.
(SPATOLA et al., 2024)	Italy	Pilot Randomized Controlled Trial	MEDLINE	92 patients with coronary heart disease undergoing cardiac rehabilitation were enrolled and randomized, following an unbalanced randomization ratio of 2:1 for the ACT group and the control group. The primary outcomes were LDL, resting systolic blood pressure, BMI, and psychological well-being as measured by the PGWBI. Outcome measures were assessed at baseline and end.	Although the analyses revealed null results, the results can inform the design of future ACT-based CR interventions and can help researchers strike a balance between the idealized implementation of an ACT intervention and the structural limitations of existing CR programs.

Legend: ACT: Acceptance and Commitment Therapy; USCPG: National Cancer Institute Smoking Cessation App based on U.S. clinical practice guidelines (USCPG); CPT: Standard Behavioral Therapy; QL: Smoking Cessation Service Line; TAC: Behavioral Analytic Therapy; CBT: Cognitive Behavioral Therapy; AAQ-II: Acceptance and Action Questionnaire-II; CORE-OM: Clinical Outcome in the Routine Outcome Assessment; HEI: healthy eating index; HBT: Monitoring of health behavior; BMI: Body Mass Index; LDL: Low-density lipoprotein; PGWBI: Psychological General Well-Being Index; PPA: Prevalence of Punctual Abstinence, CU: Usual Care.

Chart 3 details the interventions carried out in each study, specifying the duration, resources and modalities used, as well as the modifiable risk factor addressed.

Table 3. Characterization of the interventions and resources used. Quixeramobim-CE, 2025.

AUTHOR, YEAR	INTERVENTIONS	RESOURCES /MODE	MODIFIABLE RISK FACTORS
(BRICKER et al., 2020)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(BRICKER et al., 2021)	25 coaching phone calls (15-20 minutes each) from ACT or TAC.	Phone Call	Inadequate diet/low level of physical activity
(BRICKER et al., 2022)	Intervention Group: 5 sessions of ACT Coaching by telephone Control Group: 5 sessions of Coaching by standard telephone to quit smoking.	Phone Call	Smoking habit
(CATTIVELLI et al., 2021)	Intervention Group: Medical, nutritional, and physical rehabilitation program + 3 weekly group sessions based on ACT. Control Group: Multiprofessional Rehabilitation + CBT.	Classroom	Inadequate diet/low level of physical activity

(KAREKLA; SAVVIDES; GLOSTER, 2020)	Six sessions of approximately 25 minutes of online intervention based on the ACT.	Mobile App	Smoking habit
(LEVIN et al., 2021)	Intervention Group: 8-week ACT on Health Program plus weekly telephone coaching Control Group: Waiting List.	Online Self-Help Course + Phone Call	Inadequate diet/low level of physical activity
(LEVIN et al., 2022)	Self-guided online tutorial + App usage for four weeks.	Mobile App	Inadequate diet/low level of physical activity
(LILLIS et al., 2021)	One-day (5 hours) or none (control) online workshop with 3 months of limited email follow-up.	Face-to-face and Email	Inadequate diet/low level of physical activity
(MAK; LEUNG; LOKE, 2020)	Control Group: Health education by handouts Intervention Group: Health education by handouts + An initial face-to-face session and two ACT sessions by phone at 1 week and 1 month after the first session.	Face-to-face and Phone Call	Smoking habit
(MCCLURE et al., 2020)	ACT-based group counseling or a CBT-based group program with attention matching. Both received nicotine patches for 8 weeks.	Classroom	Smoking habit
(MUELLER et al., 2022)	Intervention Group: online web platform with 12 weekly "SWiM sessions". + semi-structured scripted phone call (20 min) and a personalized email, respectively, from your SWiM trainer Control Group: Standard waitlist counseling group.	Mobile App	Inadequate diet/low level of physical activity
(MUELLER et al., 2023)	Intervention Group: Access to an ACT-based online web platform with 12 weekly modules and contact by email and telephone. Control Group: standard counseling group.	Mobile App	Inadequate diet/low level of physical activity
(O'CONNOR et al., 2020)	6 weekly behavioral support group sessions, ACT or ACT combined with the smartphone app.	Face-to-face and Mobile	Smoking habit
(POTTS; KRAFFT; LEVIN, 2020)	Intervention Groups: ACT Self-Help Book (8 weeks to read) + Telephone Coaching Self-Help Book Group + Emails (8 weeks to read) Control Group: Waiting List.	Self-Help Book Reading	Inadequate diet/low level of physical activity
(SANTIAGO-TORRES et al., 2021)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SANTIAGO-TORRES et al., 2022a)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SANTIAGO-TORRES et al., 2022b)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SANTIAGO-TORRES et al., 2022c)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SANTIAGO-TORRES et al., 2022d)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit

