META-ANALYSIS PROCESS FOR EFFECTIVE REVIEWS

Evidence-Synthesis of Literature Review Data

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Learning Objectives

- Identify the most crucial parts of executing a literature review and finalizing the literature review process
- Perceiving relevant endpoints and effects measures within relevant studies
- Understanding data extraction and risk of bias assessment
- Using relevant software to create models of approach

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Part 1: Finalizing the Literature Review Process

Literature Reviews: The Process

Note that ALL manuscripts must execute a literature review in order to properly evaluate relevant information. A good situated intervention (and, ultimately a successful review project) *will rely on the effectiveness how you execute and document a literature review.*

Literature Review Process

A chief component of major review types such as systematic reviews, scoping reviews, and even rapid reviews is isolating all the best available evidence. This includes:

- Adequate term harvesting and search strategy development
- Translation of a reproducible search strategy across relevant database platforms
- Supplemental searching (hand-searching) within select information resources, and through select methods such as citation analysis
- Deduplication and screening of retrieved records using interrater reliability settings and collective input
- Full-Text review of screened records
- Inclusion of content-aligned records for data extraction and ultimate evidence-synthesis

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PICO & Term Harvest

Clinical Query: How effective is sauna bathing for patients suffering from Cardiovascular Disease?

P – Cardiovascular Disease

I – Sauna Bathing

C – No Comparator

O – Effectiveness

Synonyms and Further Terms

- Cardiology
- Cardiac Events
- Heart Disease
- Steam Bath
- Finnish Bath
- Efficacy
- Treatment Outcome

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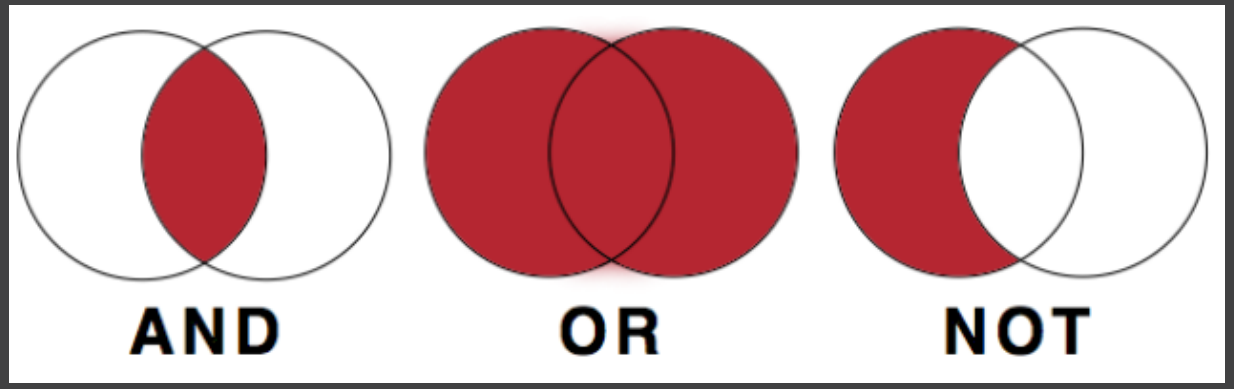
Search Strategy Development

Nested Boolean Searching



- Keyword Terms
- Subject Headings
- Altered Indexing
- Term Groupings

Reproducible Searches and MEDLINE

Ovid MEDLINE

Ovid MEDLINE(R) ALL <1946 to November 26, 2024>

1	cardiovascular disease.mp. or exp Cardiovascular Diseases/		2906601
2	exp Cardiology/ or cardiology.mp.	68069	
3	cardiac events.mp.	20966	
4	1 or 2 or 3	2938437	
5	exp Steam Bath/ or sauna bathing.mp.	862	
6	sauna.m_titl.	590	
7	sauna.ab. or sauna.tw.	1026	
8	finnish bath.mp.	4	
9	5 or 6 or 7 or 8	1221	
10	effectiveness.mp.	684847	
11	efficacy.mp.	1183323	
12	treatment outcome.mp. or exp Treatment Outcome/		1337445
13	10 or 11 or 12	2826106	
14	4 and 9 and 13	27	

PubMed®

Query	Results
Search: **((((cardiovascular diseases) OR (cardiac events)) OR (cardiology)) AND (((sauna bathing) OR (steam bath)) OR (finnish bath))) AND (((efficacy) OR (effectiveness)) OR ("Treatment Outcome"[Mesh]))**	131

Further Databases & Strategy Translation

Embase®

Scopus

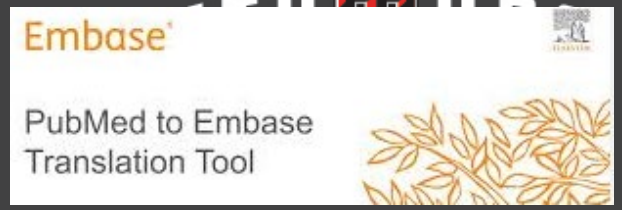
Clarivate
Web of Science™

Cochrane
Library

CINAHL®
Available via EBSCOhost®

Additional Iterations

- The most relevant research databases are easily identified from the library's homepage
- Manual translations of the official reproducible strategy are generally needed to **retrieve all the best available evidence**.
- Select tools for automated translation of the strategy are available. Consult your local librarian for further details on this.

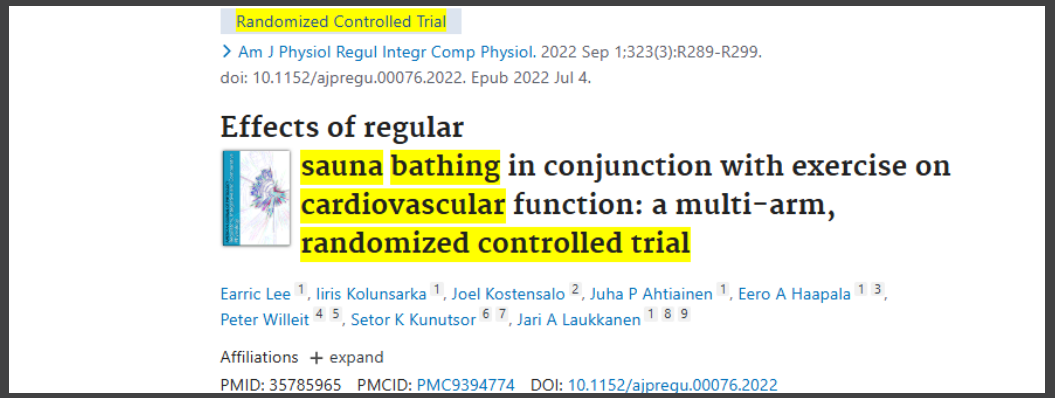


Hand Searching and Citation Analysis

Information Resources

- Not all records can be retrieved via a well-constructed reproducible search
- Searching in select web tools with succinct keyword entries is encouraged to gather further evidence.
- Citations and reference lists from foundational articles can retrieve additional records

Citation Analysis


Randomized Controlled Trial

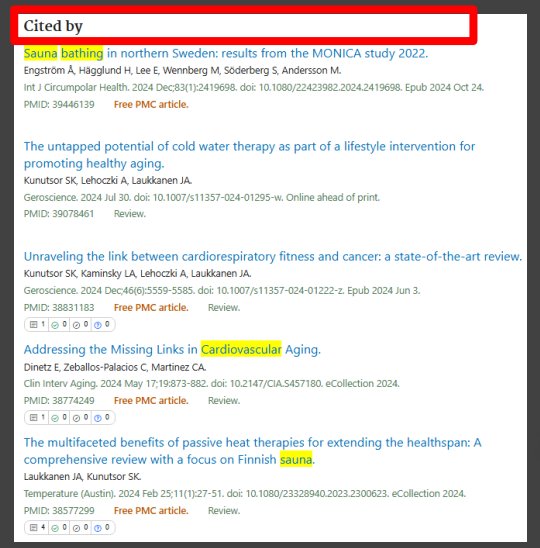
Am J Physiol Regul Integr Comp Physiol. 2022 Sep 1;323(3):R289-R299.
doi: 10.1152/ajpregu.00076.2022. Epub 2022 Jul 4.

