2018
28-30 JUNE
VIENNA, AUSTRIA
SUPPORTIVE CARE MAKES EXCELLENT CANCER CARE POSSIBLE

Measurement of Cognitive Dysfunction (Adult)

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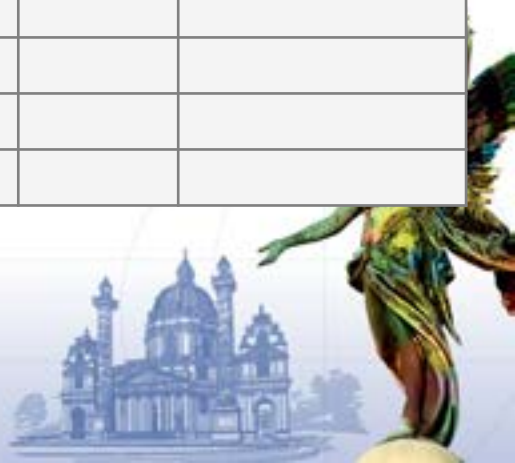
Faculty Disclosure

X	No, nothing to disclose
	Yes, please specify:

Company Name	*Honoraria/ Expenses*	*Consulting/ Advisory Board*	*Funded Research*	*Royalties/ Patent*	*Stock Options*	*Ownership/ Equity Position*	*Employee*	*Other (please specify)*
Example: company XYZ	x		x		x			



Greetings from the Canadian Prairies and the University of Alberta

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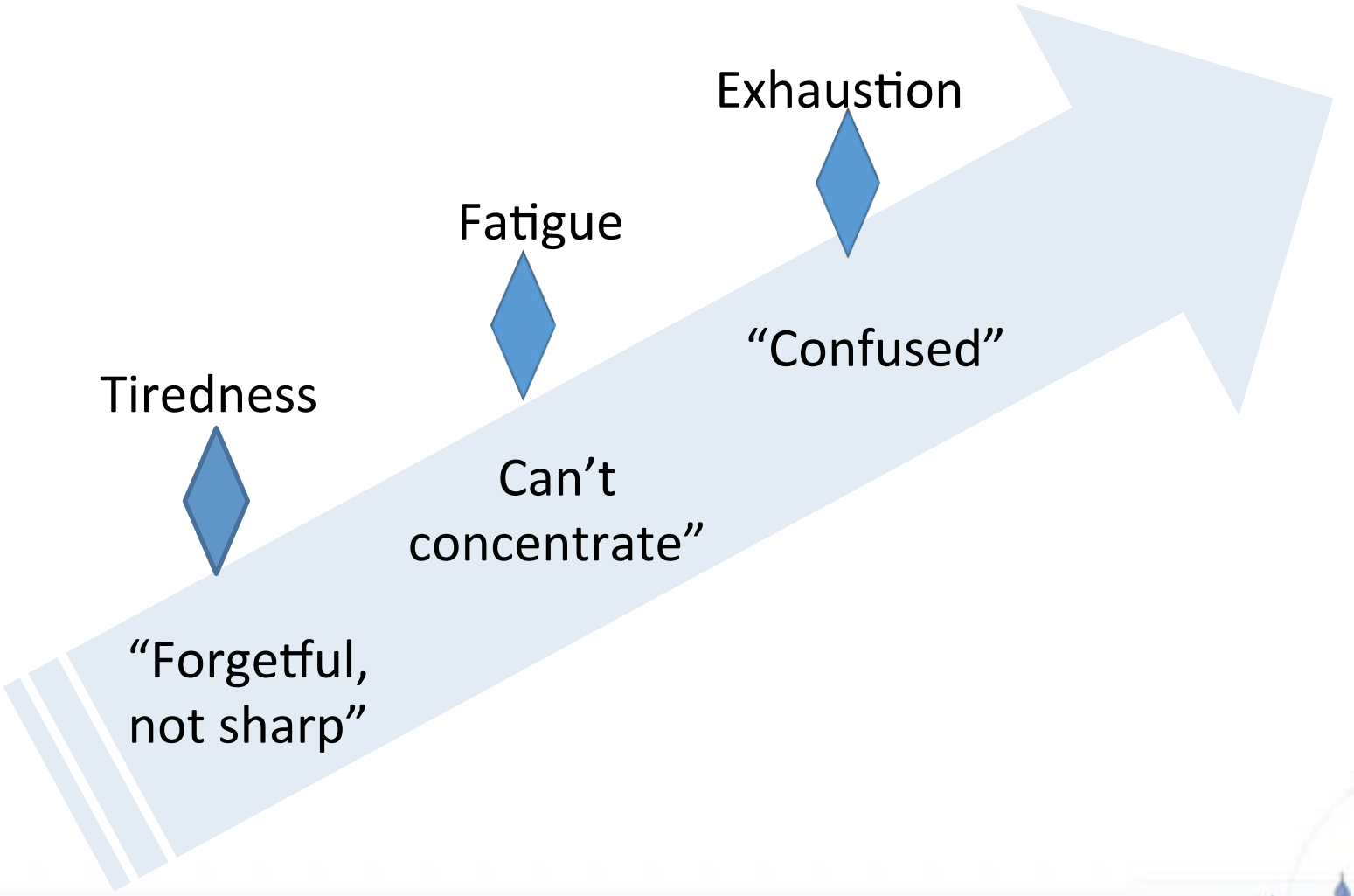
Background

- Cognitive changes in the context of fatigue experienced by individuals with cancer
- Patients described fatigue as having several components:
  - Difficulty thinking clearly
  - Emotional lability
  - Social withdrawal
  - Decreased functional ability
  - Decreased sleep quality


Exhaustion
Fatigue
Tiredness
"Confused"
Can't concentrate"
"Forgetful, not sharp"

Starting points

- Cognition is defined as a process comprised of eight domains: attention, concentration, information processing speed, memory, language, executive function, visuo-spatial ability and psychomotor ability

- Cognitive function (sometimes called intellectual function) is the ability of the brain to acquire, process, store, and retrieve information.

