The Self-Medication Assessment Tool (SMAT)

Training Program
What is the Self-Medication Assessment Tool?

The Self-Medication Assessment Tool (SMAT) is a comprehensive instrument intended to screen for medication self-management deficits in older adults and to facilitate targeted interventions.
# The Self-Medication Assessment Tool (SMAT) Training Program

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Module I: Introduction and Background

Part A: Factors Affecting Medication Adherence
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Background

A person’s capacity for medication management is defined as the “cognitive and functional ability to self-administer a medication regimen as it has been prescribed.”

The majority of community dwelling older adults are engaged in the self-care activity of managing a medication regimen.
Background

It has been estimated that 35 - 60% of people do not take their medications as prescribed.

Drug related problems are reported to be a major or contributing cause of:

- about 19-28% of hospitalisations in people over age fifty,
- increased emergency room visits,
- and increased need for assisted living arrangements.
Factors Influencing Adherence

Many factors affect long-term adherence to medication therapies, including:

- Patient Factors
- Medical & Treatment Factors
- System Barriers
Factors Affecting Adherence: Patient Factors

Several patient factors have been identified to influence medication adherence, namely:

- Age
- Physical & Sensory Factors
- Memory & Cognition
- Attitudes, beliefs and preferences
Patient Factors: Age

- Adherence across adult age groups
  - Ages 65 – 74 = fewest errors
  - Ages 75+ = most errors
- Why do the “young” older adults perform better?
  - Less busy and/or routine activities allows planning/ use of memory aids
  - Health-care is a priority
Patient Factors: Age

Increasing Age

- Physical functional capacity impacted
  - E.g., Arthritic conditions can make it difficult to remove medication from packaging
  - Impaired drug metabolism and unique sensitivity to drug effects
  - Can impact cognition, mobility, memory
Patient Factors: Age

Increasing age

- Sensory acuity changes
  - Vision
    - Need 12 pt or larger font and high contrast text on labelling
  - Hearing
    - High frequency loss affects language comprehension
    - Function best with low noise environment and low vocal tone
Patient Factors: Memory & Cognition

The complex cognitive task of medication adherence includes:

- Understanding the instructions
- Making a plan of action (integrating with daily activities)
- Remembering what to do
- Remembering to do it
- Remembering if you did it already (reality monitoring)
- Deciding what to do if missed a dose
- Assessing performance
- Deciding if memory aids are needed
Patient Factors: Memory & Cognition

- There are many aspects of memory performance related to medication adherence. Some decline in normal aging, but others do not.

- Decreased cognitive ability may not lead to adherence problems, as many seniors compensate for normal cognitive declines very successfully.
Patient Factors: Memory & Cognition

Cognitive abilities that are maintained or improved in older adults not suffering from dementia:

- Automatic processing
  - Highly practiced tasks show few declines.
- Increased vocabulary
  - The size of our vocabulary continues to increase throughout adulthood.
Patient Factors: Memory & Cognition

- Prospective memory (Remembering to do something in the future)
  - Seniors, particularly 60 – 75 year olds, are often superior at remembering to carry out an action in the future because they use reminders effectively.
Patient Factors: Memory & Cognition

- Both External and Internal cues can be helpful with prospective memory:
  - External Cues: Physical reminders (alarms, visual cues)
    - can be very effective, but are used less often.
  - Internal Cues: Mental plans
    - Time-based cues ("I will take my pill at 10 pm")
    - Event-based cues ("I will take my pill before bed")
      - Event-based cues are generally more effective, but sometimes not when the routine is disrupted.
Patient Factors: Memory & Cognition

Age-related losses in older adults not suffering from dementia:

- Reduced speed of processing
  - Information needs to be presented in an organized and unhurried fashion.
Patient Factors: Memory & Cognition

- Reduced working memory
  - Working memory allows us to juggle multiple pieces of information, and focus on a problem without being distracted.
  - Older adults can be challenged when needing to:
    - combine instructions for different medications into a plan of action
    - integrate plan of action into daily activities
Patient Factors: Memory & Cognition

- Reduced source memory:
  - Older adults are more likely to forget where they learned something, even if they remember the information.
  - Some older adults will therefore make decisions about how to take their medications based on information that comes from unreliable sources (e.g., magazines, television).
Patient Factors: Memory & Cognition

- Reality Monitoring: remembering that an action has been carried out.
  - difficult to recall accurately whether a medication has been taken earlier that day, particularly if a well-established routine exists.
  - difficult to determine if we actually carried out an action, or simply thought about it.
- Blister packs and dosettes are particularly helpful to avoid doubling doses due to age-related decline in reality monitoring.
Patient Factors: Memory & Cognition

- Research suggests that people adopt external memory aids because of their beliefs concerning memory, not because they believe their illness is serious.

