PRAKTEK ASUHAN KEPERAWATAN BERBASIS BUKTI ILMIAH DAN UPAYA MENCEGAH MEDICATION ERROR DI ICU

Pelatihan Manajemen keperawatan di Intensive Care Unit (ICU) Rumah Sakit
YOGYAKARTA, 19-22 Juni 2014

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Objective:

- Dapat menjelaskan konsep dasar ebm, dan gambaran kejadian medication error di ICU serta pentingnya pencegahan medication error di ICU
- Dapat menjelaskan tahapan dalam ebm
- Dapat menyusun PICO
- Dapat menentukan level of evidence drug literature
- Dapat menyebutkan web site ebm
- Dapat melakukan critical appraisal dan menjelaskan penerapan konsep EBM di ICU

Introduction

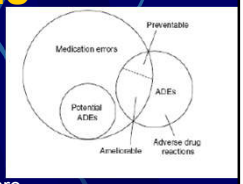
- Apakah latar belakang yang mendasari lahirnya EBM di kedokteran? Bagaimana di ICU?
- Apakah EBM?
- Apakah urgensinya?
- Bagaimana gambaran aplikasinya?

Introduction

- Opinion based v.s. evidence based medication
- Harm v.s. safety
- Law and legal formal
- Economic beneficity

Introduction: Error medicine

- Leape L. Error in Medicine. JAMA 1994
  - 4% of all hospital stays
  - mortality rate of14%



- Committee on Quality of Health Care in America, Institute of Medicine. 2000.
  - Death related to adverse events:
    - 44000 à 98000 patients each year
    - 8th cause of mortality

Table 4 Median (ranges) of the percentages of pADEs by error type

Error type	Median (range)
Overdose or underdose	22.4 (7.9-29.6)
Inappropriate drug	17 (9.0-20.9)
Inappropriate drug administration	16.5
Inadequate patient monitoring	12 (1.8-46.7)
Wrong frequency	8.8 (4.6-12.9)
Known allergy	6.9 (5.7-8.1)
Lack of preventive therapy	6.7
Missed dose	6.1 (5.0-7.2)
Drug-drug interaction	2.8 (2.7-2.8)
Other	12.2

(Camphbel et al., 2008)

MEDICATION ERROR, PREVENTABILITY AND MORBIDITY LEVEL

Preventable Drug-Related Morbidity in Inpatients

Author, Year, Country (reference no.)	Sampling Type, Sample Size, Setting	Sample Description[b]	Prevalence of DRM	Prevalence of PDRM	Preventability Rate
Outcome: Significant, Serious, Life-Threatening, or Fatal Adverse Drug Events					
Bates et al., 1995, U.S. (21)	Prospective n = 4,031 HAs (21,412 IPDs) 2 tertiary hospitals	SRS of (+) all adults admitted to 11 units of 2 hospitals over 6 months, February to July 1993;[a,b] (–) obstetric Pts.	247/4,031 (6.1%) 6.5% adjusted	70/4031 (1.7%)[c] 1.8% adjusted	70/247 (28%)
Bates et al., 1993, U.S. (22)	Prospective n = 420 HAs (2967 IPDs)	(+) All adults admitted to 7 units (2 medical, 2 surgical, 2 obstetric general care, 1 coronary IC) during 37 days in August and September 1990[b]	27/~420[d] (6.4%)	15/420 (3.6%)	15/27 (56%)
Bates et al., 1995, U.S. (23)	Prospective n = 379 HAs	(+) All adults admitted over 51 days during October and November 1992 to 3 medical units: 2 general medical, 1 ICU[a]	25/379 (6.6%)	5/379 (1.4%)	5/25 (20%)
Outcome: Disability, Death, or Prolonged Hospital Stay					
Wilson et al., 1995, Australia (24)	Retrospective n = 14,179 PRs SRS from 28 hospitals with > 3000 admissions in 2 states	(+) RS of at least 520 HAs from each hospital (–) Hospitals with less than 3000 eligible admissions per annum, day-only admissions, admissions to psychiatric wards mean age = 43.8[f]	233/14,179 (1.6%)	84/14,179 (0.6%)	84/233 (36.1%)
Leape et al., 1991, U.S. (25)	Retrospective n = 30,195 PRs	(+) RS of PRs from an SRS of 51 hospitals (NY)[a,f]	0.72% (adjusted)	0.32% (adjusted)	45.2%

