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A systematic review of the behavioral change determinants among patients with NAFLD using the theoretical domains framework

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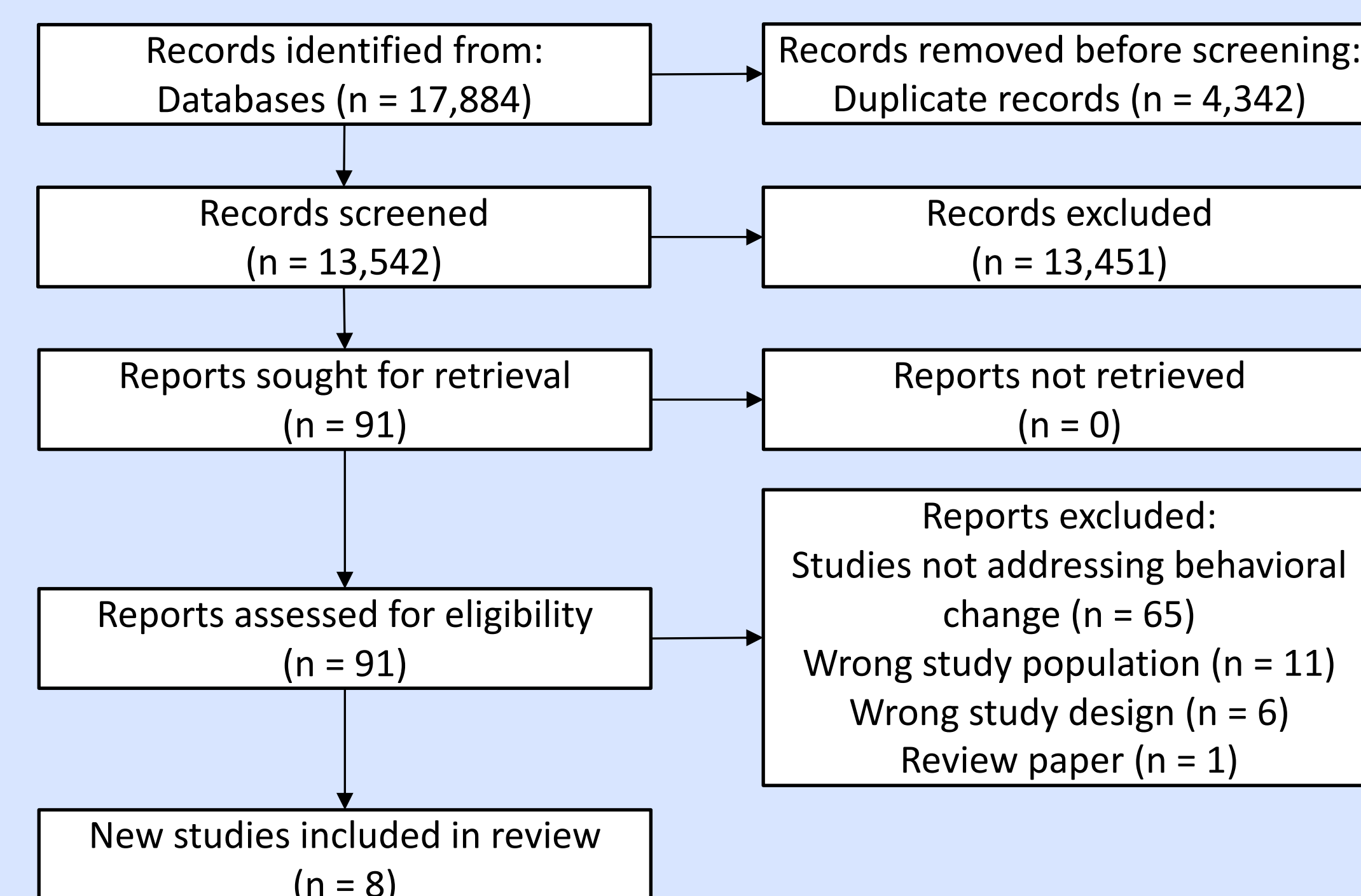
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INTRODUCTION

- Behavioral change, with the goal of clinically significant weight loss, is first-line treatment for patients with NAFLD.
- The first step in developing interventions is to identify determinants of weight loss behaviors (physical activity and diet), which would serve as targets for change techniques.
- This systematic review maps what has been published to date regarding the determinants of behavioral change in patients with NAFLD using the Theoretical Domains Framework (TDF).
- TDF integrates behavioral change theories into 12 key domains that researchers can use to identify barriers & facilitators that may influence behaviors and should be addressed as part of behavioral intervention planning.[1]

METHODS

- Systematic search of original studies published in Medline, EMBASE, Cochrane, PsycINFO, and Web of Science from inception to May 6, 2021 (see Flowchart).
- Inclusion criteria:
  - Original data reporting psychosocial determinants of weight loss behaviors in patients with NAFLD.
  - Adults (age ≥ 18).
  - Cross sectional, cohort, or qualitative studies.
- Exclusion criteria:
  - Non-English papers.
  - Review articles.
  - Research not addressing behavioral change determinants.
  - For studies with overlapping cohorts, we used most recent data.
- Two independent reviewers screened titles/abstracts, reviewed full papers, and abstracted data.
- We applied 11 relevant domains from TDF (see Table 2).

