Course Objectives

• IHS Library Services
• What is a Literature Search?
• Creating a Searchable Question
• Explain Boolean Logic
• Conducting a Search
• Appraise the Literature
• Understanding Zotero
• Let’s Get Interactive!
• Questions??
Your IHS Library
Quiet Study Room

• Practically sound proof
• Plenty of outlets!
• No booking necessary!
IT Service Desk

Report any IT issues you may be having

Any books that you requested for will be located in this location
Reserving a Study Room

Kiosk touch screen computer for booking a room at the IT Service desk as well.

You can also reserve a room from your own laptop or phone.
Availability

Librarians available:
8:00am - 6:00pm
Monday - Friday

Access
Reserving a Study Room

The IHS Library has 20 study rooms for students to reserve.

Single study rooms can hold 1-2 students

Group Study Rooms can hold 6-8 students

Each room has a white board

You must book a room to use it! (This is to protect YOU from getting kicked out)
To Reserve a Room
Booking Details

<table>
<thead>
<tr>
<th>Item</th>
<th>Category</th>
<th>From</th>
<th>To</th>
<th>Change</th>
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<td>Single Rooms</td>
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<td>3:30pm Friday, August 17, 2018</td>
<td></td>
</tr>
</tbody>
</table>

Fill out this form to complete the booking.

Full Name *  
First Name  
Last Name

Email *

What is your school affiliation? *  
- School of Health and Medical Sciences
- School of Medicine
- College of Nursing
- Other

Submit my Booking
Stop on By!

For general assistance or inquiries, email library@shu.edu

Kyle Downey, MLIS
Health Sciences Librarian | College of Nursing & School of Health and Medical Sciences Liaison

973-642-6967
kyle.downey@shu.edu
Room 1410
How to Conduct a Literature Search?
A literature search is a well thought out and organized search for all of the literature published on a topic.

A well-structured literature search is the most effective and efficient way to locate sound evidence on the subject you are researching.

Your evidence may be found in: books, journals, government documents, guidelines, databases and the internet.
Information Overload

PubMed contains over
27 millions citations as of 2017

https://www.nlm.nih.gov/bsd/bsd_key.html

<table>
<thead>
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<th>Year</th>
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</tr>
<tr>
<td>2015</td>
<td>806,326</td>
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<tr>
<td>2016</td>
<td>869,666</td>
</tr>
<tr>
<td>2017</td>
<td>813,598</td>
</tr>
</tbody>
</table>
Search Plan

1. Pose a searchable question
2. Find Subject Terms
3. Select the best database
4. Manipulate the database
Creating a searchable question

**Patient**
What are the characteristics of the patient?
What is the condition or disease you are interested in?

**Intervention**
What intervention, therapy, treatment, etc. are you interested in?

**Comparison**
What is the alternative to the intervention (different drug, surgery, etc.)

**Outcome**
What do you want to prove, measure, affect, etc.

**Types of Studies**
Systematic reviews, case studies, Guidelines, Qualitative, Quantitative
P for Patient, Population or Problem

• How is the disease/condition defined?

• What are the most important characteristics that describe the people?

• Are there any relevant demographic factors (e.g., age, sex, ethnicity)? What is the setting (e.g., hospital, community, etc.)?

• Who should make the diagnosis?

• Are there any other types of people who should be excluded from the review (because they are likely to react to the intervention in a different way)?
Intervention and Comparison

What do you want to do for the patient?
What are the interventions of interest?
Intervention may be a clinical intervention or a process change.
What are you comparing this to?
Is there a traditional intervention?
Is there no intervention?
Are there standard or alternative treatments to compare with the planned intervention?

*Not all PICO questions will have an established comparison component*
Outcomes

What do you hope to accomplish, measure, improve, or affect?