Hepler & Segal, 2003

Table 8 Reported medication error and ADE severity

Author	Setting	Event definition	Fatal/life threatening		Serious		Significant	
			No.	%	No.	%	No.	%
Bates[42]	General inpatient	Preventable ADEs	14	20%	30	43%	26	37%
Bates[31]	General inpatient	Preventable ADEs	1	20%	1	20%	3	60%
Kaushal[37]	Paediatrics	Preventable ADEs	0	0%	4	80%	1	20%
Gurwitz[43]	Nursing home	Preventable ADEs	26	9%	145	53%	105	38%
Weingart[44]	General medical	Preventable ADEs	0	0%	3	100%	0	0%
Bates[31]	General inpatient	Intercepted potential ADEs	0	0%	2	12%	15	88%
Kaushal[37]	Paediatrics	Intercepted potential ADEs	16	24%	28	41%	24	35%
Bates[42]	General inpatient	Non-intercepted potential ADEs	13	12%	43	39%	55	50%
Bates[31]	General inpatient	Non-intercepted potential ADEs	4	19%	5	24%	12	57%
Kaushal[37]	Paediatrics	Non-intercepted potential ADEs	2	4%	24	51%	21	45%
Gurwitz[43]	Nursing home	Potential ADEs	16	9%	149	79%	23	12%
Gandhi[45]	Outpatient	Preventable or ameliorable ADEs	11	6%				

(Camphbel et al., 2008)

MEDICATION ERROR IN PROCESS

Process Locations of Errors in Inpatient Studies

Author	Prescribing (Choice of Drug, Dose, Route)[32]	Drug Distribution (Transcription, Dispensing, and Administration)[31]	Follow-up, Monitoring[21]
Bates 1995[a]	68%	29%	2%
Bates 1995[a]	49%	51%	0%
Bedell 1991			Inadequate follow-up
Leape[b] 1991	49%	9%	29%

[a] Includes 264 actual and potential ADEs.

[b] Denominator is 227 drug treatment errors. One error could be classified into more than one error type. Excludes two additional error types: professional practicing outside his expertise (4%) and other (8%).

Hepler & Segal, 2003

ORIGINATION MEDICATION ERROR

Table 9 Stage of origination of medication errors and ADEs

Study	Setting	Definition	No.	Prescription	Dispensing	Administration
Bates[46]	General	ADEs	27	0.60	0.04	0.36
Kaushal[37]	Paediatrics	Errors	616	0.84	0.01	0.14
	Paediatrics	Potential ADEs	120	0.91	0.04	0.05
Cullen[47]	Non-ICU	Preventable & potential ADEs*	106	0.46	0.14	0.40
	ICU		158	0.41	0.11	0.48

* intercepted & non-intercepted ADEs

(Camphbel et al., 2008)

INTRODUCTION : ERROR IN ICU?

Intensive Care Med
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ORIGINAL

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Patient safety in intensive care: results from the multinational Sentinel Events Evaluation (SEE) study

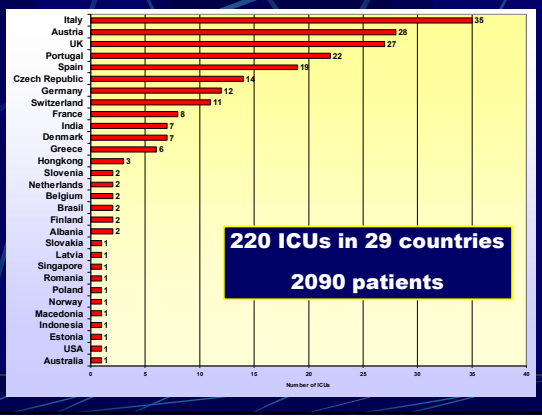
- Unintended Event :
  An occurrence that harmed or could have harmed a patient
- SEE: multicenter, multinational, single day study in ICU
- Reporting by all ICU staff members :
  Voluntarily – Anonymously - Confidential

