Unit 7: Databases, Portals, and Artificial Intelligence

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Learning Goals

By the end of this unit, you will be able to:

- Choose the **right scholarly database** for a given research need and construct efficient searches using field tags and controlled vocabularies.
- Use Indian **AYUSH-specific portals** (AYUSH Research Portal, NAMASTE) to locate evidence and code morbidity data for service and research use.
- Apply **Artificial Intelligence (AI)** tools safely for searching, screening, summarising, and organising literature—while avoiding ethical and methodological pitfalls.

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1) Why databases and portals matter

High-quality research begins with finding the **right evidence at the right place**. General web search is noisy and biased. Scholarly databases curate and index content with rich metadata; portals aggregate **specialty content** (e.g., AYUSH trials, morbidity codes) that you may not find quickly elsewhere. For BAMS coursework and dissertations, using the **appropriate database/portal** saves time, improves the rigour of your review, and helps align your work with **Evidence-Based Medicine (EBM)** and national priorities.

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2) Core scholarly databases (what, when, how)

2.1 PubMed (MEDLINE and more)

What it is: The world's largest free biomedical citation database managed by the U.S. National Library of Medicine (NLM). It indexes MEDLINE journals and other life-science records; many citations link to full text in PubMed Central or publishers.

When to use: Most clinical, epidemiological, and basic research questions; near-universal starting point for health topics, including Ayurveda-related clinical outcomes reported in mainstream journals.

How to search well

- Use **MeSH (Medical Subject Headings)** to capture synonyms (e.g., "Osteoarthritis, Knee"). Combine MeSH with **text words** for recent, not-yet-indexed items.
- Use field tags: `ayurveda[tiab] AND osteoarthritis[MeSH] AND randomized[Title/Abstract]`.
- Narrow with filters (article type, study design, age, language) but beware of over-restricting.

2.2 Scopus

What it is: A large subscription-based abstract and citation database (Elsevier) covering medicine, science, social science, books, and conference proceedings; curated by an independent **Content Selection Advisory Board**. Besides discovery, it offers **citation analytics**, author profiles, and journal metrics.

When to use:

- Mapping a field (who publishes, where, and how often).
- Tracking citations and h-index for promotion dossiers.
- Identifying **related records** beyond MEDLINE coverage (e.g., conference papers or book chapters relevant to Ayurveda health services).

Tip: Use **source filters** to avoid predatory journals; export RIS/CSV for reference managers.

2.3 Cochrane Library / CENTRAL

What it is: A collection that includes the **Cochrane Database of Systematic Reviews (CDSR)** and the **Cochrane Central Register of Controlled Trials (CENTRAL)**—a curated index of randomised trials compiled from multiple sources.

When to use:

- To find **high-quality systematic reviews** for clinical decisions.
- To identify trials (including those not easily found by topic words in PubMed) via CENTRAL.

How to search: Use simple PICO terms; check “Trials” tab; scan **Inclusion criteria** and “Risk of bias” in Cochrane Reviews to understand quality.

2.4 Other helpful sources (snapshot)

- **Google Scholar:** broad coverage, good for grey literature; de-duplicate results carefully.
- **DOAJ (Directory of Open Access Journals):** check if an open-access journal is **legitimate**.
- **Clinical trial registries:** for prospectively registered studies (e.g., trial IDs you can later verify in manuscripts).
- **Subject-specific indexes** (e.g., Embase via subscription) can add pharmacology depth and European coverage.

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3) AYUSH-specific portals (India)

3.1 AYUSH Research Portal (ARP)

What it is: A Ministry of Ayush initiative (with CCRAS leadership) that collates **research outputs across Ayurveda, Yoga & Naturopathy, Unani, Siddha, Homoeopathy, Sowa-Rigpa** and allied areas. The portal supports search, browsing by system/topic, and links to CCRAS journals (JRAS/JDRAS) and compendia.

Why use it:

- To scan **Indian evidence** quickly (theses, institute publications, and select articles) that may not be prominent in international databases.
- To understand **national priorities** and download **compendia** or e-books for background sections.

Practical workflow: Start in ARP to map Indian context → switch to PubMed/Scopus for global literature → return to ARP for **local comparators** and **policy-relevant** references.

3.2 NAMASTE Portal (National AYUSH Morbidity & Standardised Terminologies Electronic)

What it is: A national web portal to **standardise AYUSH morbidity terminology** and enable **code-based reporting** across public and private facilities. It supports dual coding—AYUSH morbidity codes **and** ICD-10/ICD-11—thereby linking traditional diagnoses with mainstream health information systems.

Why it matters for research:

- Enables **comparable datasets** across centres (crucial for multicentre observational research and service audits).
- Facilitates **reason-for-encounter** and **morbidity** surveillance specific to AYUSH systems.
- Eases **data sharing** with national platforms that require ICD coding.