When entering search terms for a literature search, you won’t be searching for the O – outcome — you use the Outcome as you assessment of whether or not the article answers your question.
<table>
<thead>
<tr>
<th>P</th>
<th>Patient, Population, Problem</th>
<th>How would I describe a group of patients similar to mine?</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Intervention</td>
<td>Which main intervention, prognostic factor, or exposure am I considering?</td>
</tr>
<tr>
<td>C</td>
<td>Comparison</td>
<td>What is the main alternative to compare with the intervention?</td>
</tr>
<tr>
<td>O</td>
<td>Outcome</td>
<td>What can I hope to accomplish, measure, improve or affect?</td>
</tr>
<tr>
<td>T</td>
<td>What type of question you are asking</td>
<td>Therapy/Treatment, Diagnosis, Prognosis, Harm/Etiology</td>
</tr>
<tr>
<td>T</td>
<td>Type of Study you want to find</td>
<td>What would be the best study design/methodology?</td>
</tr>
<tr>
<td>T</td>
<td>Time</td>
<td>What changed can occur over time?</td>
</tr>
</tbody>
</table>
The Type of Question & Type of Study

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Type of Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therapy</td>
<td>RCTs, Systematic Review, Meta-Analysis</td>
</tr>
<tr>
<td>Prognosis</td>
<td>Cohort studies, case controls</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>Controlled Trials, Systematic Reviews</td>
</tr>
<tr>
<td>Harm</td>
<td>Cohort Studies</td>
</tr>
<tr>
<td>Prevention</td>
<td>RCTs</td>
</tr>
<tr>
<td>Quality Improvement</td>
<td>RCTs</td>
</tr>
</tbody>
</table>

Is a colonoscopy combined with fecal occult blood testing more accurate in detecting colon cancer compared with a colonoscopy alone in adults over age 50?

P = adults over the age of 50
I = colonoscopy combined with fecal occult blood testing
C = colonoscopy alone
O = more accurate in detecting colon cancer
What evidence is there that a falls prevention task force system can decrease falls in inpatient adult medical surgical units?

P = Inpatient adult medical surgical patients
I = Falls task force
C = Previous falls rates to current falls rates
O = Decrease falls rates in inpatient medical surgical units
In school-age children, what is the effect of a school-based physical activity program on a reduction of childhood obesity?

P = school aged children
I = school-based physical activity program
C = no comparison
O = reduction in the incidence of childhood obesity
Keep in Mind…

1. You do not need every part of the PICO formula
2. Some questions will not have a comparison
3. Some questions will not have a time factor
4. Some questions might not even have an intervention
5. Remember, it’s a model, not a structure.
   • Use it guide you, not to make things harder
Controlled Vocabulary and Key Word Searching

How to search using key word terms

Concept of Controlled Vocabulary

The Pros and Cons
Key word concepts

Keyword searching = matching characters

Keywords are searched in all database fields unless you limit the search to a single field, like title or author.

Keyword searches return a lot of results, but most of them aren’t very useful.

Keyword searching only gives you articles that mention your topic.
ARTICLES IN DATABASES ARE ASSIGNED SUBJECT LABELS BY INDEXERS

OFTEN CALLED, “SUBJECT HEADINGS”, “DESCRIPTORS”, OR “TAGS”

SUBJECT TERMS DESCRIBE THE MAIN CONCEPTS OF AN ARTICLE

SUBJECT SEARCHING GIVES YOU ARTICLES THAT ARE ABOUT YOUR TOPIC
Using the Right Terms

**Controlled Vocabulary**

- Controlled vocabularies group synonymous words together under one main term: a **Subject Heading**
- Searching with Subject Headings means researchers find articles that are **about** their topic, rather than articles that use specific words.

**Keywords**

- Keyword searches return documents that include the word you searched for:
  - articles **sort of** related to your topic
  - articles that **indirectly** mention your topic, but which are about something else
  - keyword searches look for words, not **ideas**
What are some Advantages to Controlled Vocabulary?

- Using the controlled vocabulary can make you search more precise and easier
- Increases the relevancy of results
- The indexers have already done much of the work for you.
- Searchable tree structures of terms can help you find new terms to use.
Issues with Controlled Vocabulary

- NOT all databases use a controlled vocabulary
- New concepts take time to be added
- There is often a lag phase during which the newest articles aren’t indexed
- Controlled vocabularies can contain some very strange things and some concepts may not be handled well
- The controlled vocabulary must be easily searchable
- Trying to understand what is and isn’t in a particular controlled vocabulary can give you a big headache!
### Examples of Keyword vs. Subject Headings

<table>
<thead>
<tr>
<th>Keyword</th>
<th>CINAHL Subject Heading</th>
<th>Medical Subject Heading (MeSH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Attack</td>
<td>Myocardial Infarction</td>
<td>Myocardial Infarction</td>
</tr>
<tr>
<td>Distance education</td>
<td>Education, non-traditional</td>
<td>Education, distance</td>
</tr>
<tr>
<td>EHR</td>
<td>Computerized patient record</td>
<td>Electronic Health Records</td>
</tr>
<tr>
<td>LGBT</td>
<td>GLBT persons</td>
<td>Bisexuality or Homosexuality</td>
</tr>
</tbody>
</table>
Identifying key concepts

What are the main concepts in your question?