SEE STUDY

Selected Events

- **Medication** — wrong drug, dose, or route
- **Airway** — unplanned extubation; artificial airway obstruction; cuff leakage
- **Lines, Drains Catheters** — dislodgement; inappropriate opening/disconnection
- **Equipment failure** — power supply, oxygen supply, ventilator, infusion pump
- **Alarms** — inappropriate turn off

SEE Study – participating Countries



SEE STUDY

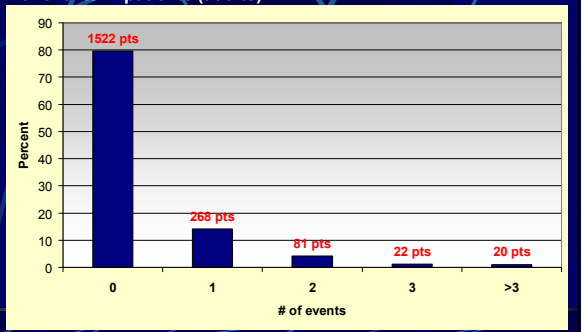
Adults

Patients:	1913
Sex:	61 % m / 39 % w
Age (mean):	62,3 ± 16,3 (18 – 99 a)
NEMS (median):	27 (18;38)
SOFA (median):	4 (2;7)
Events:	584
Pts with ≥ 1 Event:	393

At least 1 sentinel event: 73% of ICUs

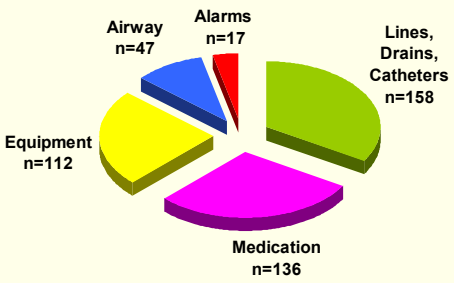
SEE STUDY

of events in patients (adults)



SEE STUDY

391 affected patients

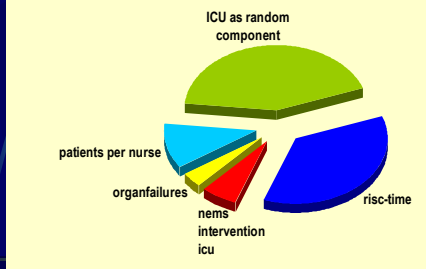


SEE STUDY

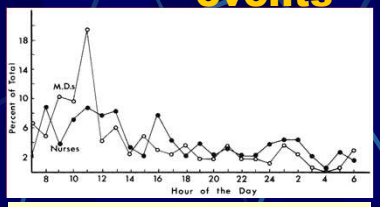
	Events / 100 pt days	lower 95% CI	upper 95% CI
All	38.8	34.7	42.9
Lines, drains	14.5	12.0	16.9
Medication	10.5	8.6	12.4
●Prescription	5.7	4.4	7.1
●Administration	4.8	3.6	6.0
Equipment	9.2	7.4	11.1
Airway	3.3	2.4	4.3
Alarms	1.3	0.6	1.9

SEE study

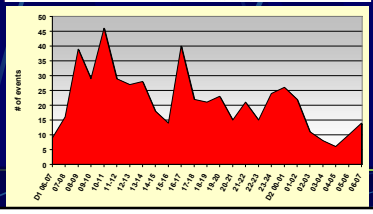
Explanatory power within the final model



Time - pattern of events

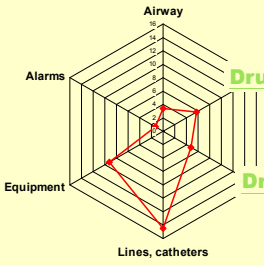


A look into the nature and causes of human errors in the ICU
Donchin et al, Crit Care 1995