Effects of regular sauna bathing in conjunction with exercise on cardiovascular function: a multi-arm, randomized controlled trial

Earric Lee [1], Iiris Kolunsarka [1], Joel Kostensalo [2], Juha P Ahtiainen [1], Eero A Haapala [1 3], Peter Willeit [4 5], Setor K Kunutsor [6 7], Jari A Laukkanen [1 8 9]

Affiliations + expand

PMID: 35785965 PMCID: PMC9394774 DOI: 10.1152/ajpregu.00076.2022


Cited by

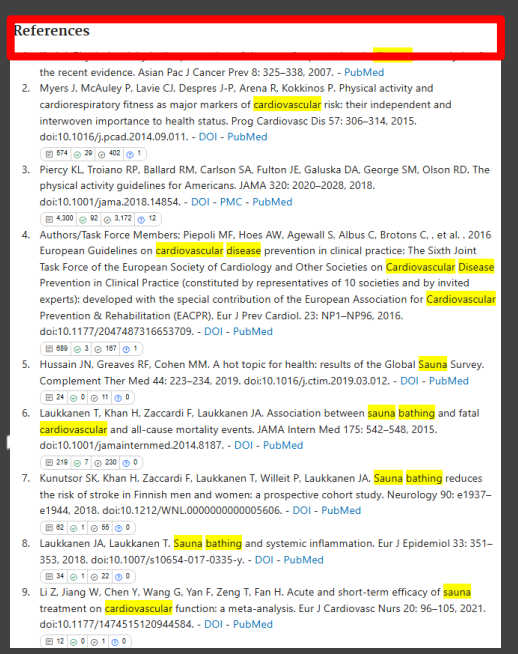
Sauna bathing in northern Sweden: results from the MONICA study 2022.
Engström Å, Hägglund H, Lee E, Wennberg M, Söderberg S, Andersson M.
Int J Circumpolar Health. 2024 Dec;83(1):2419698. doi: 10.1080/22423982.2024.2419698. Epub 2024 Oct 24.
PMID: 39446139 Free PMC article.

The untapped potential of cold water therapy as part of a lifestyle intervention for promoting healthy aging.
Kunutsor SK, Lehoczki A, Laukkanen JA.
Geroscience. 2024 Jul 30. doi: 10.1007/s11357-024-01295-w. Online ahead of print.
PMID: 39078461 Review.

Unraveling the link between cardiorespiratory fitness and cancer: a state-of-the-art review.
Kunutsor SK, Kaminsky LA, Lehoczki A, Laukkanen JA.
Geroscience. 2024 Dec;46(6):5559-5585. doi: 10.1007/s11357-024-01222-z. Epub 2024 Jun 3.
PMID: 38831183 Free PMC article. Review.

Addressing the Missing Links in Cardiovascular Aging.
Dinetz E, Zeballos-Palacios C, Martinez CA.
Clin Interv Aging. 2024 May 17;19:873-882. doi: 10.2147/CIA.S457180. eCollection 2024.
PMID: 38774249 Free PMC article. Review.

The multifaceted benefits of passive heat therapies for extending the healthspan: A comprehensive review with a focus on Finnish sauna.
Laukkanen JA, Kunutsor SK.
Temperature (Austin). 2024 Feb 25;11(1):27-51. doi: 10.1080/23328940.2023.2300623. eCollection 2024.
PMID: 38577299 Free PMC article. Review.


References

the recent evidence. Asian Pac J Cancer Prev 8: 325–338, 2007. - PubMed
2. Myers J, McAuley P, Lavie CJ, Despres J-P, Arena R, Kokkinos P. Physical activity and cardiorespiratory fitness as major markers of cardiovascular risk: their independent and interwoven importance to health status. Prog Cardiovasc Dis 57: 306–314, 2015. doi:10.1016/j.pcad.2014.09.011. - DOI - PubMed
3. Piercy KL, Troiano RP, Ballard RM, Carlson SA, Fulton JE, Galuska DA, George SM, Olson RD. The physical activity guidelines for Americans. JAMA 320: 2020–2028, 2018. doi:10.1001/jama.2018.14854. - DOI - PMC - PubMed
4. Authors/Task Force Members: Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, , et al. . 2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts): developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR). Eur J Prev Cardiol. 23: NP1–NP96, 2016. doi:10.1177/2047487316653709. - DOI - PubMed
5. Hussain JN, Greaves RF, Cohen MM. A hot topic for health: results of the Global Sauna Survey. Complement Ther Med 44: 223–234, 2019. doi:10.1016/j.ctim.2019.03.012. - DOI - PubMed
6. Laukkanen T, Khan H, Zaccardi F, Laukkanen JA. Association between sauna bathing and fatal cardiovascular and all-cause mortality events. JAMA Intern Med 175: 542–548, 2015. doi:10.1001/jamainternmed.2014.8187. - DOI - PubMed
7. Kunutsor SK, Khan H, Zaccardi F, Laukkanen T, Willeit P, Laukkanen JA. Sauna bathing reduces the risk of stroke in Finnish men and women: a prospective cohort study. Neurology 90: e1937–e1944, 2018. doi:10.1212/WNL.0000000000005606. - DOI - PubMed
8. Laukkanen JA, Laukkanen T. Sauna bathing and systemic inflammation. Eur J Epidemiol 33: 351–353, 2018. doi:10.1007/s10654-017-0335-y. - DOI - PubMed
9. Li Z, Jiang W, Chen Y, Wang G, Yan F, Zeng T, Fan H. Acute and short-term efficacy of sauna treatment on cardiovascular function: a meta-analysis. Eur J Cardiovasc Nurs 20: 96–105, 2021. doi:10.1177/1474515120944584. - DOI - PubMed

Documenting the Review

- Gathering all the best available evidence requires proper documentation
- Organizing your query, harvested terms, search strategies, iterations, and hand searches is vital for accurately recording your review process
- An Excel or Word document is useful for properly managing your information. Consult a librarian for the best way to do this using Google Sheets.

PICO: In patients with Opioid-Use Disorder, how effective is microdosing Suboxone at diminishing opioid-related withdrawal symptoms?			
Authors: Abdelgawad, Sara, MD (PI); Baronia, Regina, MD; Hernandez, Amber, MS1; Chaturvedi, Dhwaani, MS1; Stuart, Dan, PhD, MLS			
Study Approach: Systematic Review and Meta-Analysis			
Databases/Search Platforms: PubMed/MEDLINE, Embase, CENTRAL, PsychINFO, Google Scholar			
Patient/Population/Problem	**Intervention**	**Comparator(s)**	**Outcome**
Opioid-Use Disorder	**Suboxone**	***No Comparator***	Treatment Outcome
Opioid-Related Disorders	"Buprenorphine, Naloxone Drug Combination"[Mesh]	*Methodone*	**Efficacy**
Opioid Addiction	Buprenorphine	*Standard Management*	Reduction of Withdrawal Symptoms
Opioid Abuse	Buprenorphine-Naloxone		"Substance Withdrawal Syndrome"[Mesh]
Opioid Dependence	(Opioid Analgesics) AND (Suboxone OR Buprenorphine)		Relapse Rate/Rate of Relapse
(Substance-Related Disorders) AND (Opioid OR Opiate)			Adherence/Compliance
			Retention Rates
			Constipation
	AND		Sedation
			QTc Prolongation
	Microdosing		Respiratory Depression
	Micro-Dosing		Onset and Duration of Withdrawal Symptoms
	Microinduction		
	Low-Dose		
	Low Dose		
Study Limits: Human, <10, Adult			
Excluders/Confounders: Animal			
Measures of Effect: Clinical Opioid Withdrawal Scale (COWS); Incidence of Precipitated Withdrawal			
Foundational Studies De Aquino, J. P., Parida, S., & Sofuoglu, M. (2021). The Pharmacology of Buprenorphine Microinduction for Opioid Use Disorder. *Clinical drug investigation*, 41(5), 425–436. https://doi.org/10.1007/s40261-021-01032-7			

PubMed Reproducible

((((((opioid-use disorder) OR (opioid-related disorders)) OR (opioid addiction)) OR (opioid abuse)) OR (opioid dependence)) OR ((substance-related disorders) AND ((opioid) OR (opiate)))) AND ((((((suboxone) OR ("Buprenorphine, Naloxone Drug Combination"[Mesh])) OR (buprenorphine)) OR (buprenorphine-naloxone)) OR ((opioid analgesics) AND ((suboxone) OR (buprenorphine)))) AND ((((((microdosing) OR (micro-dosing)) OR (micro-dose)) OR (microinduction)) OR (low-dose)) OR ("low dose")))) AND ((((((((((treatment outcome) OR (efficacy)) OR (substance withdrawal syndrome)) OR ("Substance Withdrawal Syndrome"[Mesh])) OR (relapse rate)) OR (adherence)) OR (compliance)) OR (retention rates)) OR (constipation)) OR (sedation)) OR (qtc prolongation)) OR (respiratory depression))