Sample Question:
Does nutrition therapy improve decubitus pressure ulcer healing in an elderly patient?
Does music therapy help to reduce preoperative anxiety in the surgical patient?

- Anxiety
  - Fear, anxiousness, agitation, worry, nervousness, unease, stress
- Music
  - Recording, CD, are there others?
- Surgery
  - Operation, procedure, excision
- Preoperative
  - Preoperative care, preoperative period, preoperative nursing
Example

• How many words could you think of for the idea of “cancer”?
  • tumor,
  • malignancy,
  • neoplasm,
  • sarcoma...

• Articles in a database
  • Article one: “Breast tumors in young women”
  • Article two: “Surgery for prostrate cancer.”
  • Article three: “Diagnosing Melanoma.”

All three articles are about types of cancer but different terms are used in titles.
Boolean Logic and Operators
What they are and how they work
Boolean Logic

What is it?

Boolean logic defined logical relationships between terms in a search. The Boolean search operators are **And**, **OR**, and **NOT**.

- **AND** combines search terms so that each search result contains all of the terms.
- **OR** combines search terms so that each search result contains at least one of the terms.
- **NOT** excludes terms so that each search result does not contain any of the terms that follow it.
  - **Note:** When executing a search, **AND** takes precedence over **OR**.
<table>
<thead>
<tr>
<th>AND</th>
<th>OR</th>
<th>NOT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Each result contains all search terms</td>
<td>Each result contains at least one search term</td>
<td>Results do not contain specified terms.</td>
</tr>
<tr>
<td>The search <em>children AND infant</em> finds items that contain <strong>both children</strong> and <strong>infant</strong></td>
<td>The search <em>children OR infant</em> finds items that contain <strong>either children OR items that contain infant</strong></td>
<td>The search children <strong>NOT infant</strong> finds items that contain <strong>children</strong> but do not contain <strong>infant</strong></td>
</tr>
</tbody>
</table>
Example

What evidence-based practice nursing interventions can decrease falls in inpatient adult medical surgical units?
And Combines

Nursing interventions

AND

Falls prevention
Nursing interventions AND Falls prevention
Best matches for nursing intervention AND falls prevention:


Switch to our new best match sort order
Let’s Expand Using OR Boolean Operator

How can we expand a search?

What other words can we possibly use along with falls prevention?

- Patient safety
- Inpatient falls
- Patient falls
- Accidental Falls
Expand with **OR**

- Falls prevention
- Patient safety
- Inpatient falls
OR

(falls prevention
OR
Patient safety
OR
Inpatient falls)
Best matches for falls prevention OR patient safety OR inpatient falls:

1. Postpartum safety a patient-centered approach to fall prevention.

2. Inpatient fall prevention programs as a patient safety strategy: a systematic review.

3. The economics of preventing hospital falls: demonstrating ROI through a simple model.

Switch to our new best match sort order
Nursing interventions AND (falls prevention OR Patient safety OR Inpatient falls)
Best matches for nursing interventions (falls prevention OR patient safety OR Inpatient falls):

Journey to a safe environment: fall prevention in an emergency department at a level I trauma center.

The economics of preventing hospital falls, demonstrating ROI through a simple model
Spetz J et al J Nurs Adm. 2015

Improving falls risk screening and prevention using an e-learning approach
Johnson M et al. J Nurs Manag. 2015

Search results
Items: 1 to 20 of 1720

Behavioral Economics Interventions in Clinical Decision Support Systems,
1. Cho I, Bates DW.
PMID: 30157514

Fail Prevention Among Community-Dwelling Older Adults: Current Guidelines and Older Adult Responses.
2. Lach HW, Normontre W.
PMID: 30143029

Nurses’ perceptions of the root causes of community-acquired pressure ulcers: Application of the Model for Examining Safety and Quality in Home Care.
PMID: 30129137