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Records identified from:
Databases (n = 17,884)  →  Records removed before screening:
                            Duplicate records (n = 4,342)

Records screened         →  Records excluded
(n = 13,542)                (n = 13,451)

Reports sought for retrieval  →  Reports not retrieved
(n = 91)                          (n = 0)

Reports assessed for eligibility  →  Reports excluded:
(n = 91)                             Studies not addressing behavioral
                                     change (n = 65)
                                     Wrong study population (n = 11)
                                     Wrong study design (n = 6)
                                     Review paper (n = 1)

New studies included in review
(n = 8)
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RESULTS

Table 1. Key Characteristics of Included Studies.

Study	Origin	Study Design	Study Population	NAFLD Patients (n)	Mean Age (years)	Mean BMI (kg/m²)	Diabetes Prevalence	Target Behaviors Addressed	TDF Domain*
Frith 2010	U.K.	Prospective cross-sectional	Hepatology clinic referral	230	58	34	Not reported	Physical activity	2, 3, 4
Centis 2013	Italy	Prospective cross-sectional	Hepatology clinic referral	138	48	31	18%	Diet, physical activity	5
Stewart 2015	U.S.A.	Prospective cohort	Hepatology clinic referral	58	50	33.4	40%	Diet, physical activity	5, 9
Zelber-Sagi 2017	Israel	Prospective cross-sectional	Clinical trial	146	48	32	9%	Diet, physical activity	1, 3, 11
Hallsworth 2020	U.K.	Qualitative	Hepatology clinic referral	12	59	Not reported	Not reported	Weight loss in general	1, 2, 8, 10
Stine 2020	U.S.A.	Prospective cross-sectional	Hepatology clinic referral	87	52	35	40%	Physical activity	1, 4, 10, 11
Dhaliwal 2021	India	Prospective cross-sectional	Hepatology clinic referral	264	53	28	16%	Diet, physical activity	1
O'Gorman 2021	Ireland	Prospective cross-sectional	Hepatology clinic referral	101	54**	Not reported	Not reported	Physical activity	1, 5, 10, 11

*See Table 2 for TDF domain descriptions. **Median age. Mean age not reported.

Table 2. Theoretical Domains Framework and Findings.

TDF Domain	Description	Findings
1. Knowledge	General knowledge and perceptions	Most patients viewed NAFLD as having little to no consequences or unclear implications and did not understand the cause of disease.
2. Skills	Competency and ability to engage in behavioral change	A lack of skills required to engage in weight loss behaviors was reported.
3. Beliefs about capabilities (self-efficacy)	Own perceived confidence to carry out behavioral change	Self-reported levels for physical activity were low among routine patients with NAFLD and somewhat higher among patients enrolled in clinical trials.
4. Beliefs about consequences	Anticipated outcomes and attitudes surrounding behavioral change	Positive outcome expectations for exercise are high in NAFLD patients, though lower among those with a fear of falling.
5. Motivation & goals	Readiness and reasoning for behavioral change	Most patients are in the contemplation stage of change with some who are still pre-contemplative. Health and fitness were the strongest motivators for physical activity.
6. Memory, attention, & decision processes	Anticipated ability to remember and devote attention to behavioral change	Not addressed by included studies.
7. Environmental constraints	Physical or surrounding factors that may limit behavioral change	Not addressed by included studies.
8. Social Influences	Social support or pressure that may affect behavioral change	A lack of support to make weight-related lifestyle changes was reported.
9. Emotion	Personal emotional factors that may affect behavioral change	NAFLD patients had higher neuroticism and lower conscientiousness than the general population (both are associated with lower levels of readiness for behavioral change). 20% of NAFLD patients had symptoms of depression, 12% had anxiety, and 33% had other cognitive complaints.
10. Behavioral regulation	Self-monitoring, goal setting, barriers, and facilitators to behavioral change	Prominent barriers to physical activity included pain and a lack of willpower, time, energy, cost, and skills (more so among women). Patients want tools and resources to help monitor themselves.
11. Nature of the behaviors	Automaticity of prior behaviors versus new behaviors	Most NAFLD patients did not meet recommended physical activity guidelines at baseline. Among patients enrolled in clinical trials, most were trying to make dietary changes.

CONCLUSIONS

- Understanding behavioral determinants of change for diet and physical activity is key to developing weight loss interventions for NAFLD.
- Important themes to be addressed in developing interventions for behavioral change:
  - Poor knowledge of NAFLD.
  - Low self-efficacy for physical activity.
- The current research suggests further health education about NAFLD's causes and consequences may help treatment efforts.
- Patients need to be supported and taught specific skills to improve weight loss behaviors and to overcome perceived limitations to physical activity.
- More research is needed, particularly addressing outcome expectations, self-efficacy, and social influences of dietary behaviors.

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