Results 06-07-24 --> 82 (<10 years)

Clinical Trials (clinicaltrials.gov)

buprenorphine microdosing

Results 06-28-24 --> 5

WHO ICTRP

buprenorphine microdosing

Results 06-28-24 --> 2* (same 2 records as found in clinicaltrials.gov)

Citation Analysis

A role for arthropods as vectors of multidrug-resistant Enterobacterales in surgical site infections from South Asia
Hassan, B.; Ijaz, M.; Khan, A.; Sands, K.; Serfas, G.-I.; Clayfield, L.; El-Bouseary, M.M.; Lai, G.; Portal, E.; Watkins, W.J.; Parkhill, J.; Walsh, T.R.
Nature Microbiology 2021;6(10):1259-1270; 2021; DOI: 10.1038/s41564-021-00965-1

Potential Nosocomial Infections by the Zika and Chikungunya Viruses in Public Health Facilities in the Metropolitan Area of Recife, Brazil
Krokovsky, L.; Guedes, D.R.D.; Santos, F.C.F.; Sales, K.G.D.S.; Bandeira, D.A.; Pontes, C.R.; Leal, W.S.; Ayres, C.F.J.; Paiva, M.H.S.; Tropical Medicine and Infectious Disease 2022;7(11): 2022; DOI: 10.3390/tropicalmed7110351

Cockroaches as carriers of fungi of medical importance.
Lemos, A A; Lemos, J A; Prado, M A; Pimenta, F C; Gir, E; Silva, H M; Silva, M R R; Mycoses / 2006;49(1):23-5; Germany 2006; DOI: 10.1111/j.1439-0507.2005.01179.x

Investigation on American cockroaches medically important bacteria in Khorramshahr hospital, Iran; Kassiri, H.; Kassiri, A.; Kazemi, S.; Asian Pacific Journal of Tropical Disease 2014;4(3):201-203; 2014

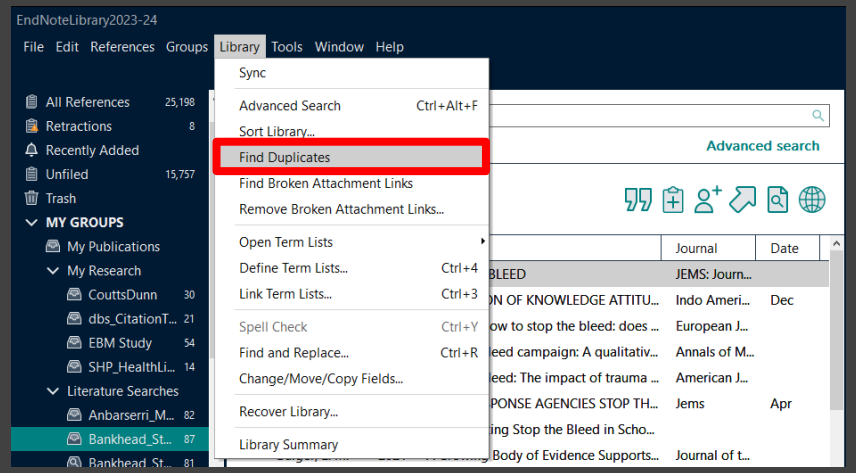
An Examination of Flying Insects in Seven Hospitals in the United Kingdom and Carriage of Bacteria by True Flies (Diptera: Calliphoridae, Dolichopodidae, Fanniidae, Muscidae, Phoridae, Psychodidae, Sphaeroceridae).
Boiocchi F; Davies MP; Hilton AC; J Med Entomol Oct 2019;56(6):1684-1697; England 2019 Oct; DOI: 10.1093/jme/tjz086

Scopus (References & Citations) 07-01-2024 --> 53 (Limits: Articles & Reviews, "Hospital" & "Insect" related keyword filters, <10 years)
Results 07-09-24 --> 162 (Limits - only <10 years)

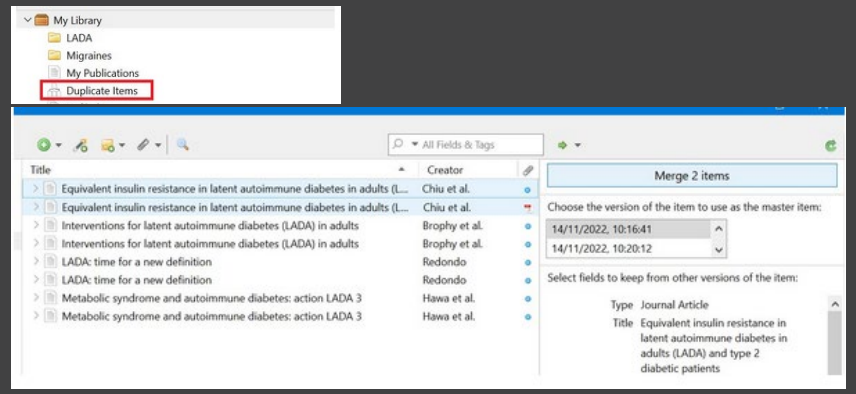
Records Deduplication

Citation Managers

EndNote™



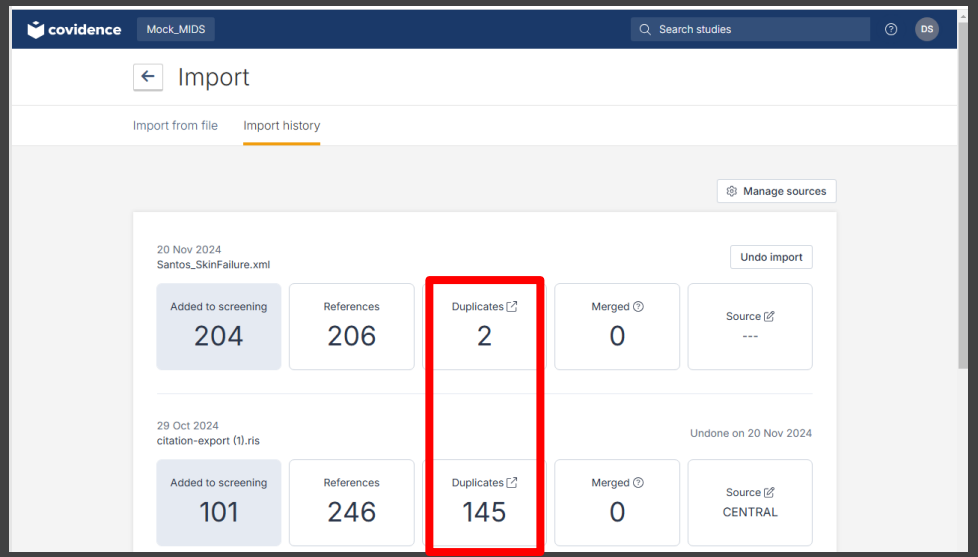
Zotero



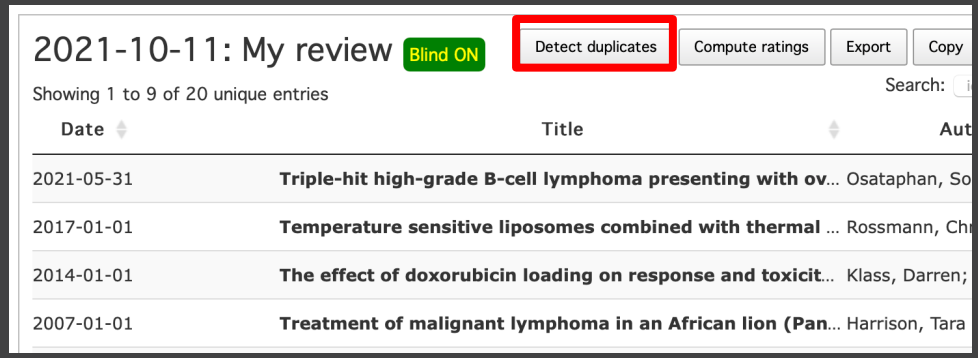
- Expectedly, many records from one search will appear in a translated, reproduced search on a separate database
- Deduplication is needed to exclude repeat records
- Automated options for this include citation managers and specialized review software