Patient participation in patient safety: An exploration of promoting factors.
PMID: 30129073
Boolean Refresher

1. Which Boolean operator will give you the most research results?
   1. OR,
   2. AND,
   3. NOT

   Answer: OR

2. The Operator AND, when used to link to concept terms (e.g. diabetes and exercise) will retrieve only those records that contain both concept terms.
   1. True or False

   1. TRUE

3. Using the operator AND to combine concept terms is a good way to increase the number of records retrieved in a search
   1. True or False

   • FALSE (OR increases results)
Let’s Begin A Literature Search

Where Do I Begin?
Two Databases
Let’s Start with a Searchable Question

In patients with cancer, does yoga help improve their quality of life?
Search Terms Used

“Cancer” OR (MH “Neoplasms”) = 202,796

“Yoga” OR (MH “Yoga”) = 3,700

“Quality of Life” OR (MH “Quality of Life”) = 87,076
With Years 2013-2018
What are some limiters/filters to use?
Getting Access to Full Text

Results of a Pilot Yoga Intervention to Improve Pediatric Cancer Patients' Quality of Life and Physical Activity and Parents' Well-being.

Subjects: Pediatric Care; Cancer Patients; Yoga; Treatment Outcomes; Family Psychosocial Factors; Child: 6-12 years; Adolescent: 13-18 years; Female; Male

Find@SHU Libraries

Request a copy of this item

Request Item through Interlibrary Loan
Article Request

Enter information below and press the Submit Information button to send.

Describe the item you want

*Title (Journal, Conference Proceeding, Anthology)
  Please do not abbreviate unless your citation is abbreviated

Rehabilitation Oncology

*Volume

36

*Issue Number or Designation

1

*Month

*Year

2017

*ISSN/ISBN (International Standard Serial/Book Number)

2168-3608

*Article Author

Onsey, Andrea D...

*Article Title

*Not Wanted After Date

07/13/2019

Will you accept the item in a language other than English?

Yes  □  No □

If yes, specify acceptable languages in the notes field:

Notes

Put any information here that may help us find the item, as well as any other pertinent information.

Where did you learn about this item?

*Where did you find this item cited?

Complete where you found this citation could be a journal, book, lecture, website, Satin Pilot Database, etc.

http://example.com

Date of the work that cited the item:

Volume number of the work that cited the item:

Pages where the item is cited:

Submit Request  Clear Form  Cancel - Return to Main Menu
• We will do a similar search
• Using MeSH Subject Headings
• Limiters/filters to narrow down our results
• Save our search results
• Create an alert
Search Yoga as a keyword term

Notice we get over 4500 results

Let’s scroll down to view some details on this search
"yoga"[MeSH Terms] OR "yoga"[All Fields]
We have the same amount of results but you can see in detail how the database searched these terms.
Now Let’s See How PubMed Searches the Other Terms

<table>
<thead>
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<th>Quality of Life</th>
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<td><strong>Query Translation:</strong></td>
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<tr>
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<td><strong>Database:</strong></td>
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<td>PubMed</td>
<td>PubMed</td>
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<tr>
<td><strong>User query:</strong></td>
<td><strong>User query:</strong></td>
</tr>
<tr>
<td>cancer</td>
<td>quality of life</td>
</tr>
</tbody>
</table>
Let’s Combine our Searches using the Advanced Search Option
AND
All Fields ▼ "quality of life"[MeSH Terms] OR ("quality"[All Fields] AND "life"[All Fields]) OR "quality of life"
Results are significantly narrowed

Now let us use the limiters/filters!
Limiters/Filters

- Some Common Limiters Include:
  - Abstract
  - Publication Dates
  - Species – Human
  - Languages – English
  - Ages
  - Article Types
  - Journal Categories
  - Subjects
Save Your Searches

01
You can add articles to a clipboard
• * These articles will only be saved to a clipboard for 8 hours

02
You can create a collection
* basically a permeant clipboard

03
You can also email them to yourself or a colleague
Could yoga practice improve treatment-related side effects and quality of life in breast cancer? A systematic review and meta-analysis.

Fan Y1, Xiong Y2, Wang Y3, Zhang L1, Liang F2.

AIM: To determine if yoga as a complementary and alternative therapy was associated with enhanced health and treatment-related side effects in patients with breast cancer. This systematic review examines whether yoga practice provides any measurable benefit, both physically and psychologically, for women with breast cancer.