(SANTIAGO-TORRES et al., 2023a)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SANTIAGO-TORRES et al., 2023b)	Control Group: Education and health-based app available for 12 months Intervention Group: ACT-based app for 12 months.	Mobile App	Smoking habit
(SPATOLA et al., 2024)	Control Group: 6-week multidisciplinary program, covering physical training, educational counseling, and medical examinations. Experimental Group: In addition to the program, three group sessions based on the ACT.	Classroom	Inadequate diet/low level of physical activity

Legend: ACT: Acceptance and Commitment Therapy; TAC: Behavioral Analytic Therapy; CBT: Cognitive Behavioral Therapy.

The risk factors of inadequate diet and low level of physical activity were addressed in 40.9% of the studies found, while the habit of smoking was the most commonly addressed risk factor, being present in 59.09% (n=13) of the articles analyzed. In smoking-focused interventions, ACT has often been shown to be a complementary or alternative approach to traditional interventions such as nicotine patches and group counseling programs (McClure et al., 2020).

ACT-based interventions were conducted through different modalities, including mobile apps, face-to-face sessions, phone calls, and online courses. Among these, the use of mobile applications was widely explored (Bricker et al., 2020; Santiago-Torres et al., 2022a-d), reflecting the increasing incorporation of digital technologies in behavioral interventions.

Regarding delivery modalities, while some studies have opted for exclusively remote interventions (Levin et al., 2022; Mueller et al., 2023), others maintained face-to-face components, such as group sessions in multidisciplinary programs (Cattivelli et al., 2021; Spatola et al., 2024). The duration of the interventions, on the other hand, varied widely, from short-term programs, such as the six-week program (O'Connor et al., 2020), to prolonged follow-ups for 12 months (Santiago-Torres et al., 2022d). Some studies focused exclusively on smokers, while others addressed individuals with multiple risk factors (e.g., Cattivelli et al., 2021; Levin et al., 2021), reflecting differences in the objectives of the interventions.

DISCUSSION

ACT has emerged as a promising approach in healthcare, especially in the context of behavior modification. In a study carried out by Roche et al. (2020), it was evidenced

that these interventions would be as effective as active controls for these outcomes. These results converge with the findings of the present study, where 81.81% of the studies located indicate interventions at least as effective as the controls present in their samples.

This efficacy observed in ACT-based interventions is reflected in a wide range of age groups, evidencing the applicability of these approaches in different age groups. The studies analyzed show wide variation in the average age of the participants, which ranges from 22 to 62 years. Most of the samples are concentrated in the age group of 35 to 51 years. Studies with younger participants include ages between 22 and 23.51 years present in the research of Karekla, Savvides, and Gloster (2020) and Levin et al. (2022), respectively.

Regarding gender distribution, there is a predominance of women in several studies, such as 82.1% present in the study developed by Levin et al. (2021) and 78% in the studies by Mueller et al. (2022, 2023). On the other hand, studies such as the one carried out by Spatola et al. (2024) show predominantly male samples, where 84% of the sample was composed of men. The greater female representation may indicate greater adherence to interventions, highlighting the need for strategies aimed at specific audiences in stroke prevention.

The samples of the studies analyzed reflect different ethical and cultural profiles. The study by Santiago-Torres et al., 2022d showed a prevalence of Black individuals, while his other article developed in the same year, Santiago-Torres et al., 2022a, highlighted the majority presence of North Americans, including indigenous peoples and Alaska Natives. This diversity reinforces the relevance of considering ethnic-cultural aspects in research, allowing a better understanding of the particularities of each group. However, the importance of expanding the inclusion of underrepresented populations in future studies for greater scientific equity is highlighted.