SEE study

SEE study



Drug prescription

Drug administration

SENTINEL EVENTS EVALUATION (SEE)

Information
www.hsro-esicm.org

Contact:
andreas.valentin@meduniwien.ac.at

Adverse events in ICU

- Frequent and in relation with
  - Severity of the patients
  - Procedures
- Impact on : (Zhan C, Miller MR. Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization. JAMA, 2003, 290:1868-1874)
  - Morbidity and mortality
  - Finance :
    - Iatrogenic pneumothorax : 17,312 US$
    - DVP and post operative pulmonary emboli : 21,709 US$
- Legal issues
- Psychology of the team
- Preventability ?

If you hear this

"I am proud to say that I have no adverse event in my ICU"

You should conclude that this is a very dangerous ICU

- No documentation of events
- No evaluation
- No corrective action
- May be even no patient in that ICU……

Apakah EBM?
Dan bagaimana aplikasinya?

E B M

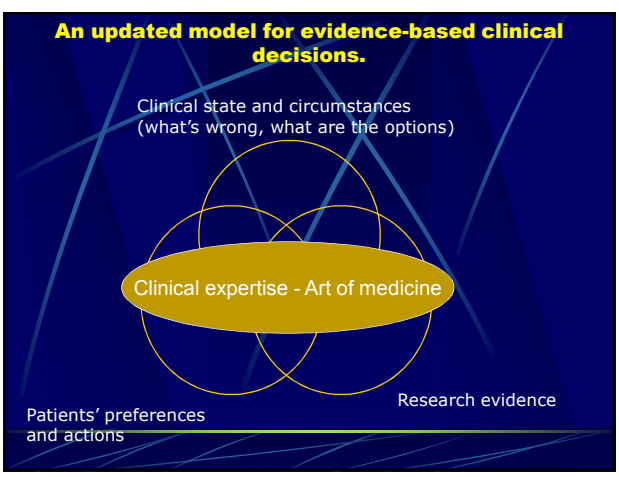
※ **Use of current best evidence in making decisions about the care of individual patients.**

Ø **Evidence-based medicine (EBM) is the process of systematically reviewing, appraising and using clinical research findings to aid the delivery of optimum clinical care to patient (www.bandolier.com)**

※ **Not only a skill but also an attitude change**

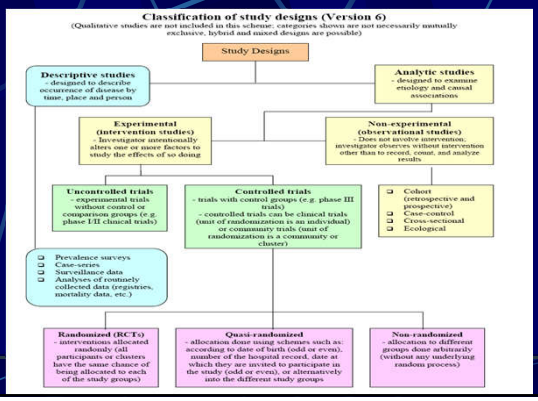
※ Conscientious, explicit, and judicious use of current best evidence in making decisions about individual patients.
~ Archie Cochrane 1972

An updated model for evidence-based clinical decisions.



Piramida evidence dan Desain Penelitian

Level of evidence Study design



Resources drug literature/medicinal literature

- PUBMED
- McMaster University HIRU（Health Information Research Unit）Cochrane Collaboration
  - http://hiru.mcmaster.ca/
- Oxford University Centre for Evidence-Based Medicine
  - http://cemb.jr2.ox.ac.uk
- American College of Physician（ACP）， ACP Journal Club Online
  - http://www.acpjc.org

THE FIVE BASIC STEPS OF EBM

1. Clinical Question : Patient-focused, problem-oriented
2. Find Best Evidence: Literary Search
3. Critical Appraisal : Evaluate evidence for quality and usefulness
4. Apply the Evidence : Implement useful findings in clinical practice
5. Evaluate : The information, intervention, and EBM process

Five Steps to Practice EBM

- Step 1. Converting the need for information (about prevention, diagnosis, prognosis, therapy, causation, etc.) into an answerable **question or PICO.**
- Step 2. **Searching** the best evidence with which to answer that question.
- Step 3. Critically **appraising** the evidence for its validity (closeness to the truth), impact (size of the effect), and applicability (usefulness in our clinical practice).
- Step 4. **Integrating** the evidence with our clinical expertise and patients' unique biology, values and circumstances.
- Step 5. **Evaluating** our effectiveness and efficiency in executing steps 1-4 and seeking ways to improve them both for next time.