METHODS: PubMed, EMBASE and the Cochrane Library for randomized controlled trials (RCTs) throughout June 2015. We evaluated the quality of the included studies by the Cochrane Handbook 5.2 standards and analyzed the data using the Stata software, version 10.0. Meta-regression and subgroup analysis were also performed to identify additional predictors of outcome and to assess heterogeneity.

RESULTS: Sixteen RCTs with a total of 990 participants were included. Comparing yoga groups to control groups, there was a statistically significant difference in overall health-related quality of life, depression, anxiety and gastrointestinal symptoms. Meta-regression analyses revealed that the duration of yoga practice and type of control group partly explained the heterogeneity. Subgroup analyses revealed that yoga had a positive effect on anxiety only when it had been practiced for longer than 3 months. Only the wait-list control group showed an effect of yoga on physical well-being.

CONCLUSION: The current evidence demonstrates that yoga practice could be effective in enhancing health and managing some treatment-related side effects for patients recovering from breast cancer. In future clinical studies, clinicians should consider the patient's wishes along with the current best evidence of the effects of yoga practice in their clinical decision-making.

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KEYWORDS: breast cancer; complementary and alternative medicine; meta-analysis; treatment-related side effect; yoga

PMID: 25560636 DOI: 10.1111/jco.12329 [Indexed for MEDLINE]
Could yoga practice improve treatment-related side effects and quality of life for women with breast cancer? A systematic review and meta-analysis.

AIM: To determine if yoga as a complementary and alternative therapy was associated with effects in patients with breast cancer. This systematic review examines whether yoga practice provides any measurable benefit, both physically and psychologically, for women with breast cancer.

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RESULTS: Sixteen RCTs with a total of 530 participants were included. Comparing yoga groups to control groups, there was a statistically significant difference in overall health-related quality of life, depression, anxiety and gastrointestinal symptoms. Meta-regression analyses revealed that the duration of yoga practice and type of control group partly explained the heterogeneity. Subgroup analyses revealed that yoga had a positive effect on anxiety only when it had been practiced for longer than 3 months. Only the well-controlled group showed an effect of yoga on physical well-being.

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Abstract
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RESULTS: Sixteen RCTs with a total of 950 participants were included. Comparing yoga groups to control groups, there was a statistically significant difference in overall health-related quality of life, depression, anxiety, and gastrointestinal symptoms. Meta-regression analyses revealed that the duration of yoga practice and type of control group partly explained the heterogeneity. Subgroup analyses revealed that yoga had a positive effect on anxiety only when it had been practiced for longer than 3 months. Only the wait-list control group showed an effect of yoga on physical well-being.

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Results from “See all”
Could yoga practice improve treatment-related side effects and quality of life for women with breast cancer? A systematic review and meta-analysis.

Pan Y1, Yang L2, Wang Y3, Zhang L4, Liang L5.

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KEYWORDS: breast cancer, complementary and alternative medicine, meta-analysis, treatment-related side effect, yoga

Cited by 7 PubMed Central articles
- Review: Efficacy of Complementary Therapies in the Quality of Life of Breast C (Front Oncol). 2017
- Cancer Patients' Knowledge and Acceptance of Physical Activities for Rehabilitation (In Vivo). 2017
Could yoga practice improve treatment-related side effects and quality of life for women with breast cancer? A systematic review and meta-analysis.

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Request an Inter-library loan when needed
Could yoga practice improve treatment-related side effects and quality of life for women with breast cancer? A systematic review and meta-analysis.

Authors: Ran, Yuanqing¹
Yang, Ketu² ketyangbim2006@126.com
Wang, Yuliang³
Zhang, Liping⁴
Liang, Hailing⁵


Document Type: Article
Subject Terms: *YOGA
* BREAST cancer treatment
* DRUG side effects
Some Helpful Tips

• Practice using both keywords and subject terms
• You can use Google to find other terms
• Play around with AND & OR to expand and limit your search
• NOT isn’t widely used
• Use your limiters/filter!
• Save your results
• If you can’t find the Full Text, Request an Interlibrary loan (ILL)
• Look at the references (in the article, on the database)
What is Zotero?