The studies analyzed included samples in which comorbidities were restricted to diseases of the circulatory system, due to risk factors shared with Cerebral Vascular Accident (CVA), as evidenced by Kleindorfer et al. (2021). This relationship is exemplified by the study by Spatola et al. (2024), which investigated the effectiveness of behavioral interventions in patients with Coronary Artery Disease (CAD), with the aim of reducing the risks of developing stroke.

In addition, the diversity of approaches in behavioral interventions is amplified by the prevalence of remote methods, as exemplified in the study by Karekla et al. (2020). This

study used 25-minute online sessions based on interaction with an avatar to act in smoking cessation and was considered to be of high applicability, especially among the population of young adult smokers who are difficult to access. According to Milne-Ives et al. (2019), it is clear that technological advances have facilitated the active participation of patients in the management of their own health, with thousands of mobile applications developed to promote healthy behaviors. However, the evidence on its efficacy in behavioral modification and improving health outcomes remains inconclusive.

Despite the advancement in remote intervention technologies, as demonstrated by Karekla et al. (2020), the issue of smoking, especially with the increasing use of e-cigarettes, continues to require effective behavioral approaches. According to Middlekauff (2019), the use of e-cigarettes has attracted global attention due to its rapid dependence and high nicotine intake compared to conventional cigarettes. This consumption is associated with preclinical biomarkers indicative of cardiovascular injury, including sympathetic activation, oxidative stress, inflammation, thrombosis, and vascular dysfunction. Thus, behavioral interventions become relevant to address this risk factor. Santiago-Torres et al. (2023b) evidence the relationship between the use of e-cigarettes, smoking cessation apps, and a lesser or no improvement in the smoking cessation rate.

In a meta-analysis, performed by Hartmann-Boyce et al. (2021), the researchers discuss behavioral interventions for smoking cessation and conclude that behavioral support for smoking cessation can increase quit rates by six months or more. There is no evidence that support causes harm to patients, and that there is a greater chance of success by adding components of higher frequency of follow-up and counseling. This data from the literature is consistent with that found in this scoping review. There were also studies in which there were improvements in measures of subjective well-being but there were no significant results for lifestyle habits, such as the findings present in the studies by Mak et al. (2020) and Mueller et al., (2022).

While these outcomes indicate significant benefits in terms of smoking cessation, a longitudinal analysis reveals the importance of prolonged follow-up to assess the effectiveness of interventions and ensure the maintenance of behavioral changes. The study by Lillis et al. (2021) presents a differentiated methodological approach, in this context, with a prolonged and more extensive follow-up of the participants. This allows for a more detailed analysis of the evolution of behavioral and psychological changes over time. Compared to other studies that adopt shorter evaluation periods, the method used by the

authors provides more robust data on the maintenance of changes and the factors that influence the success of interventions in the long term. This type of approach reinforces the importance of longitudinal investigations for a complete understanding of the impacts of interventions on lifestyle and stroke prevention.

Despite the results obtained in this study, it is important to recognize some limitations that may influence the generalization and interpretation of the findings present in the studies analyzed in this review. First, the sample used was restricted to heterogeneous groups of participants, which limits the representativeness of the results for other populations. In addition, the lack of control over some external variables may have introduced biases that affect the accuracy of the results, such as differences in the socioeconomic and cultural context of the participants in the articles analyzed.

Another point to be considered is the presence of different methodological designs of the studies located and analyzed, which may not have captured all the important aspects of the intervention or the factors that influence the behaviors and lifestyles of the participants in question. Although some studies have adopted robust methods for data collection, the absence of elements of their respective interventions may have contributed to information gaps during the analysis of the articles. These limitations indicate the need for further studies with large samples, different methodologies, and a longer follow-up to validate and expand the findings presented here.

FINAL CONSIDERATIONS

Therefore, it is concluded that intervention models aimed at changing lifestyle habits, based on ACT, are highly pertinent and viable, especially when applied to primary and secondary prevention strategies. These models demonstrate efficacy in a variety of contexts, are applicable to different treatment modalities, and are adaptable to a wide variety of populations and risk factors. The flexibility of ACT allows it to be used in a personalized way, addressing the specific needs of each individual, which makes the intervention effective both in patients at risk and in those who have already suffered a cardiovascular event. Thus, it can be stated that ACT, with its focus on acceptance and commitment to behavior change, presents itself as a valuable and accessible approach to promote health and prevent related diseases, such as stroke, in an increasingly diverse population.