STEP I: ASKING ANSWERABLE CLINICAL QUESTION

Types of Clinical Questions

By Content	By Format
Diagnosis	Background
Therapy	
Etiology	Foreground
Prognosis	

PERTANYAAN "Foreground"

- Ask for specific knowledge about managing patients with a disorder
- Have four (or three) essential components:
  - 1. Patient and/or problem
  - 2. Intervention (treatment)
  - 3. Comparison intervention
  - 4. Clinical outcomes

Foreground question: There are four elements of a well-formulated question

Patient ~ Who is the patient or what is the problem being addressed?
Intervention ~ What is the intervention?
Comparison ~ What are the alternatives?
Outcome ~ What are the outcomes?

PICO METHODE

MERUMUSKAN PERMASALAHAN METODE PICO?

Step 1 of the EBM process: formulate a sensible, focused clinical question – use PICO methods

PICO	EBM process asks the doctor to consider	Example
Patient	What patient population he or she is interested in?	Patient is female caucasian child with ear infection
Intervention	What tests, what treatments could be considered?	Antibiotics
Comparison	alternatives to consider?	No treatment
Outcome	what the outcome of interest is (and how is it to be measured)	Ear infection reduced

atau

Element	Tips	Specific example
Patient or Problem	Starting with your patient ask "How would I describe a group of patients similar to mine?"	"In women over 40 with heart failure from dilated cardiomyopathy …"
Intervention	Ask "Which main intervention am I considering?"	"… would adding anticoagulation with warfarin to standard heart failure therapy…"
Comparison intervention	Ask "What is the main alternative to compare with the intervention?"	"… when compared with standard therapy alone …"
Outcome	Ask "What can I hope to accomplish?" or "What could this exposure really affect?"	"… lead to lower mortality or morbidity from thromboembolism."

Ex. Asking Answerable Clinical Question

Patient/Problem	Insulin-dependent diabetics
Intervention	Intensive insulin regimen
Comparison	Regular insulin regimen
Outcomes	Retinopathy Symptomatic hypoglycemia

In the insulin-dependent diabetics, does intensive insulin regimen or Regular insulin regimen lead to symptomatic hypoglycemia?

KASUS 1

- Meurut Saudara perlu atau tidakkah pengontrolan GDS pada semua pasien di ICU? Ataukah pasien kritis yang memiliki riwayat DM yang perlu dikontrol GDSnya? Apakah dasar bukti ilmiah pendapat Saudara?
- Bagaimana langkah Saudara dalam mencari bukti ilmiah?
- Bagaimana mana Saudara menyusun permasalahan klinis dan apakah PICOnya ?

Kasus 2

- Penggunaan kortikosteroid pada pasien ARDS masih diperdebatkan efikasinya. Bagaimana menurut Saudara? Apa dasar bukti ilmiah pendapat Saudara?
- Susunlah rumusan permasalahan penggunaan kortikosteroid pada ARDS dan apakah PICOnya?