Use in your project:

- When designing cohort/case-series studies, **pre-map your case definitions** to NAMASTE + ICD codes.
- In your Methods, state: “Morbidity was coded using NAMASTE (AYUSH) codes and mapped to ICD-10/11, enabling

interoperability with hospital information systems."

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4) Building effective searches (with Ayurveda examples)

4.1 Boolean logic and field tags

- **Boolean:** `AND` (narrow), `OR` (broaden synonyms), `NOT` (exclude carefully).
- **Phrase searching:** "low back pain".
- **Field tags in PubMed:** `[tiab]` for title/abstract; `[mh]` for MeSH; `[au]` for author; `[dp]` for year.

Example (Ayurveda + osteoarthritis, RCTs):
`(Ayurveda[tiab] OR Abhyanga[tiab] OR Panchakarma[tiab]) AND (Osteoarthritis, Knee[mh] OR knee osteoarthritis[tiab]) AND (randomized[tiab] OR randomised[tiab])`

Refine with MeSH: Combine **Osteoarthritis, Knee[mh]** with `Massage[mesh]` or **Physical Therapy Modalities[mh]** if the intervention is procedure-based.

4.2 Scopus analytics

Use **"Analyze search results"** to identify top journals, institutions, and authors—handy for selecting a **target journal** and spotting **collaborators**.

4.3 CENTRAL for trial discovery

When your PubMed search finds few RCTs, repeat in **CENTRAL**; you may capture trials indexed from non-MEDLINE sources.

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5) Artificial Intelligence (AI): what to use, what to avoid

5.1 Where AI truly helps

- **Query formulation:** Generative AI can propose **keyword lists**, **MeSH/Emtree candidates**, and **Boolean strings** you then refine.
- **De-duplication and screening:** Modern review platforms use ML to prioritise likely-relevant records; you verify decisions.
- **Summarisation:** Draft **evidence tables**, pull out **outcomes/time-points**, and create initial summaries for each study.
- **Organisation:** Auto-tag PDFs, extract references, and maintain a PRISMA-style audit trail.

5.2 Red lines and cautions

- **No "AI as author."** You remain responsible for facts, reasoning, and copyright; disclose tool-use transparently (see Unit 4 on publication ethics).
- **Hallucinations:** Always **verify citations** in databases; never trust an AI-generated DOI/reference without checking.
- **Privacy:** Do not upload **patient data** or proprietary documents to public tools; if required, use institution-approved solutions.
- **Bias:** ML models can amplify publication bias; countercheck with manual searches and registries.

5.3 A practical AI-assisted workflow (10 steps)

1. Draft PICO → 2) Ask AI for **synonyms/MeSH** → 3) Build PubMed string; test and refine → 4) Replicate in **Scopus/CENTRAL** → 5) Export to a reference manager → 6) Use ML-assisted screening (you confirm) → 7) Extract data into standardised forms → 8) Ask AI to **summarise methods/outcomes** (you verify line-by-line) → 9) Build

SoF (summary of findings) table → 10) Write human, critical **Discussion** acknowledging limitations and heterogeneity.

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6) Quick comparison tables

6.1 Databases and portals (what they're best for)

Resource	Best for	Unique strengths	Typical limitations
PubMed	Clinical & basic biomedical literature	Free; **MeSH** controlled vocabulary; Clinical Queries	Fewer conference/ regional items; may miss grey literature.
Scopus	Comprehensive discovery + citation analysis	Broad coverage incl. books & proceedings; analytics	Subscription; must screen for journal quality.
Cochrane Library / CENTRAL	Systematic reviews; RCT finding	Cochrane reviews; trial registry aggregation	Subscription in some settings; CENTRAL is bibliographic.
AYUSH Research Portal	Indian AYUSH evidence & compendia	System-wise view; CCRAS journals; national context	Coverage depends on feeds; supplement with PubMed/Scopus.
NAMASTE	Standardised morbidity coding; service data	Dual coding (AYUSH + ICD-10/11); national surveillance	Not a literature database; use with study-specific CRFs.

6.2 Search strategy essentials

Element	What to do	Example
Boolean	Combine synonyms with `OR`, concepts with `AND`	`(abhyanga OR massage) AND osteoarthritis`
Controlled vocab	Add MeSH (PubMed) / Emtree (Embase)	`Osteoarthritis, Knee[mh]`
Fields	Focus on title/abstract for precision	`ayurveda[tiab]`
Filters	Design, language, year cautiously	`randomized controlled trial` filter
Export	RIS/CSV to EndNote/Zotero/Mendeley	Maintain PRISMA counts

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7) Putting it all together: a mini-playbook

Research idea: "Does adding a standardised *Abhyanga–Svedana* package improve function in knee OA?"

1. **PICO** defined; outcomes & time-points set.
2. **PubMed search** using MeSH + text words; save strategy and set alerts.
3. **Scopus** to broaden and map key journals/teams.
4. **CENTRAL** to ensure no RCT is missed.
5. **ARP** to capture Indian studies and theses; note formulations used locally.
6. **NAMASTE** codes integrated into data collection plan for any observational component.
7. **AI assist** to tidy records, draft evidence tables, and suggest summary text—**you verify every figure**.