In this sense, it is essential that future well-structured research focus on the elderly male population, the group epidemiologically most vulnerable to stroke. This age group has specific characteristics, such as cognitive rigidity and loss of functionality, which require highly personalized interventions. Given the profile of this population, it becomes a priority target for secondary prevention strategies, which seek to reduce risks and improve quality of life. The implementation of targeted approaches adapted to the particular needs of this group can be decisive for the success of interventions, in addition to contributing to the reduction of the incidence of new stroke episodes.

In addition, it is essential that future studies consider the integration of digital technologies, such as remote monitoring apps and platforms, to enhance ACT-based interventions, especially in hard-to-reach populations or those with physical limitations. The combination of these personalized behavioral interventions with the use of these tools can optimize outcomes, increasing adherence and the effectiveness of prevention strategies. The continuity of this research will allow a significant advance in health promotion and in the reduction of the incidence and recurrence of strokes, with special attention to the adaptation of interventions to the needs of more vulnerable groups.

REFERENCES

1. Araújo, W. C. O. (2020). Recuperação da informação em saúde. *ConCI: Convergências em Ciência da Informação*, 3(2), 100–134. <https://doi.org/10.33467/conci.v3i2.12692>
2. Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology*, 8(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
3. Brasil. Ministério da Saúde. Secretaria de Ciência, Tecnologia e Insumos Estratégicos. Departamento de Ciência e Tecnologia. (2014). Diretrizes metodológicas: Sistema GRADE - Manual de graduação da qualidade da evidência e força de recomendação para tomada de decisão em saúde. Brasília, DF: Ministério da Saúde.
4. Brewer, J. A., Mallik, S., Babuscio, T. A., Nich, C., Johnson, H. E., Deleone, C. M., ... Rounsaville, B. J. (2011). Mindfulness training for smoking cessation: Results from a randomized controlled trial. *Drug and Alcohol Dependence*, 119(1-2), 72–80. <https://doi.org/10.1016/j.drugalcdep.2011.05.027>
5. Bricker, J. B., Mull, K. E., Kientz, J. A., Vilardaga, R., Mercer, L. D., Akioka, K. J., & Heffner, J. L. (2020). Efficacy of smartphone applications for smoking cessation: A randomized clinical trial. *JAMA Internal Medicine*, 180(11), 1472–1480. <https://doi.org/10.1001/jamainternmed.2020.4055>
6. Bricker, J. B., Watson, N. L., Mull, K. E., Iles-Shih, M., & Heffner, J. L. (2021). Efficacy of telehealth acceptance and commitment therapy for weight loss: A pilot randomized clinical trial. *Translational Behavioral Medicine*, 11(8), 1527–1536. <https://doi.org/10.1093/tbm/ibab015>
7. Bricker, J. B., Watson, N. L., Heffner, J. L., Sullivan, B., Mull, K., Kwon, D., ... O'Connor, K. (2022). Full-scale randomized trial comparing acceptance and commitment therapy telephone-delivered coaching with standard telephone-delivered coaching among Medicare/uninsured quitline callers. *Nicotine & Tobacco Research*, 24(10), 1556–1566. <https://doi.org/10.1093/ntr/ntac044>
8. Butryn, M. L., Forman, E., Hoffman, K., Shaw, J., & Juarascio, A. (2011). A pilot study of acceptance and commitment therapy for promotion of physical activity. *Journal of Physical Activity and Health*, 8(4), 516–522. <https://doi.org/10.1123/jpah.8.4.516>