STEP II: SEARCHING THE BEST EVIDENCE

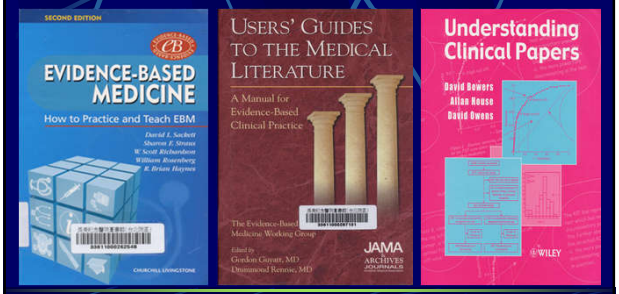
WEB SITE – SOURCE OF DRUG LITERATURE

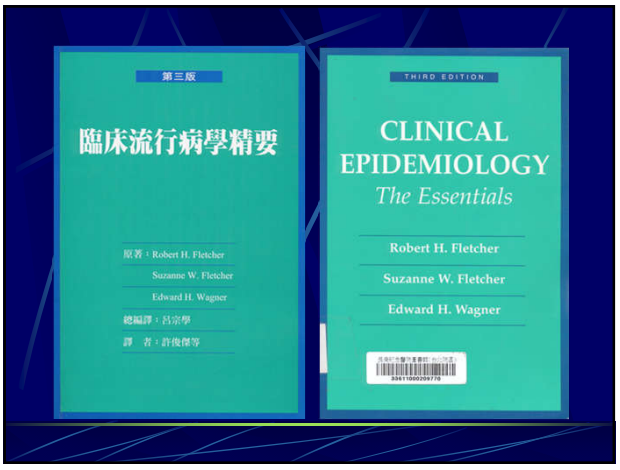
CRITICAL THINKING – APPRAISAL DRUG LITERATUR

Searching The Best Evidence

- (primary journals or databases) ~ Medline, NEJM, Lancet...
- (secondary journals or databases) ~ ACP journal club, Cochrane.
- (level of evidence) 。

TEXT BOOK OF EBM





WEBSITE OF EBM

PubMed: http://www.ncbi.nlm.nih.gov/PubMed/

1. ACP Journal Club: http://www.acpjc.org/ (1-4, 7)
2. Cochrane ~ DARE (Database of Abstracts of Reviews of Effects)
3. CDSR (Cochrane Database of Systematic Reviews) ~ Collaborative Review Groups http://www.cochrane.org/cochrane/revabstr/crgindex.htm
4. CCTR (Cochrane Central Register of Controlled Trials):
5. Cochrane collaberation
6. NGC (National Guideline Clearinghouse): http://guideline.org
7. Micromedex (CCIS)
8. Centre for Evidence-Based Medicine: http://www.cebm.net/ = http://cemb.jr2.ox.ac.uk
9. McMaster UniversityHIRU（Health Information Research Unit）Cochrane Collaboration: http://hiru.mcmaster.ca/
10. American College of Physician（ACP）: http://www.acponline.org
11. Bandolier: http://www.ebandolier.com = http://www.jr2.ox.ac.uk/bandolier/
12. AHRQ website: http//www.ahrq.gov
13. InfoPOEMs: http://www.infopoems.com
14. Other resources: http://www.google.com.tw/ www.yahoo.com/ http://www.mdconsult.com/
15. (HINT): http://www.hint.org.tw

LATIHAN 2

- SEARCHING JOURNAL SEBAGAI BUKTI ILMIAH

KASUS 1

- Apakah kata kunci dan alamat sumber pustaka dimana Saudara akan mencari bukti ilmiah yang Saudara butuhkan sebagaimana permasalahan pada kasus 1?

Kasus 2

- Penggunaan kortikosteroid pada pasien ARDS masih diperdebatkan efikasinya. Bagaimana menurut Saudara? Apa dasar bukti ilmiah pendapat Saudara?

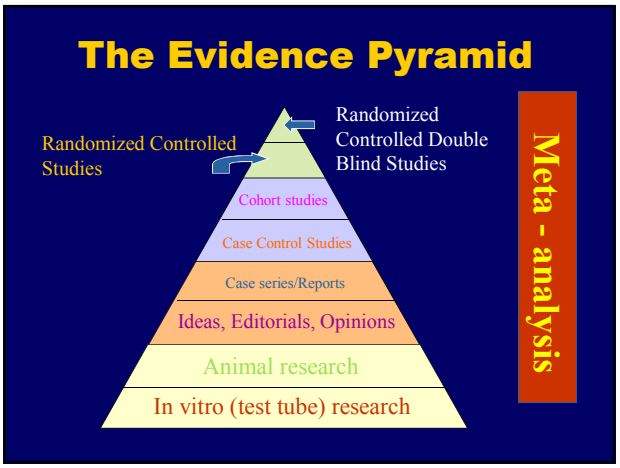
Apakah kata kunci dan alamat sumber pustaka dimana Saudara akan mencari bukti ilmiah yang Saudara butuhkan sebagaimana permasalahan pada kasus 2?