The Problems

- Despite perceived changes in cognition, testing for cognitive changes using standardized assessment tools typically returned negative results.
- Many kinds of tests (screens, subjective, objective, imaging)
  - Wide variation in cognitive domains assessed
  - Questions about whether tools were sufficiently sensitive to detect changes, and about testing effects with repeated use, etc.
  - Use of some tests (standardized neuropsych tests, imaging) often require highly trained professional staff, and were too long for inclusion in busy clinical settings.

Scoping review

- Olson, K., Hewit, J., Slater, L., chambers, T., Hicks, D., Farmer, A., Grattan, K., Steggles, & Kolb, B. (2016). Assessing cognitive function in adults during or following chemotherapy: A scoping review. Supportive Care in Cancer 24, 3223-3234.
  - Funded by Canadian Institute of Health Research

- Inclusion criteria: Included at least 7 of the 8 domains of cognition, adults at least 18 years old, currently receiving chemo or received chemo in the past, written in any language
- Exclusion: non-cancer populations, samples that included patients with brain metastases or other injuries, dementia

- Methods
  - 5 step Arksey and O'Malley approach
  - Searched Medline, Psych INFO, Scopus, Web of Science, Social Science Citation Index from inception to Feb 2013, with keysections updated to May 2018
  - After removal of duplicates and articles that did not meet inclusion criteria, the full text of 279 articles was reviewed independently by 2 reviewers and 268 articles were removed, scoping review included 11 articles

- Results:
  - Primary reasons for exclusion: Did not include at least 7 of 8 dimensions of cognition
  - Difficult to compare because of differences in type of cancer, age, gender, design (mostly cross sectional), and types of tools

- Types of assessment tools/approaches
  - Screening
  - Subjective
  - Objective
  - Imaging

- Had hoped that by including only studies with measurement of at least 7 dimensions of cognition, congruence between objective and subjective measures would be higher but this was not the case

- Methodological issues
  - Lack of self assessment
  - Lack of baseline data
  - Protocols too long for inclusion in clinical setting
  - No distinction between attention and concentration

- Support International Cognition and Cancer Task Force (ICCTF) recommendations:
  - Focus on **four key dimensions of cognition** that are most vulnerable to adverse effects of chemotherapy
    - **Learning** and **Memory**: Hopkins Verbal Learning Test-Revised
    - **Executive Function** and **Processing Speed**: Trail Making
    - **Executive function**: Controlled Oral Word Association

Screening tools

- Cog Screening tools (positive results indicate that further follow up is needed, not diagnostic)
  - Mini-Mental State Exam (MMSE) (Folstein, 1975)
    - 10 minutes,
    - Sensitivity 18%, Specificity 100% compared to clinical judgement
    - Limited use for detecting mild cognitive impairment
    - Copyright now held by PAR, available for purchase at https://www.parinc.com/products/pkey/237

- Mini Cog for dementia (Borson, 2000)
  - 3 minutes
  - Sensitivity 94.3%, Specificty 87.4% compared to MMSE ((Lycke, 2014)
  - Assesses memory, executive function, visou-spatial, abstract thinking
  - http://geriatrics.uthscsa.edu/tools/MINICog.pdf
  - Problem: validated using a tool with low validity (MMSE)

- Montreal Cognitive Assessment (MOCA) (Nasreddine, 2005)
  - 10 minutes,
  - Sensitivity 90%, Specificity 87% compared to clinical judgement but also validated using neuropsych tests
  - Assesses all cognitive domains except processing speed
  - Used in individuals with cancer and correlates well with patient reported outcomes. (Isenberg-Grzeda, Huband, & Lam, 2017)
  - Available free at https://www.mocatest.org/about/

Subjective Tests (not screens)

- FACT-Cog
  - Available in many languages
  - Measures attention, concentration, memory, language, executive function
    - Only 2 of the ICCTF recommendations
  - validation issues:
    - Chinese version correlated well (r=0.7) with EORTC-QLQ cognitive function scale (Cheung et al, 2013)
    - French version not correlation with MMSE s (Joly et al, 2012)
    - Not significantly correlated with neuropsych tests (Jacobs, 2004)

Neuropsych Tests

- Specific to cognitive domains (see scoping review)
- Require highly trained staff
- Too long to fit in a busy clinical setting

- Imaging studies (Sherling and Smith, 2013, Hu et al., 2016)
  - MRI: To investigate structural and anatomical changes
  - PET, fMRI, and EEG: To investigate functional changes

Forget-me-nots:

- Screen using ICCTF recommendations to identify those who need follow up:
  - Develop screening questions and validate by comparing results to pt. perception of cognitive changes
  - Suggested screening question with compariosn to before diagnosis:
    - Learning: Do you have more trouble learning new things?
    - Memory: Do you have more trouble remembering things?
    - Executive function: Do you have more trouble making decisions? Do you have trouble finding the words you want to use?
    - Processing Speed: Does it take you longer to solve problems?
- Neuopsych follow up with valid tools:
  - Learning and Memory: Hopkins Verbal Learning Test-Revised
  - Executive Function and Processing Speed: Trail Making
  - Executive function: Controlled Oral Word Association

- Include baseline measurement, with follow up
- Stratify for age and gender
- Control possible confounders such as dementia, fatigue, depression, anxiety etc.

Questions?

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