- Education should focus on the idea that everyone needs memory aids, as well as on the importance of adherence.
Patient Factors: Attitudes, Beliefs and Preferences

• General attitude toward taking medications
  • Negative: “drugs don’t work for me”
  • Overly positive: “there must be a drug that can solve my problem”

• Patient’s wants and expectations
  • “cure my pain”
  • “not to have to take so many pills every day”
Patient Factors: Attitudes, Beliefs and Preferences

- Patient beliefs and knowledge
  - Unsure if medication is of benefit
  - Concern about risks
  - Side effects experienced (patient or family/friends)
  - Confusion over how or why to take a medication
  - Fear related to previous problems or those of a family member
Medical and Treatment Factors: Diagnosis

- Symptom severity
  - Higher rates of adherence (>65%) with:
    - Hypertension, hypothyroidism, diabetes
  - Lower rates (50% or less) with “silent” diseases:
    - Osteoporosis and hypercholesterolemia
- Increased co-morbidity burden
  - Increased adherence rates among those with multiple diagnoses
    - E.g., Hypertension + hypercholesterolemia + gout
Medical and Treatment Factors: Diagnosis

- Increased adherence with add-on drug therapy
  - Due to previous experience taking medications for a condition
Medical and Treatment Factors: Diagnosis

- Depression
  - People who are depressed are likely to:
    - amplify the side-effects of medications,
    - misinterpret symptoms of depression as side effects
  - Depression related to some medical conditions can go undetected and result in decreased adherence
    - E.g., Depression post-stroke
  - Antidepressants – prescribed by psychiatrist
    - Improved compliance with refills
Medical and Treatment Factors: Regimen Complexity

• A complex medication regimen for a patient includes:
  • high medication count,
  • frequent daily dosing,
  • multiple dosage forms,
  • additional usage directions

• Complex medication regimens have been linked to a greater risk of medication non-adherence in some patient populations
Medical and Treatment Factors: Patient-Provider Relationship

- Patient-provider relationship
  - Often, patients are provided little information about their medications
    - Information for older adults is best provided in list format
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**Medical and Treatment Factors: Patient-Provider Relationship**

- Pharmacists and physicians
  - overestimate how much information they provide
  - rarely ask about side-effects or other barriers to adherence
  - may not recognize patients’ low level of understanding/recall
    - e.g., “take one capsule 3 times a day” – confusing
    - “take one capsule 8am, 3pm, and 10 pm” – better
System Barriers: Socio-economic Issues

- Education
  - Low literacy levels
- Ethnicity
  - Impacts beliefs about healthcare and medications
- Language
  - Translated materials/information may not convey intended message
System Barriers: Socio-economic issues

- Lack of social support
  - Those without social support are less likely to
    - Be motivated to take medication
    - Receive reminders from others
- Financial status
  - Impacts access to healthcare and medications
  - May not be able to pay the medication cost or the co-pay associated with a drug plan
System Barriers: Socio-economic

- Lack of or cost of transportation and impaired patient mobility
  - Difficult to attend appointments
  - or to drop off or pick up prescriptions at pharmacy
Measuring Adherence: Consumption

- Measures of medication consumption
  - Pill counts
    - Often inaccurate or not feasible due to:
      - Missing information from labels
      - Variability between dispense and start dates
      - Old and new supplies combined
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Measuring Adherence: Consumption

- Patient self-report
  - DRUGS tool; MedTake test
  - Quick screening tools
- Electronic medication adherence devices
  - MEMS; MDLog; CompuMed
  - Expensive
  - Not readily available
Measuring Adherence: Possession

- Measures of medication possession
  - Refill records, community pharmacy
    - Inconsistent report designs
  - Electronic claims databases
    - Medication possession ratio (MPR) reliable
      - Days’ supply of drug over 1st yr of use/# days in yr
      - If ratio < 1 = lapses in Rx refills
      - If ratio 1 or greater; “perfect compliance”
Measuring Adherence: Possession

- Electronic claims databases
  - Persistency
    - Amount of time that person remains on chronic drug therapy
- Physician office electronic prescribing records
  - PPR – prescription possession ratio
  - Similar to MPR
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The SMAT was designed to address many of these barriers:

• The SMAT assessment tool provides a comprehensive approach to determining a patient’s ability to self medicate;

• The scoring system included in the SMAT allows for an objective interpretation of the patient’s results;

• The SMAT also allows the pharmacist to plan interventions with the patient, caregivers and healthcare team;

• And finally, the SMAT may help prevent medication mismanagement events that can result in hospitalization.
Module I: Introduction and Background

Part B: The Self-Medication Assessment Tool
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Description

The SMAT includes five scales that measure the various abilities required for safe and effective medication self-management.