Critical appraisal drug literature:

1. Apakah informasinya valid?.....Drug literature and Level of evidence
2. Apakah informasinya penting?... Menghitung parameter outcome clinic
3. Apakah informasinya bermanfaat? …..menilai aplikabilitas

Strength of Evidence

I	Strong evidence from at least one systematic review of well designed randomized controlled trials
II	Strong evidence from at least one properly designed randomized controlled trial of appropriate size
III	Evidence from well designed trials without randomization: single group pre-post, cohort, time series or matched case-controlled studies
IV	Evidence from well designed non-experimental studies from more than one centre or research group
V	Opinions of respected authorities, based on clinical evidence, descriptive studies or reports of expert committees
VI	Someone once told me



Grade of Recommendation	Level of Evidence	Therapy
[A]	1a	Systemic review of RCTs
	1b	Single RCT
	1c	'All-or-none'
[B]	2a	Systemic review of cohort studies
	2b	Cohort study or poor RCT
	2c	'Outcomes' research
	3a	Systemic review of case-control studies
	3b	Case-control study
[C]	4	Case series
[D]	5	Expert opinion, physiology, bench

What type of evidence best addresses the question, problem or issue?

CLINICAL PRACTICE	APPROPRIATE DESIGN FOR CLINICAL RESEARCH
Diagnosis, Dx testing	Cross-sectional study – not randomized trial
Prognosis	Follow-up studies of patients evaluated at same early point of illness
Therapy, treatment	RCT or Systematic review of multiple RCTs must be used Avoid non-experimental approaches to avoid false conclusions about efficacy
	Exceptions: When treatment may be successful in an otherwise fatal condition When no studies are available (rare conditions, new treatments, etc.)
Harm	RCT, Cohort, Case-control
OTHER INFORMATIONAL	
Explore hypothesis	Qualitative research
History-taking	Case control study
Individual trial & error	n of 1 trial
Following clinical course	Cohort study
Recordkeeping	Systematic registry-based (computer supported) research
Quality of Care research	Individual peer review, Process Evaluation
MISCELLANEOUS	Basic Science, Genetics, Immunol

Menilai tingkat kepentingan informasi

- Informasi dari jurnal ilmiah yang valid ada 2 jenis yaitu

Penting — Tidak penting

Bagaimana menilainya?

MENILAI TINGKAT KEPENTINGAN DATA/INFORMASI JURNAL ILMIAH

- Lakukan perhitungan parameter outcome:
- 1. jurnal dengan design RCT/uji kemanjuran: hitung NNT/ARR/RR apabila skala pengukurannya nominal tetapi utk yang skala pengukurannya ratio lihat nilai p (signifikansi)
- 2. jurnal dengan design kohort/uji prognosis hitung nilai RR/NNT
- 3. jurnal dengan design cross sectional/case control/uji diagnosis hitung nilai OR/

Menilai tingkat kepentingan informasi yang disajikan jurnal Imiah

Table 2. How to calculate odds ratios, risk r

	Number of patients	Number of events (eg cured)
Intervention	1,000	150
Control	1,000	100

EER= A/A+B=150/1000=15%

CER=D/C+D=100/1000=10%

ARR=EER-CER=15%-10% =5%

NNT=1/ARR=1/5%=20

Latihan 3:

- Tentukan level of evidence dari jurnal ilmiah yang Saudara peroleh untuk kasus 1 dan kasus 2

LATIHAN 4:

- Bagaimana menghitung outcome atau menilai tingkat kepentingan informasi dari jurnal ilmiah yang Saudara peroleh?

Selamat mencoba