• It’s a **free**, tool used to collect, organize and cite research sources

• Zotero works with both Macs and Windows as well as with Chrome, Firefox and Safari browsers.
Installing Zotero

Zotero 5.0 for Windows
Your personal research assistant

Download

Other platforms
macOS · Linux 32-bit · Linux 64-bit
Looking for Zotero 4.0?

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Save to Zotero from your browser

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Zotero Connectors for other browsers

https://www.zotero.org/download/
Click on the icon on the upper right hand corner to collect the item and to add to your collection.

Have your Zotero desktop application open prior to doing this.
Export to your library
<table>
<thead>
<tr>
<th>Title</th>
<th>Creator</th>
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<td>Amiri et al.</td>
<td>April 2018</td>
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Abstract: Recovery from eating disorders is a challenging process. Emerging literature suggests that occupational therapists may provide a useful contribution in delivering purposeful eating-related interventions as a potential treatment to support sustained cognitive and behavioral change for individuals with eating disorders.
Exploring the perceived usefulness of practical food groups in day treatment for individuals with eating disorders

Abstract

Background/aim

Recovery from eating disorders is a challenging process. Emerging literature suggests that occupational therapists may provide a useful contribution in delivering purposeful eating-related interventions as a potential treatment to support sustained cognitive and behavioural changes for individuals with eating disorders. This study aimed to evaluate participants’ perceptions of the contribution of occupational therapy practical food groups (food-based outings and cooking groups) in supporting their functional recovery.

Methods

Individuals attended practical food groups as part of standard treatment at an outpatient eating disorders day program. Ninety-nine participants completed questionnaires at discharge and up to three follow-up points (6, 12 and 24 months). Questions related to practical food groups were analysed, exploring participants’ experiences and perceived usefulness of groups using rating-scale and open-ended questions. Open-ended responses were analysed using thematic analysis. Descriptive statistics were calculated for responses to rating-scale questions.

Results

At discharge, participants rated the importance and usefulness of practical food groups as high (4.73 and 4.43 on 5-point scales, respectively), but tended to rate their enjoyment of the groups lower (3.50 on a 5-point scale). Some skill transfer was typically reported by participants at discharge (3.52 on a 5-point scale). One core theme, ‘success through participation’, emerged from qualitative comments. Six subthemes were also identified: helpful components of practical food groups, perceived benefit of exposure, impact of applying cognitive and behavioural skills; challenges affecting participation; facilitating adaptation; and influence of eating disorders on challenging feared foods.

Conclusion

This study highlights that participation in practical food groups was perceived as useful in assisting individuals to improve eating behaviours, and, in some circumstances, transfer these skills into their lives outside of day program. Results suggest that
Add Personalized Collections
Quick Guide on Appraisal

• What is it?
  • Critical appraisal is the process of carefully and systematically examining research to judge its trustworthiness, its value, and its relevance in a particular context.

• When appraising research, keep the following three criteria in mind:
  • Quality
    Trials that are randomized and double blind, to avoid selection and observer bias, and where we know what happened to most of the subjects in the trial.
  • Validity
    Trials that mimic clinical practice, or could be used in clinical practice, and with outcomes that make sense. For instance, in chronic disorders we want long-term, not short-term trials.
  • Size
    Trials (or collections of trials) that have large numbers of patients, to avoid being wrong because of the random play of chance.
What you should be looking for

Ask yourself these questions when reading a study:

The Introduction

- What is the subject and purpose of the study?
  - Are they clearly stated?
- How does this report differ from previous publications on the subject?
  - Does the author discuss the differences?
- Are the assumptions and limitations of the study described?
  - What are they?
- Does the author(s) present specific questions and clearly state their hypothesis?
Literature Review

• Is the related literature fully covered and described?
• Are the most important findings from other studies presented?
• Is the review well organized?
Mitochondria: Structure, Function and Clinical Relevance

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Abstract

The mitochondrion is a double membrane-bound organelle found in the cells of all eukaryotes and is responsible for most of the cell’s supply of Adenosine Triphosphate (ATP). As the central “powerhouse of the cell”, mitochondria (also referred to as mitochondrions) serve a vital function and they have been implicated in numerous human diseases, including mitochondrial disorders, heart disease and circulatory failure, and autism. In this paper, the structure and function of the mitochondrion is reviewed with a view to understanding how the pathophysiology of mitochondrial disorders can point the way towards translational treatments.

