The Effectiveness of eHealth Interventions on Lifestyle Modification in Patients with Non-Alcoholic Fatty Liver Disease: A Systematic Review and Meta-Analysis

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BACKGROUND

- **The prevalence of non-alcoholic fatty liver disease (NAFLD) is increasing in parallel with the epidemic of obesity and metabolic syndrome.**
- **Lifestyle modification is a crucial strategy for the treatment of NAFLD, which can lead to a reduction in liver fat with concomitant weight loss.**
- **The use of eHealth technologies is an effective approach to improve health outcomes in patients as they do not have any time and space limitations.**

PURPOSE

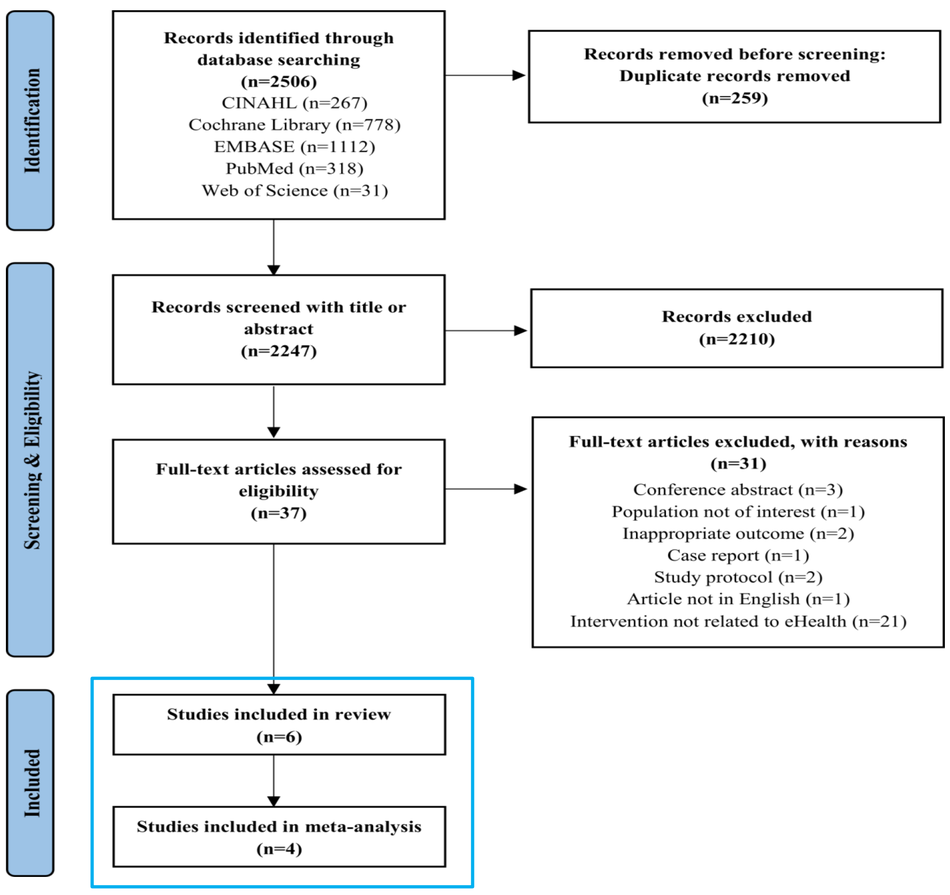
- **To evaluate published eHealth intervention studies for the improvement of lifestyle modifications among patients with NAFLD and to provide recommendations for future studies.**

METHODS

- **Design: systematic review and meta-analysis**
- **Search strategy:**
  - **Database: PubMed, Cochrane Central, CINAHL, EMBASE, and Web of Science**
  - **Publication years: ~ 2021. 4. 15**
  - **Population: patients with NAFLD**
  - **Interventions: lifestyle modification (diet or exercise)**
  - **Outcome: weight, BMI, ALT, AST**
  - **Eligibility criteria: ≥18 years, diagnosed with NAFLD by sonography or elastography, eHealth intervention,**
  - **Quality assessment tool: Cochrane risk of bias, Risk of Bias Assessment Tool for Non-randomized Studies RoBANS)**

RESULTS 1

➢ Study selection



➢ Intervention Characteristics

- **Study duration: 2016-2020 years**
- **Included studies: 6 studies (4 RCTs, 2 non-RCTs)**
- **Study region: China, Germany, Iran, Italy, Singapore, United States**
- **Intervention duration: 6-24 months**

RESULTS 2

➢ Description of interventions.

Table 1. Description the characteristics of interventions and the effect.