9. Caprio, F. Z., & Sorond, F. A. (2019). Cerebrovascular disease. *Medical Clinics of North America*, 103(2), 295–308. <https://doi.org/10.1016/j.mcna.2018.10.001>
10. Cattivelli, R., Guerrini Usubini, A., Manzoni, G. M., Vailati Riboni, F., Pietrabissa, G., Musetti, A., ... Castelnovo, G. (2021). ACTonFood. Acceptance and commitment therapy-based group treatment compared to cognitive behavioral therapy-based group treatment for weight loss maintenance: An individually randomized group treatment trial. *International Journal of Environmental Research and Public Health*, 18(18), 9558. <https://doi.org/10.3390/ijerph18189558>
11. Coordenação de Gestão de Protocolos Clínicos e Diretrizes Terapêuticas – CPCDT/CGGTS/DGITIS/SCTIE/MS. (2021). Protocolo clínico e diretrizes terapêuticas do acidente vascular cerebral isquêmico. Brasília, DF: Ministério da Saúde.
12. Feigin, V. L., Lawes, C. M., Bennett, D. A., Barker-Collo, S. L., Parag, V., & Global Burden of Disease Study 2013 Collaborators. (2016). Global burden of stroke and risk factors in 188 countries, during 1990–2013: A systematic analysis for the Global Burden of Disease Study 2013. *The Lancet Neurology*, 15(9), 913–924. [https://doi.org/10.1016/S1474-4422\(16\)30073-4](https://doi.org/10.1016/S1474-4422(16)30073-4)
13. Galvão, C. M. (2006). Níveis de evidência. *Acta Paulista de Enfermagem*, 19(2), v–vi. <https://doi.org/10.1590/S0103-21002006000200001>
14. Hartmann-Boyce, J., McRobbie, H., Butler, A. R., Lindson, N., Bullen, C., Begh, R., ... Hajek, P. (2021). Behavioural interventions for smoking cessation: An overview and network meta-analysis. *Cochrane Database of Systematic Reviews*, (1), CD013229. <https://doi.org/10.1002/14651858.CD013229.pub2>
15. Hayes, S. C. (2004). Acceptance and commitment therapy, relational frame theory, and the third wave of behavioral and cognitive therapies. *Behavior Therapy*, 35(4), 639–665. [https://doi.org/10.1016/S0005-7894\(04\)80013-3](https://doi.org/10.1016/S0005-7894(04)80013-3)
16. Hayes, S. C., Luoma, J. B., Bond, F. W., Masuda, A., & Lillis, J. (2006). Acceptance and commitment therapy: Model, processes and outcomes. *Behaviour Research and Therapy*, 44(1), 1–25. <https://doi.org/10.1016/j.brat.2005.06.006>

17. Hayes, S. C., Barnes-Holmes, D., & Roche, B. (2001). Relational frame theory: A post-Skinnerian account of human language and cognition. Springer Science & Business Media.
18. Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (2021). Terapia de aceitação e compromisso (2ª ed.). Porto Alegre, RS: Artmed.
19. Karekla, M., Savvides, S. N., & Gloster, A. (2020). An avatar-led intervention promotes smoking cessation in young adults: A pilot randomized clinical trial. *Annals of Behavioral Medicine*, 54(10), 747–760. <https://doi.org/10.1093/abm/kaaa013>
20. Kleindorfer, D. O., Towfighi, A., Chaturvedi, S., Cockcroft, K. M., Gutierrez, J., Lombardi-Hill, D., ... Williams, L. S. (2021). 2021 guideline for the prevention of stroke in patients with stroke and transient ischemic attack: A guideline from the American Heart Association/American Stroke Association. *Stroke*, 52(7), e364–e467. <https://doi.org/10.1161/STR.0000000000000375>
21. Kolmos, M., Christoffersen, L., & Kruuse, C. (2021). Recurrent ischemic stroke – A systematic review and meta-analysis. *Journal of Stroke and Cerebrovascular Diseases*, 30(8), 105935. <https://doi.org/10.1016/j.jstrokecerebrovasdis.2021.105935>
22. Leening, M. J. G., Berry, J. D., & Allen, N. B. (2016). Lifetime perspectives on primary prevention of atherosclerotic cardiovascular disease. *JAMA*, 315(14), 1449–1450. <https://doi.org/10.1001/jama.2016.1654>
23. Levin, M. E., Krafft, J., Hicks, E. T., Pierce, B., & Twohig, M. P. (2021). A randomized controlled trial of online acceptance and commitment therapy to improve diet and physical activity among adults who are overweight/obese. *Translational Behavioral Medicine*, 11(6), 1216–1225. <https://doi.org/10.1093/tbm/ibaa123>
24. Levin, M. E., Twohig, M. P., & Krafft, J. (2022). Tracking valued and avoidant functions with health behaviors: A randomized controlled trial of the acceptance and commitment therapy matrix mobile app. *Behavior Modification*, 46(1), 63–89. <https://doi.org/10.1177/01454455211011100>
25. Lillis, J., Thomas, J. G., Lipton, R. B., Dallal, G. E., Manasse, S., Forman, E., ... Wing, R. R. (2021). Novel behavioral interventions to improve long-term weight loss: A randomized trial of acceptance and commitment therapy or self-regulation for weight