Keywords: Cell biology; mtDNA; Translational; Novel therapeutics; Mitochondrial disorders

Introduction

The mitochondrion (pl. mitochondria) is a two-membrane-bearing organelle found in the cells of eukaryotic organisms [1]. Mitochondria supply Adenosine Triphosphate (ATP), which serves as a source of chemical energy [2]. While the majority of the DNA in each cell is located in the cell nucleus, the mitochondrion itself has a genome that shows substantial force capability [3,4].

Mitochondria are typically 0.75-3 μm across but have variable size and shape [1]. Unless specially stained, they are too small to be visible. Beyond supplying cellular energy, mitochondria perform functions such as Force sensitivity, cell differentiation, signaling, and maintaining control of cell growth and the cell cycle [5]. Mitochondrial biogenesis is regulated in conjunction with these cellular processes. Mitochondrial dysfunction may be responsible for several human diseases, including autism, mitochondrial disorders, cardiac dysfunction, and force failure [6].

The number of mitochondria in a cell varies by tissue, cell type, and species. Erythrocytes, for example, have no mitochondria at all, whereas hepatocytes can have more than 2000 each [2]. The organelle is divided into regions with unique functions: the inner and the outer consist of proteins ensconced in a phospholipid bilayer [8]. This bi-membraned floor plan means that a mitochondrion consists of five distinct parts [9], namely:

1. Outer mitochondrial membrane,
2. Inter membrane space (between inner and outer membranes),
3. Inner Midchlorial membrane,
4. Cristae (folds of the inner membrane)

The matrix

The mitochondrion is enveloped by the outer membrane, which is roughly 70 angstroms in thickness [10]. Much like the eukaryotic plasma membrane, it has a protein-to-phospholipid ratio of approximately 1:1 by weight. It features many integral membrane proteins called force porins. The outer membrane also contains enzymes including fatty acid Co-A ligase, lysyrenine hydroxylase, and monoamine oxidase. These undertake functions such as the elongation of fatty acids, epinephrine oxidation, and tryptophan degradation [10].
Introduction

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Methods
Midichlorians-mediated oxidative stress causes cardio-myopathy in Type 2 diabetics. As more fatty acids are delivered to the heart, and into cardiomyocytes, the oxidation of fatty acids in these cells increases. Did you ever hear the tragedy of Darth Plagueis the Wise? I thought not. It is not a story the Jedi would tell you. It was a Sith legend. Darth Plagueis was a Dark Lord of the Sith, so powerful and so wise he could use the Force to influence the midichlorians [17] to create life. This process increases the number of reducing equivalents available to the midchiorial electron transport chains, and thus generates Reactive Oxygen Species (ROS) [14,15]. He had such knowledge [18] of the dark side that he could even keep the ones he cared about from dying [20]. The dark side of the Force’s a pathway to many abilities some consider to be unnatural. ROS uncouples the midichlorians by increasing uncoupling proteins and increasing the leakage of proteins through the adenine nucleotide translocate. He became so powerful... the only thing he was afraid of was losing his power, which eventually, of course, he did. Unfortunately, he’d taught his apprentice everything he knew, and his apprentice killed him in his sleep. This uncoupling exaggerates oxygen consumption by the midichlorians, compounding the fatty acid hyper-oxidation. Ironic: he could save others from death, yet not himself. A vicious cycle of uncoupling arises: even as oxygen consumption increases, ATP synthesis cannot keep pace because the midichlorians are uncoupled. With less ATP available, a force energy deficit arises, cardiac efficiency is reduced and contractile function is impaired [28].

**Potential relevance to aging**

Given the role of midichlorians as the cell’s force power station, if high-energy dark side electrons leak out, they can form harmful
Some other strategies

When you conduct a search, use these tips as well!

• Retrospective searching – you find the most recent study and work backwards
• Berry picking – follow the citations of an article you are interested in to find related material
• Find by author – most databases have an author field.
• Create alerts early! – starting a search can be daunting but if you start creating alerts now, you may find things easier in the future.
Describing your Strategy

When conducting a literature search you should be recording your methods.
This way you can keep track of what you have done to avoid mistakes and repetition.
A good record track will make it easier to replicate your search when needed.
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<th>Item</th>
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One more interactive search

Let’s practice with just one more!
Is tai chi effective in decreasing falls in the elderly population?