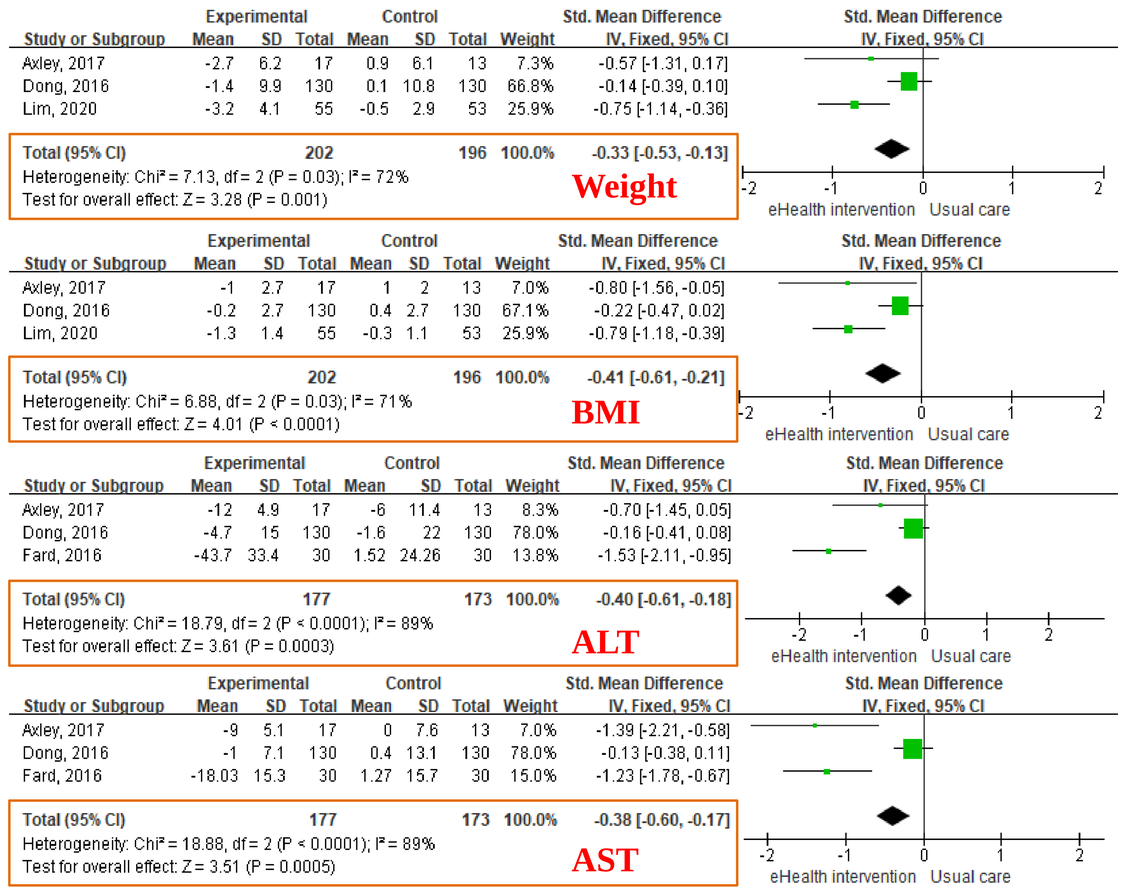
Study	Description of Interventions	
	Intervention group	Control group
1. Dong et al, 2016	· Lifestyle counseling for diet, physical activity by 2 professional physicians · Phone visit by doctors every 3 months, providing health guidance of diet and exercise	· Lifestyle counseling for diet, physical activity by 2 professional physicians
2. Fard et al, 2016	· Counseling, dietary advice, performing physical activities, face-to-face consultation · Telephone call to follow-up recommended diet and physical activities	· Counseling, dietary advice, performing physical activities, consultation
3. Axley et al, 2017	· Standard of care for liver disease in clinic on healthy diet and daily exercise for weight loss · Text messages provided information and education including individual goal, nutrition, exercise, stress management, behavior change, and overcoming barriers at every 9 AM	· Standard of care for liver disease with detailed instruction in clinic on healthy diet and daily exercise for weight loss
4. Lim et al, 2020	· Advice on dietary & physical activity modification by dietician · Food diary · Self-monitoring of physical activity · Weekly educational clips · Real-time feedback and encouragement by dietitian · Peer support chat channel	· Usual standard care: a single face to face session in the clinic
5. Mazzotti et al, 2018	· Web-based intervention: group program, similarly GBI, divided 4 sessions using a Cloud/SaaS e-learning platform: role-game measuring adherence, motivation to change, and competence by online questionnaires; channel to interact with the clinical center offline	· Group based intervention: group counseling on diet, and habitual physical activity physicians and dietitians
6. Pfirrmann et al, 2019	· Web-based platform: Individualized training support · Regular individual patient feedback · Biweekly group training at the sports center · Interaction with a counselor and peer support using a discussion board and a chatroom · Biweekly group training at the sports center	· None

➢ Components of each intervention

Table 2. Components of the interventions

Study	Delivery mode	Component of intervention								Frequency
		Assessment	Information	Education	Goal setting	Counseling	Reminder	Feedback	Interaction	
[1]	Telephone	√	√		√	√		√		every 3 months
[2]	Telephone		√	√		√		√		1-3 times per week
[3]	Text message	√	√	√	√		√	√		daily
[4]	Mobile application	√	√	√	√	√	√	√	√	daily
[5]	Web-based platform	√	√	√	√	√			√	weekly
[6]	Web-based platform	√		√	√	√		√	√	5 sessions per week

➢ Meta-analysis of interventions on lifestyle modification (weight, BMI, ALT, and AST)



CONCLUSIONS

- **Lifestyle modification interventions using eHealth technologies are significantly effective for weight, BMI, AST, and ALT in NAFLD patients.**
- **Future research should conduct interventions with larger sample sizes and evaluate whether these interventions have sustained benefits, and how we can make these eHealth methods most effective on a large scale.**

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