Review Software

covidence



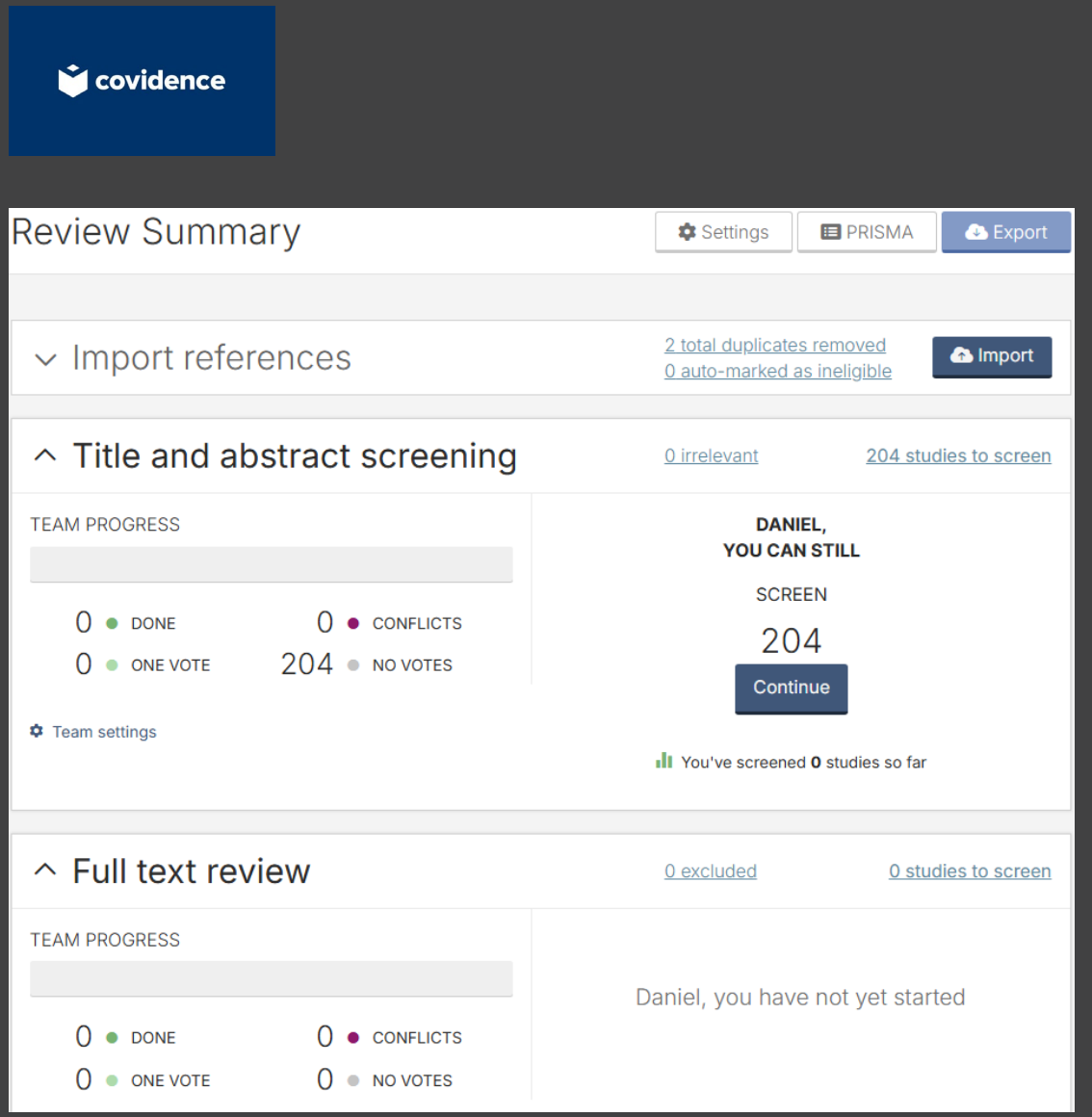
rayyan
INTELLIGENT SYSTEMATIC REVIEW



Record Screening and Full-Text Review

Screening

- Preliminary screening of all compiled records is generally done by viewing the abstract
- Two or more screeners are required to validate a record's potential
- All successfully screened records should then be evaluated using the full-text.
- Software such as Covidence can effectively organize records for this purpose.



Inclusion for Synthesis

Inclusion Criteria

- Inclusion of relevant records is a delicate process, all the more so because you must sync articles target specific **endpoints** and **measures of effect**
- Primary and secondary endpoints must need to be addressed by review authors prior to beginning a review, and used to include only the most relevant studies
- Measures of effect, statistical values and metrics associated with endpoints, should likewise be used as markers for inclusion

Endpoints & Effects Measures

Clinical Query: How effective is sauna bathing for patients suffering from Cardiovascular Disease?

- Potential Endpoints: Mortality and Subsequent Cardiac Episodes (Primary); Quality of Life (Secondary)
- Effects Measures: Death Rate and Cardiac Event Rate, LDL Levels, Diastolic and Systolic Blood Pressure, QOL Index

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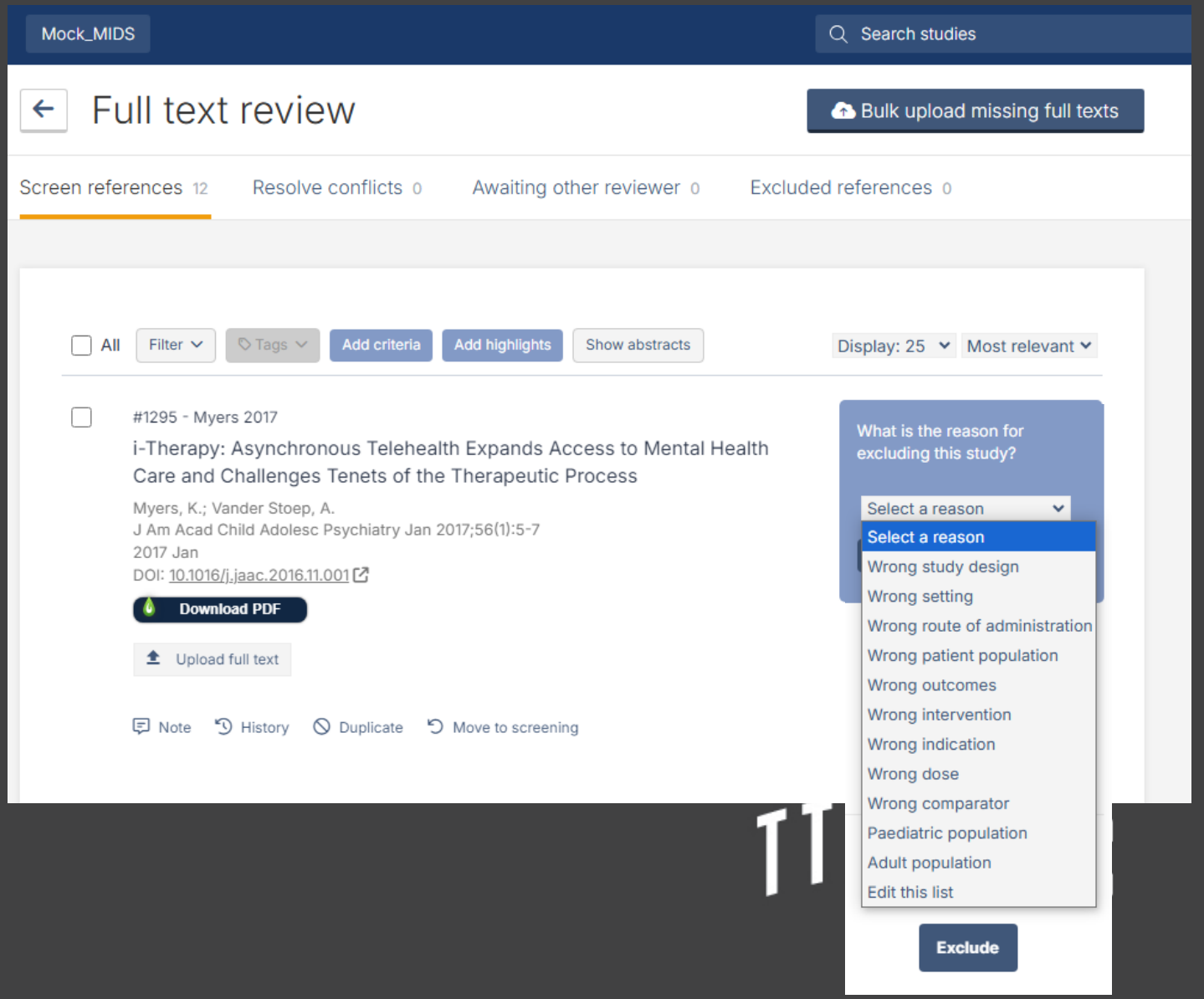
Study Exclusion

Exclusion Criteria

- Proper review methods will always require that document exclusion reasons
- This means you must report—and even tally—the number of records excluded, and the specific reasons for exclusion
- Covidence enables users to do this effectively within the full-text review folder of all review portals



Study Types For Inclusion

Randomized Controlled Trial

Am J Physiol Regul Integr Comp Physiol. 2022 Sep 1;323(3):R289-R299.
doi: 10.1152/ajpregu.00076.2022. Epub 2022 Jul 4.