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8) Common pitfalls (and fixes)

- **One-database myopia:** Use at least **PubMed + one more** (Scopus/CENTRAL) and an AYUSH portal if relevant.
- **Weak keywords:** Always add **controlled vocabulary** (MeSH) and synonyms; check mapped terms.
- **Predatory sources:** Prefer journals with transparent editorial policies; check indexing status (Scopus/DOAJ).
- **Unreproducible search:** Save your strategies, dates, and filters; report them in appendices.
- **Over-trusting AI:** Verify every citation; never let AI invent references or conclusions.

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Assessment

A. Multiple-Choice Questions (MCQs)

1. **Which statement is most accurate about PubMed?**
   A) It contains only full-text articles.
   B) It indexes MEDLINE and other life science records and links to full text where available.
   C) It is a subscription database managed by Elsevier.
   D) It does not support controlled vocabulary.
   Answer: B.
2. **MeSH in PubMed is primarily used to:**
   A) Display journal impact factors.
   B) Provide controlled vocabulary for indexing and searching.
   C) Rank articles by citations.
   D) Translate abstracts to local languages.
   Answer: B.
3. **Scopus is especially useful when you need:**
   A) Free full texts of all clinical trials.
   B) Citation analytics and wider coverage including books/proceedings.
   C) A registry of RCT protocols.
   D) Controlled vocabulary (MeSH) mapping.
   Answer: B.
4. **CENTRAL (in Cochrane Library) is best described as:**
   A) A database of clinical guidelines only.
   B) A curated register of randomised trials compiled from many sources.
   C) A repository of only Ayurveda journals.
   D) A portal for coding morbidities.
   Answer: B.
5. **NAMASTE portal's distinctive feature is:**
   A) Monetising open access articles.
   B) Dual coding using AYUSH morbidity codes and ICD-10/11.
   C) Journal peer review tracking.
   D) Automatic meta-analysis tools.
   Answer: B.
6. **A sensible first step for an Ayurveda clinical dissertation search is:**
   A) Only Google.
   B) PubMed with MeSH + AYUSH Research Portal for Indian context.
   C) Social media groups.
   D) Trial registry alone.
   Answer: B.
7. **Which AI practice is unethical or risky?**
   A) Using AI to draft keyword lists that you then verify.
   B) Letting AI be listed as an author of your paper.
   C) Using AI to de-duplicate references, followed by human check.
   D) Asking AI to summarise a PDF and then verifying each number.
   Answer: B. (See Unit 4 publication ethics.)
8. **An efficient way to avoid missing new PubMed records on your topic is to:**
   A) Search once and stop.
   B) Set an email alert for your final search string.
   C) Rely on AI summaries only.
   D) Search titles only.
   Answer: B.

B. Short-Answer Questions (SAQs)

1. Write a **PubMed search string** (with at least one MeSH term and two synonyms) for: “Nasya for cervical spondylosis pain.”
2. List **three use-cases** for the AYUSH Research Portal in preparing the background section of a dissertation.
3. Explain **two advantages** of using NAMASTE codes in an OPD-based cohort and how they improve generalisability.
4. Give **two tasks** in which AI can assist during a systematic review and **one safeguard** for each.
5. Distinguish in two lines: **Google Scholar** vs **Scopus** for evidence mapping.

C. Long-Answer Questions (LAQs)

1. You are planning a pragmatic RCT of a whole-system Ayurvedic package for knee osteoarthritis across three district hospitals. Describe a **search and evidence-synthesis plan** that uses PubMed (MeSH), Scopus analytics, CENTRAL, AYUSH Research Portal, and NAMASTE coding to build your background, justify outcomes, and design data collection.
2. **Critically discuss the role of AI** in systematic reviews for Ayurveda: benefits, risks (hallucination, bias, privacy), ethical disclosure, and a step-by-step human-in-the-loop workflow that preserves reproducibility.

D. Practical Task (Hands-on)

Construct and test (in your chosen database) a search strategy for: “Effect of *Takra* (buttermilk)-based diet on dyspepsia.”

- Give the **final Boolean string** for PubMed (include at least one MeSH term).
- List the **top 5 additional keywords/synonyms** you would use in Scopus.
- Specify how you would record your search (date, database, filters) for the **Methods** appendix.

Take-Home Messages

- Start with **PubMed + MeSH** for clinical questions; add **Scopus** when you need analytics and broader coverage; check **CENTRAL** for RCT completeness.
- Use **AYUSH Research Portal** to ground your review in Indian evidence; plan your data capture with **NAMASTE + ICD dual coding** for interoperability.
- **AI can accelerate** searching and organising evidence, but all outputs must be **verified, transparent, and ethically disclosed**—AI is a tool, **not an author**.

End of Unit 7.