loss maintenance. *Journal of Behavioral Medicine*, 44(4), 527–540.
<https://doi.org/10.1007/s10865-021-00215-8>

26. Mak, Y. W., Leung, D. Y. P., & Loke, A. Y. (2020). Effectiveness of an individual acceptance and commitment therapy for smoking cessation, delivered face-to-face and by telephone to adults recruited in primary health care settings: A randomized controlled trial. *BMC Public Health*, 20(1), 1719. <https://doi.org/10.1186/s12889-020-09788-7>
27. McClure, J. B., Bush, T., Anderson, M. L., Blasi, P., Thompson, E., Nelson, J., & Catz, S. L. (2020). Comparative effectiveness of group-delivered acceptance and commitment therapy versus cognitive behavioral therapy for smoking cessation: A randomized controlled trial. *Nicotine & Tobacco Research*, 22(3), 354–362. <https://doi.org/10.1093/ntr/ntz017>
28. Middlekauff, H. R. (2020). Cardiovascular impact of electronic-cigarette use. *Trends in Cardiovascular Medicine*, 30(3), 133–140. <https://doi.org/10.1016/j.tcm.2019.04.006>
29. Milne-Ives, M., Lam, C., De Cock, C., Van Velthoven, M., & Meinert, E. (2020). Mobile apps for health behaviour change in physical activity, diet, drug and alcohol use, and mental health: A systematic review. *JMIR mHealth and uHealth*, 8(3), e17046. <https://doi.org/10.2196/17046>
30. Mueller, J., Richards, R., Jones, R. A., Whittle, F., Woolston, J., Stubbings, M., ... Davies, A. (2022). Supporting weight management during COVID-19 (SWiM-C): A randomised controlled trial of a web-based, ACT-based, guided self-help intervention. *International Journal of Obesity*, 15(4), 550–559. <https://doi.org/10.1038/s41366-021-01036-0>
31. Mueller, J., Richards, R., Jones, R. A., Whittle, F., Woolston, J., Stubbings, M., ... Davies, A. (2023). Supporting weight management during COVID-19 (SWiM-C): Twelve-month follow-up of a randomised controlled trial of a web-based, ACT-based, guided self-help intervention. *International Journal of Obesity*, 47(1), 51–59. <https://doi.org/10.1038/s41366-022-01232-6>
32. O'Connor, M., Whelan, R., Bricker, J., & McHugh, L. (2020). Randomized controlled trial of a smartphone application as an adjunct to acceptance and commitment therapy for smoking cessation. *Behavior Therapy*, 51(1), 162–177. <https://doi.org/10.1016/j.beth.2019.06.002>