Effects of regular sauna bathing in conjunction with exercise on cardiovascular function: a multi-arm, randomized controlled trial

Earric Lee [1], Iiris Kolunsarka [1], Joel Kostensalo [2], Juha P Ahtiainen [1], Eero A Haapala [1 3], Peter Willeit [4 5], Setor K Kunutsor [6 7], Jari A Laukkanen [1 8 9]

Affiliations + expand

PMID: 35785965 PMCID: PMC9394774 DOI: 10.1152/ajpregu.00076.2022

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Abstract

Regular exercise and sauna bathing have each been shown to improve cardiovascular function in clinical populations. However, experimental data on the cardiovascular adaptations to regular exercise in conjunction with sauna bathing in the general population are lacking. Therefore, we compared the effects of exercise and sauna bathing to regular exercise using a multi-arm randomized controlled trial. Participants (n = 47) aged 49 ± 9 with low physical activity levels and at least one traditional cardiovascular disease (CVD) risk factor were randomly assigned (1:1:1) to guideline-based regular exercise and 15-min postexercise sauna (EXS), guideline-based regular exercise (EXE), or control (CON) for 8 wk. The primary outcomes were blood pressure (BP) and cardiorespiratory fitness (CRF). Secondary outcomes included fat mass, total cholesterol levels, and arterial stiffness. EXE had a greater change in CRF (+6.2 mL/kg/min; 95% CI, +4.2 to +8.3 mL/kg/min) and fat mass but no differences in BP when compared with CON. EXS displayed greater change in CRF (+2.7 mL/kg/min; 95% CI, +0.2 to +5.3 mL/kg/min), lower systolic BP (-8.0 mmHg; 95% CI, -14.6 to -1.4 mmHg), and lower total cholesterol levels compared with EXE. Regular exercise improved CRF and body composition in sedentary adults with CVD risk factors. However, when combined with exercise, sauna bathing demonstrated a substantially supplementary effect on CRF, systolic BP, and total cholesterol levels. Sauna bathing is a valuable lifestyle tool that complements exercise for improving CRF and decreasing systolic BP. Future research should focus on the duration and frequency of exposure to ascertain the dose-response relationship.

For systematic reviews that aim to incorporate a meta-analysis component, always target prospective, controlled studies for inclusion

Prioritize trial studies, chiefly randomized controlled trial, investigating the intervention for the predetermined endpoints and effects measures

Randomized Controlled Trial

J Appl Physiol (1985). 2023 Oct 1;135(4):795-804.
doi: 10.1152/japplphysiol.00322.2023. Epub 2023 Aug 31.

Finnish sauna bathing and vascular health of adults with coronary artery disease: a randomized controlled trial

Amélie Debray [1 2], Hugo Gravel [1 2], Laurence Garceau [1], Audrey-Ann Bartlett [1 2], Georgia K Chaseling [3], Hadiatou Barry [1], Parya Behzadi [1], Nicholas Ravanelli [4], Josep Iglesies-Grau [1], Anil Nigam [1], Martin Juneau [1], Daniel Gagnon [1 2]

Affiliations + expand

PMID: 37650138 DOI: 10.1152/japplphysiol.00322.2023

Access Options View Complete Issue

Free article

Abstract

Regular Finnish sauna use is associated with a reduced risk of cardiovascular mortality. However, physiological mechanisms underlying this association remain unknown. This study determined if an 8-wk Finnish sauna intervention improves peripheral endothelial function, microvascular function, central arterial stiffness, and blood pressure in adults with coronary artery disease (CAD). Forty-one adults (62 ± 6 yr, 33 men/8 women) with stable CAD were randomized to 8 wk of Finnish sauna use (n = 21, 4 sessions/wk, 20-30 min/session, 79°C, 13% relative humidity) or a control intervention (n = 20, lifestyle maintenance). Brachial artery flow-mediated dilation (FMD), carotid-femoral pulse wave velocity (cf-PWV), total (area under the curve) and peak postocclusion forearm reactive hyperemia, and blood pressure (automated auscultation) were measured before and after the intervention. After the sauna intervention, resting core temperature was lower (-0.27°C [-0.54, -0.01], P = 0.046) and sweat rate during sauna exposure was greater (0.3 L/h [0.1, 0.5], P = 0.003). The change in brachial artery FMD did not differ between interventions (control: 0.07% [-0.99, +1.14] vs. sauna: 0.15% [-0.89, +1.19], interaction P = 0.909). The change in total (P = 0.031) and peak (P = 0.024) reactive hyperemia differed between interventions due to a nonsignificant decrease in response to the sauna intervention and an increase in response to control. The change in cf-PWV (P = 0.816), systolic (P = 0.951), and diastolic (P = 0.292) blood pressure did not differ between interventions. These results demonstrate that four sessions of Finnish sauna bathing per week for 8 wk does not improve markers of vascular health in adults with stable CAD.**NEW & NOTEWORTHY** This study determined if unsupervised Finnish sauna bathing for 8 wk improves markers of vascular health in adults with coronary artery disease. Finnish sauna bathing reduced resting core temperature and improved sweating capacity, indicative of heat acclimation. Despite evidence of heat acclimation, Finnish sauna bathing did not improve markers of endothelial function, microvascular function, arterial stiffness, or blood pressure.

Further Study Types For Inclusion

› JAMA Intern Med. 2015 Apr;175(4):542-8. doi: 10.1001/jamainternmed.2014.8187.

Association between sauna bathing and fatal cardiovascular and all-cause mortality events

Tanjaniina Laukkanen [1], Hassan Khan [2], Francesco Zaccardi [3], Jari A Laukkanen [1]

Affiliations + expand

PMID: 25705824 DOI: 10.1001/jamainternmed.2014.8187

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Abstract

Importance: Sauna bathing is a health habit associated with better hemodynamic function; however, the association of sauna bathing with cardiovascular and all-cause mortality is not known.

Objective: To investigate the association of frequency and duration of sauna bathing with the risk of sudden cardiac death (SCD), fatal coronary heart disease (CHD), fatal cardiovascular disease (CVD), and all-cause mortality.

Design, setting, and participants: We performed a prospective cohort study (Finnish Kuopio Ischemic Heart Disease Risk Factor Study) of a population-based sample of 2315 middle-aged (age range, 42-60 years) men from Eastern Finland. Baseline examinations were conducted from March 1, 1984, through December 31, 1989.

Exposures: Frequency and duration of sauna bathing assessed at baseline.

Results: During a median follow-up of 20.7 years (interquartile range, 18.1-22.6 years), 190 SCDs, 281 fatal CHDs, 407 fatal CVDs, and 929 all-cause mortality events occurred. A total of 601, 1513, and 201 participants reported having a sauna bathing session 1 time per week, 2 to 3 times per week, and 4 to 7 times per week, respectively. The numbers (percentages) of SCDs were 61 (10.1%), 119 (7.8%), and 10 (5.0%) in the 3 groups of the frequency of sauna bathing. The respective numbers were 89 (14.9%), 175 (11.5%), and 17 (8.5%) for fatal CHDs; 134 (22.3%), 249 (16.4%), and 24 (12.0%) for fatal CVDs; and 295 (49.1%), 572 (37.8%), and 62 (30.8%) for all-cause mortality events. After adjustment for CVD risk factors, compared with men with 1 sauna bathing session per week, the hazard ratio of SCD was 0.78 (95% CI, 0.57-1.07) for 2 to 3 sauna bathing sessions per week and 0.37 (95% CI, 0.18-0.75) for 4 to 7 sauna bathing sessions per week (P for trend = .005). Similar associations were found with CHD, CVD, and all-cause mortality (P for trend ≤.005). Compared with men having a sauna bathing session of less than 11 minutes, the adjusted hazard ratio for SCD was 0.93 (95% CI, 0.67-1.28) for sauna bathing sessions of 11 to 19 minutes and 0.48 (95% CI, 0.31-0.75) for sessions lasting more than 19 minutes (P for trend = .002); significant inverse associations were also observed for fatal CHDs and fatal CVDs (P for trend ≤.03) but not for all-cause mortality events.

Conclusions and relevance: Increased frequency of sauna bathing is associated with a reduced risk of SCD, CHD, CVD, and all-cause mortality. Further studies are warranted to establish the potential mechanism that links sauna bathing and cardiovascular health.