1. **Functional Scale** – 22 items; 2 or 3 point score per item
   - Measures sensory, perceptual & physical abilities

2. **Cognitive Scale** – 22 items; 3 point score per item
   - Measures the ability to make judgments, manipulate information and interpret instructions
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**Description**

3. **Recall Scale** – 4 items per drug; 2 point score per item
   - Medication names, indications, dose regimen, description of own regimen
   - This scale determines if initial medication instructions were understood and remembered.

4. **Purposeful non-adherence** – 3 items; 4 point score per item
   - Experiences with side effects
   - Belief in value of medication to health
   - History of stopping a medication
Description

5. **Self-reported adherence** – 4 items per drug; 2 point score per item
   - Patient’s assessment of compliance to own medication regimen
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Evaluation of the SMAT

- Focus groups with pharmacists were held to ascertain opinions on:
  - Usefulness of the SMAT
  - Ease of use
  - Thoroughness
  - Willingness to use SMAT
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Evaluation of the SMAT

The reliability and validity of the SMAT was then tested in a sample of patients admitted to The Moncton Hospital between 2006 and 2008.

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**Evaluation of the SMAT**

- **Sample Characteristics**
  - Mean age of 81.5 yrs (range from 65-99 years)
  - Education level
    - Majority had one or more years in high school
- **Cognition**
  - MMSE scores ranged 12-30 (mean 26)
  - CLOCK test scores ranged 4 – 13 (mean 9.2)
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Validity and Reliability of the SMAT

• SMAT scales have high internal consistency
  • The items within each scale address the same domain.

• The SMAT shows high inter-rater reliability
  • agreement between two pharmacists who independently scored the same patient

• SMAT scores show high reliability
  • Patient scores remain stable over time
Validity and Reliability of the SMAT

- A strong correlation can be expected between the patient’s results on:
  - The Cognitive Scale and
    - Results on the Functional Scale
    - Results on the Recall Scale
  - The Recall Scale and
    - Results on the Self-reported Adherence Scale
Validity and Reliability of the SMAT

- A significant negative correlation was found between results on:
  - The Cognitive Scale and
    - results on the Purposeful Non-adherence Scale
- Based on the study sample results, there is an expected correlation between:
  - Increasing age and a
    - decrease in Functional score
    - decrease in Cognitive score
Convergent Validity

- The Clock Drawing Test (CDT) is a common screening measure used to identify dementia and other cognitive impairments.
- CDT correlates with the functional, cognitive and recall scales of the SMAT
Convergent Validity

- The Mini-Mental State Examination (MMSE) is a common screening measure used to identify cognitive impairment and monitor cognitive change over time.
  - MMSE correlates with the cognitive, recall and self-reported adherence scales of the SMAT.
Convergent Validity

- The Cognitive Competency Test (CCT) is used to measure cognitive performance within the context of everyday tasks.
  - CCT correlate with the functional, cognitive and recall scales of the SMAT
Evaluation of the SMAT – Results

• Acceptability to patients
  • Post-test surveys yielded positive reviews by patients:
    • Directions clear and easy to follow
    • 45 to 50 minute testing time not distressing
    • Assessment perceived to be useful
Evaluation of the SMAT – Results

- Clinical Usability
  - Pharmacists were able to make recommendations regarding adherence aids and supervision required using the scores from the SMAT

- Predictive Validity
  - Further research is underway to determine how well scores on the SMAT predict long-term health outcomes.
Conclusions

• The SMAT affords pharmacists a multifaceted tool that can help determine a geriatric patient’s medication management ability.

• The tool has strong patient acceptability.

• The scale is reliable across time and across pharmacists, and has been shown to have acceptable validity.

• Scales with a stronger cognitive aspect relate well to measures of cognitive function.

• SMAT scoring system provides objectivity for clinical recommendations.
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This completes Module I of the SMAT Training Program.

Thank you!