33. Perez, W. F., Fidalgo, A. P., Kovac, R., & Nico, Y. C. (2013). Introdução à Teoria das Molduras Relacionais (Relational Frame Theory): Principais conceitos, achados experimentais e possibilidades de aplicação. *Perspectivas em Análise do Comportamento*, 4(1), 33–51. <https://doi.org/10.18761/PAC.2013.004>
34. Potts, S., Krafft, J., & Levin, M. E. (2022). A pilot randomized controlled trial of acceptance and commitment therapy guided self-help for overweight and obese adults high in weight self-stigma. *Behavior Modification*, 46(1), 3–24. <https://doi.org/10.1177/0145445520961204>
35. Powers, W. J., Rabinstein, A. A., Ackerson, T., Adeoye, O. M., Bambakidis, N. C., Becker, K., ... Tirschwell, D. L. (2019). Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines for the early management of acute ischemic stroke: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. *Stroke*, 50(12), e344–e418. <https://doi.org/10.1161/STR.0000000000000211>
36. Roche, A. I., Kroska, E. B., & Denburg, N. L. (2019). Acceptance- and mindfulness-based interventions for health behavior change: Systematic reviews and meta-analyses. *Journal of Contextual Behavioral Science*, 13, 74–93. <https://doi.org/10.1016/j.jcbs.2019.06.007>
37. Santiago-Torres, M., Mull, K. E., Sullivan, B. M., Ferketich, A., & Bricker, J. B. (2021). Efficacy and utilization of smartphone applications for smoking cessation among American Indians and Alaska Natives: Results from the iCanQuit trial. *Nicotine & Tobacco Research*, 24(4), 544–554. <https://doi.org/10.1093/ntr/ntab213>
38. Santiago-Torres, M., Mull, K. E., Sullivan, B. M., Kwon, D., Grabinski, V. F., & Bricker, J. B. (2022a). Efficacy and utilization of smartphone applications for smoking cessation among low-income adults: Secondary analysis of the iCanQuit randomized trial. *Drug and Alcohol Dependence*, 231, 109258. <https://doi.org/10.1016/j.drugalcdep.2021.109258>
39. Santiago-Torres, M., Mull, K. E., Sullivan, B. M., Kwon, D., Nollen, N. L., & Bricker, J. B. (2022b). Efficacy of an acceptance and commitment therapy-based smartphone application for helping rural populations quit smoking: Results from the iCanQuit randomized trial. *Preventive Medicine*, 157, 107008. <https://doi.org/10.1016/j.ypmed.2022.107008>

40. Santiago-Torres, M., Kwon, D. M., Mull, K. E., Grabinski, V. F., & Bricker, J. B. (2022c). Efficacy of web-delivered acceptance and commitment therapy (ACT) for helping Black adults quit smoking. *Journal of Racial and Ethnic Health Disparities*, 10(6), 2816–2825. <https://doi.org/10.1007/s40615-022-01458-y>
41. Santiago-Torres, M., Mull, K. E., Kwon, D. M., & Bricker, J. B. (2023). Acceptance and commitment therapy-based smartphone applications for cessation of tobacco use among adults with high nicotine dependence: Results from the iCanQuit randomized trial. *Substance Use & Misuse*, 58(3), 354–364. <https://doi.org/10.1080/10826084.2022.2161317>
42. Santiago-Torres, M., Mull, K. E., Sullivan, B. M., & Bricker, J. B. (2022). Efficacy and utilization of an acceptance and commitment therapy-based smartphone application for smoking cessation among Black adults: Secondary analysis of the iCanQuit randomized trial. *Addiction*, 117(3), 760–771. <https://doi.org/10.1111/add.15721>
43. Santiago-Torres, M., Mull, K. E., Zvolensky, M. J., & Bricker, J. B. (2023). Use of e-cigarettes in cigarette smoking cessation: Secondary analysis of a randomized controlled trial. *JMIR mHealth and uHealth*, 11, e48896. <https://doi.org/10.2196/48896>
44. Spatola, C. A. M., Manzoni, G. M., Granieri, A., Riboni, F. V., Guerrini Usubini, A., Pietrabissa, G., ... Castelnovo, G. (2024). Effects of a brief intervention based on acceptance and commitment therapy versus usual care for cardiac rehabilitation patients with coronary heart disease (ACTonHEART): A randomised controlled trial. *BMJ Open*, 14(6), e081293. <https://doi.org/10.1136/bmjopen-2023-081293>
45. Tikk, K., Sookthai, D., Fortner, R. T., Schock, H., Kühn, T., Boeing, H., ... Kaaks, R. (2014). Primary preventive potential for stroke by avoidance of major lifestyle risk factors. *Stroke*, 45(7), 2041–2046. <https://doi.org/10.1161/STROKEAHA.114.005529>
46. Zhang, C., Lakens, D., & IJsselsteijn, W. A. (2018). Acceptance and commitment therapy for health behavior change: A contextually-driven approach. *Frontiers in Psychology*, 8, 2350. <https://doi.org/10.3389/fpsyg.2017.02350>