If the compiled search and screening process reveals that no trial data meets the criteria, see if any further prospective, observational studies are available.

While not always specified, prospective data will often be assessed using a cohort study design

› Am J Hypertens. 2017 Nov 1;30(11):1120-1125. doi: 10.1093/ajh/hpx102.

Sauna Bathing and Incident Hypertension: A Prospective Cohort Study

Francesco Zaccardi [1], Tanjaniina Laukkanen [2], Peter Willeit [3 4], Setor K Kunutsor [5], Jussi Kauhanen [2], Jari A Laukkanen [2 6]

Affiliations + expand

PMID: 28633297 DOI: 10.1093/ajh/hpx102

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Abstract

Background: Sauna bathing is associated with reduced cardiovascular risk, but the mechanisms underlying this beneficial effect are not entirely understood. We aimed to assess the relationship between sauna bathing and risk of incident hypertension.

Methods: Frequency of sauna bathing was ascertained using questionnaires in the Kuopio Ischemic Heart Disease Study, a prospective cohort study conducted in Eastern Finland that comprised a population-based sample of 1,621 men aged 42 to 60 years without hypertension at baseline. The incidence of hypertension was defined as a physician diagnosis of hypertension, systolic blood pressure (SBP) >140 mm Hg, diastolic blood pressure >90 mm Hg, or use of antihypertensive medication.

Results: During a median follow-up of 24.7 years, 251 incident cases (15.5%) were recorded. In Cox regression analysis adjusted for baseline age, smoking, body mass index, and SBP; compared to participants reporting 1 sauna session per week, the hazard ratio for incident hypertension in participants reporting 2 to 3 sessions and 4 to 7 sessions was 0.76 (95% confidence interval: 0.57-1.02 and 0.54 (0.32-0.91), respectively. The corresponding hazard ratios were similar after further adjustment for glucose, creatinine, alcohol consumption, heart rate, family history of hypertension, socioeconomic status, and cardiorespiratory fitness: 0.83 (95% confidence interval: 0.59-1.18) and 0.53 (0.28-0.98), respectively.

Conclusions: Regular sauna bathing is associated with reduced risk of hypertension, which may be a mechanism underlying the decreased cardiovascular risk associated with sauna use. Further epidemiological and experimental studies could help elucidate the effects of sauna bathing on cardiovascular function.

Keywords: Sauna bathing; blood pressure; cohort; hypertension; prevention.

Part 2: Risk of Bias Assessment and Data Extraction

Risk of Bias Assessment

Risk of Bias

- Accounting for the risk of bias within included studies is essential for all serious review types—and vital for systematic reviews with meta-analyses.
- Bias can arise from different sources. Collectively evaluating studies for such biases can help justify reasons for inclusion and better articulate the assessed, synthesized results

Types of Bias

- Publication Bias
- Selection Bias
- Reporting Bias
- Recall Bias
- Sampling Bias

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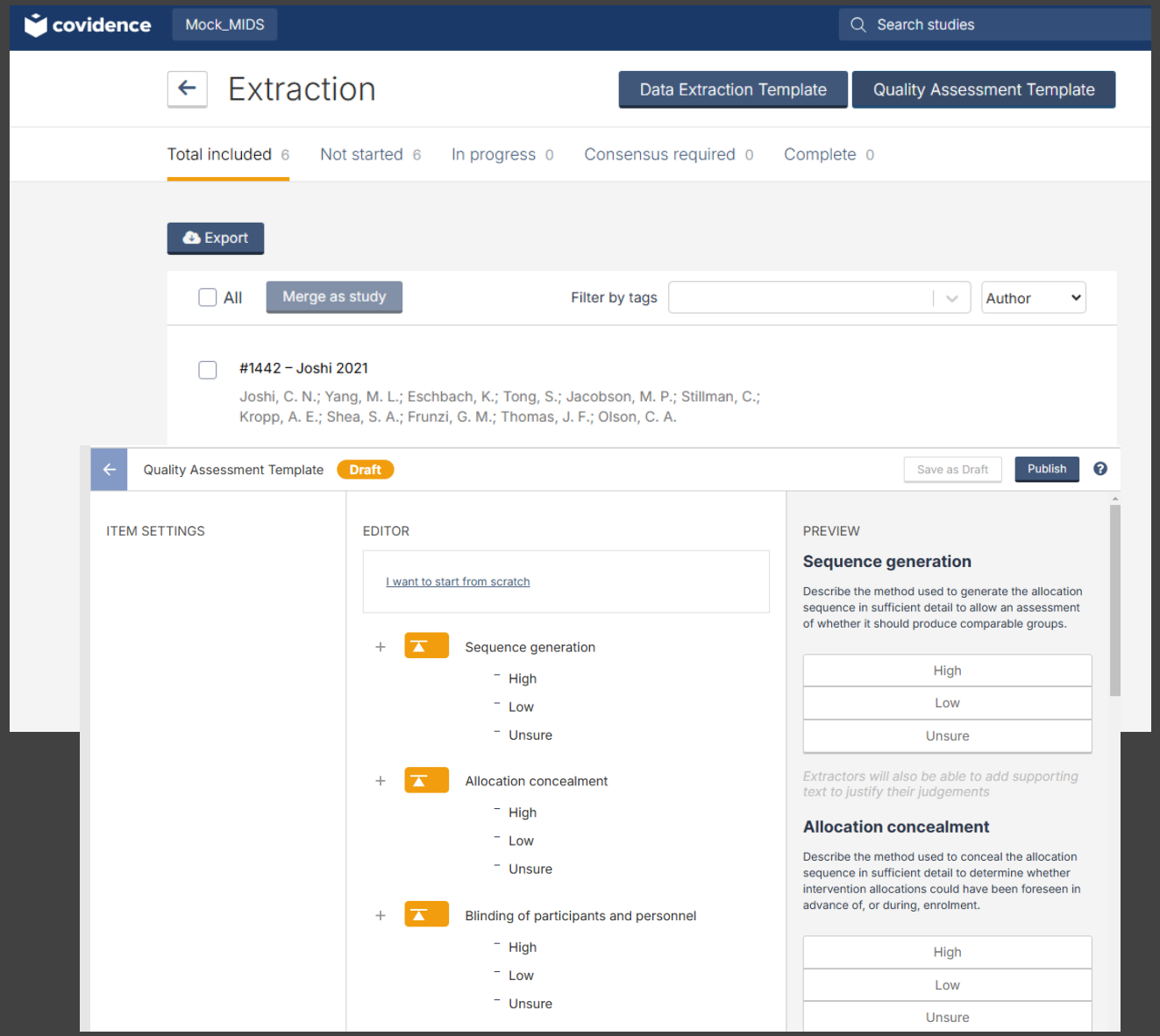
Screening for Risk of Bias

Risk of Bias

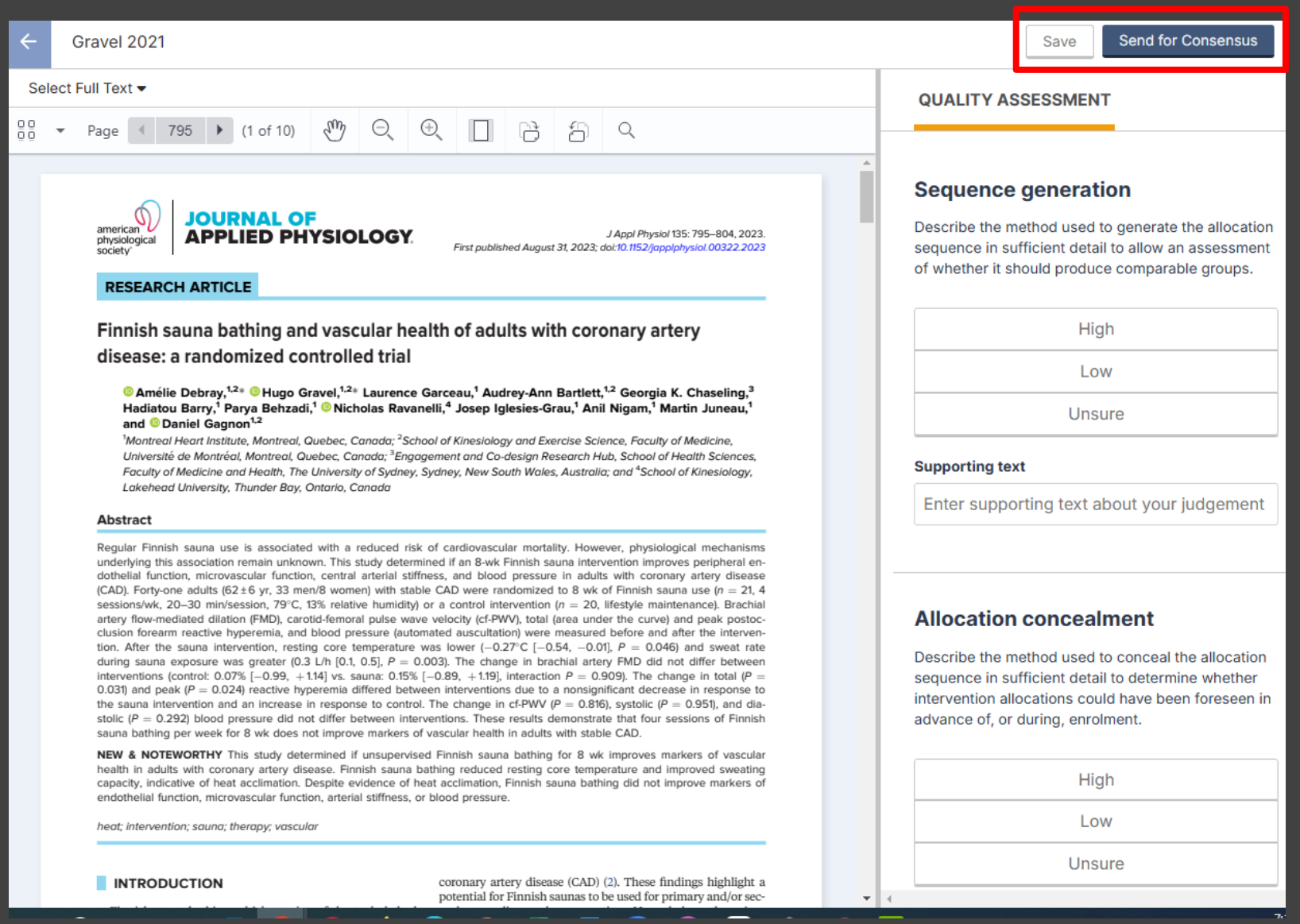
- Screening trial and prospective study data will require that you rate things like allocation, blinding and sequence generation in line with reporting guidelines
- Just as with preliminary record screening, full-text review, and final inclusion, screening for bias should be done by two or more rating appraisers
- Software such as Covidence can enable users to do this more effectively.



Collective Bias Assessment

Risk of Bias

- Screening for bias must be done collectively with reference to the full text, with consensus ratings always needed.
- Bias templates include options for perusing the full-text content while rating using appropriate interrater reliability indexes (ex. High, Medium, Low)

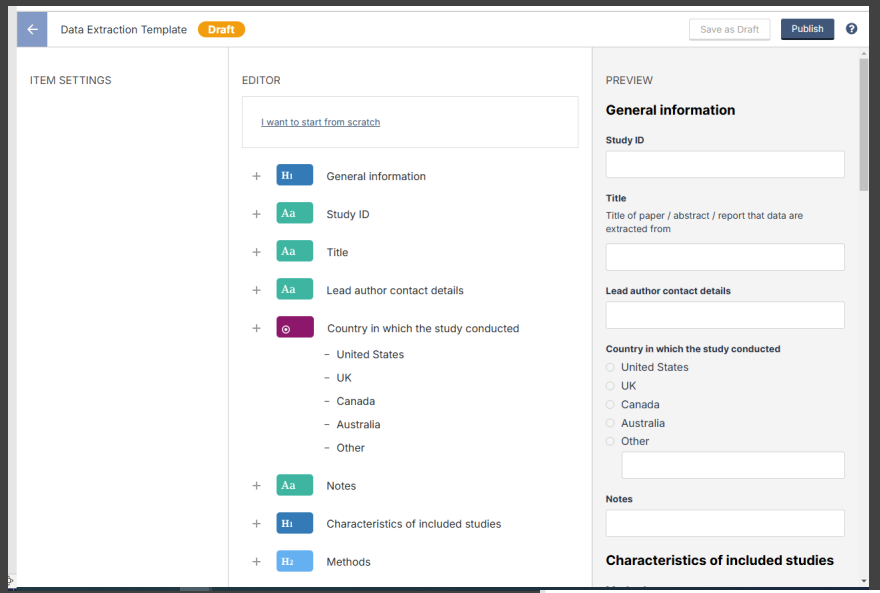


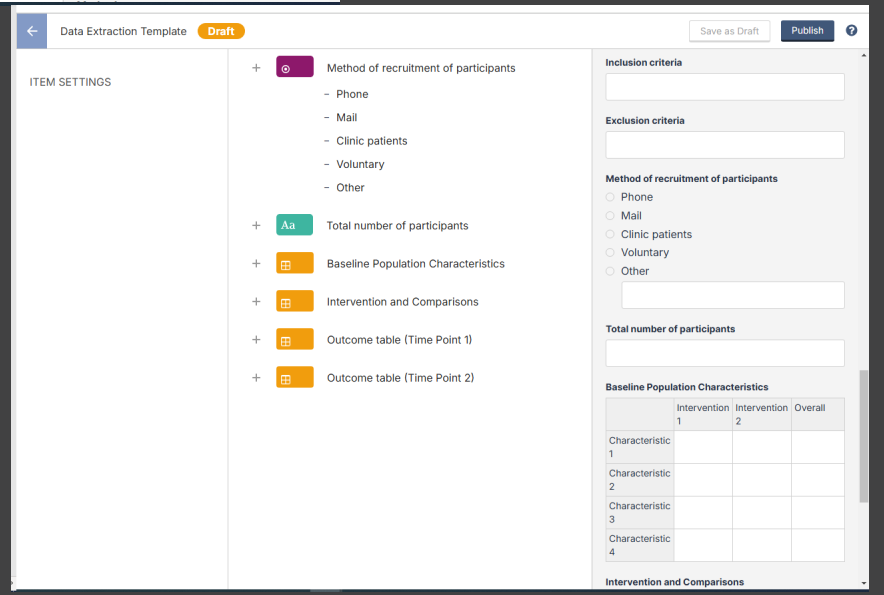
Data Extraction

Extracting Relevant Data

- Once the included studies are assessed for validity and risk of bias, it's time to extract the relevant data based on endpoints and effects measures

- This would include creating templates for and relevant outcome tables for evaluation. Covidence can help with this process as well

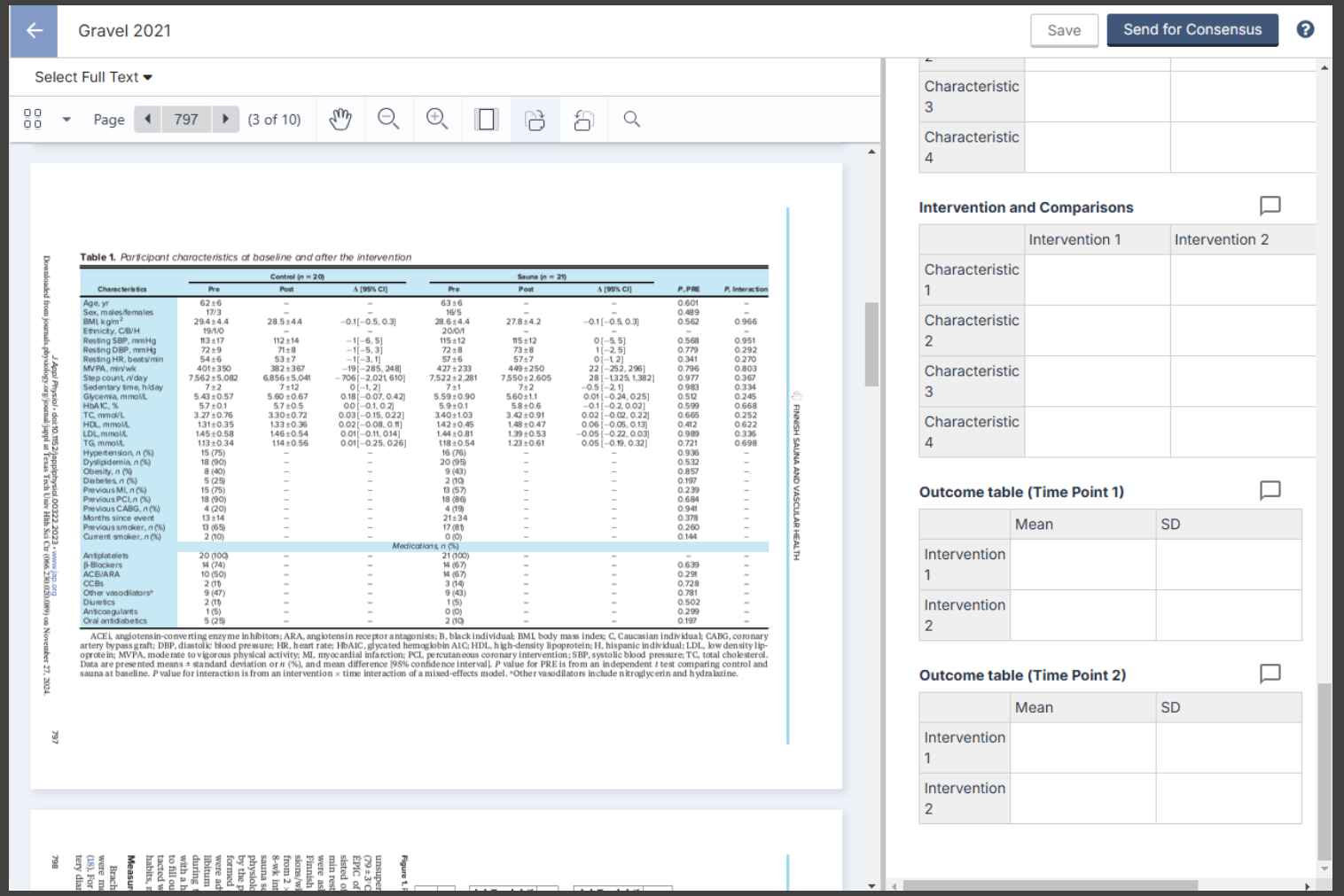




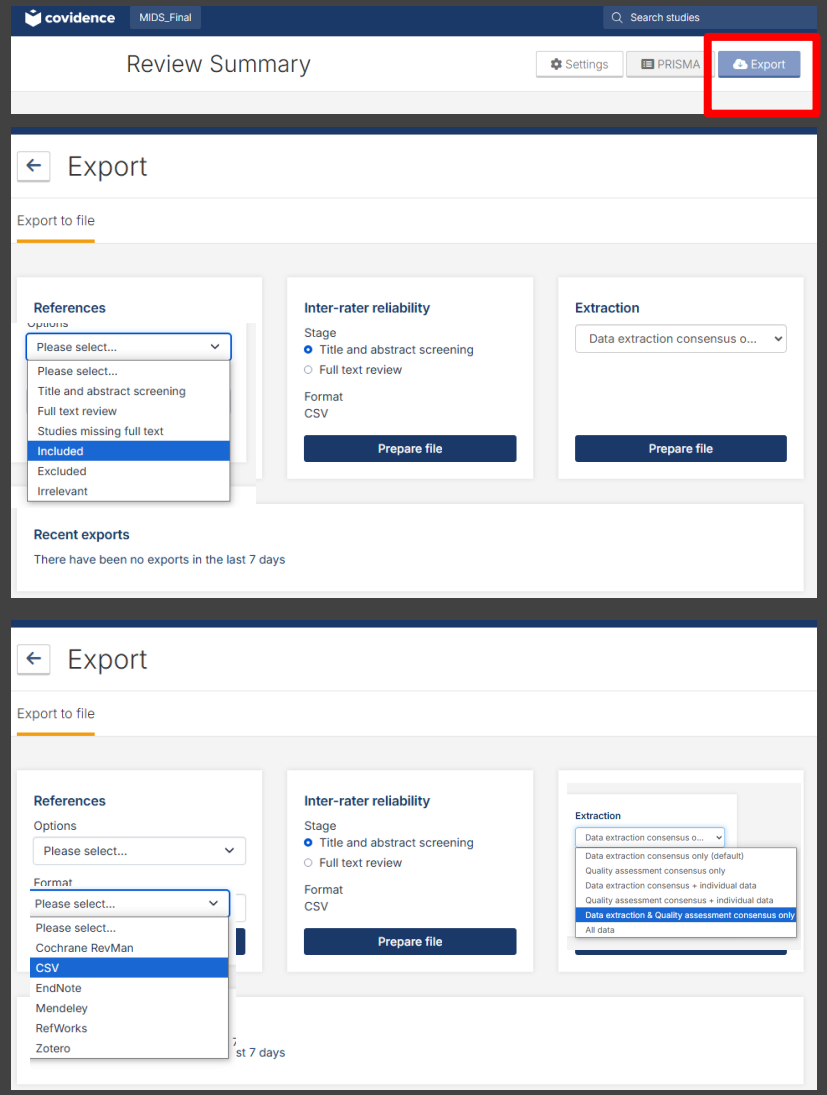
Data Extraction Screening

Extracting Relevant Data

- Use a recommended template or a customized tabular arrangement to record data from the full text.
- Generally, all raters must contribute to extraction. This means cross-checking that other raters have entered the correct data.



Exporting Extracted Data



Extracted Data will need to be exported to a relevant platform for tabulation and statistical evaluation

Generally this will mean exporting the data from software such as Covidence into a CSV file or tabulated-data platform

	A	B	C	D	E	F	G	H	I	J
1	Study ID	Title	Form	Reviewer	Status	Intervention	Group name	Identification: Sponsorship source	Identification: Country	Identification: Setting
2	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 1	Dasha Yurovskaya	Complete	Omega-3	High dose	University	Australia	Hospital
3	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 1	Dasha Yurovskaya	Complete	Omega-3	Low dose	University	Australia	Hospital
4	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 1	Dasha Yurovskaya	Complete	Placebo		University	Australia	Hospital
5	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 2	Anneliese Arno	Complete	Omega-3	High dose	University	Australia	Hospital
6	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 2	Anneliese Arno	Complete	Omega-3	Low dose	University	Australia	Hospital
7	Clegg 2001	Effect of omega-3 fatty acid on depression	Reviewer 2	Anneliese Arno	Complete	Placebo		University	Australia	Hospital
8	Clegg 2001	Effect of omega-3 fatty acid on depression	Consensus	Consensus	Complete	Omega-3	High dose	University	Australia	Hospital
9	Clegg 2001	Effect of omega-3 fatty acid on depression	Consensus	Consensus	Complete	Omega-3	Low dose	University	Australia	Hospital
10	Clegg 2001	Effect of omega-3 fatty acid on depression	Consensus	Consensus	Incomplete	Placebo		University	Australia	Hospital
11	Jonston 2015	Depression in adults	Reviewer 1	Dasha Yurovskaya	In progress	Omega-3		University	Australia	Hospital
12	Jonston 2015	Depression in adults	Reviewer 1	Dasha Yurovskaya	In progress	Placebo		University	Australia	Hospital
13	Jonston 2015	Depression in adults	Reviewer 2	Anneliese Arno	Not started					
14	Jonston 2015	Depression in adults	Consensus	Consensus	NA					
15	Smith 1991	Geriatric depression and omega-3	Reviewer 1	Unassigned	Not started					
16	Smith 1991	Geriatric depression and omega-3	Reviewer 2	Unassigned	Not started					
17	Smith 1991	Geriatric depression and omega-3	Consensus	Consensus	NA					

Citation	Study Design	Sample Size	Intervention Details	Comparison Group	Outcome Measures	Results	Follow-up Duration
Smith et al. (2020)	RCT	n=150	Nurse-led group education sessions on diet, exercise, and medication management	Standard care	HbA1c levels, Self-management behaviors	Significant reduction in HbA1c levels ($p < 0.05$), Improved self-management behaviors	6 months
Johnson et al. (2019)	Cohort	n=200	Individualized nurse-led counseling sessions	Usual care	Glycemic control, Quality of life	No significant difference in glycemic control, Improved quality of life in intervention group	12 months
Garcia et al. (2018)	Quasi-experimental	n=80	Nurse-led telephone coaching	Written materials	Medication adherence, Self-efficacy	Higher medication adherence in intervention group ($p < 0.01$), Improved self-efficacy	3 months
Patel et al. (2017)	Case-control	n=60	Nurse-led educational workshops	Standard diabetes education	Healthcare utilization, Patient satisfaction	Reduced hospital admissions in intervention group ($p < 0.05$), Higher patient satisfaction	9 months
Lee et al. (2016)	Mixed methods	n=100	Nurse-led education combined with telemonitoring	Nurse-led education alone	Hospital readmissions, Self-management behaviors	Lower hospital readmission rates in combined intervention group, Improved self-management behaviors	18 months

Part 3: Statistical Analysis and Graphical Representation