

Development of Novel Clutter and Cleanliness Scales for Infection Prevention and Control in U.S. Home Healthcare Settings

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BACKGROUND

- In the U.S., **homebound older adults often have multiple chronic conditions thereby increasing their infection risk.**¹
- Environmental hazards like clutter and poor cleanliness can worsen infection risks** for those in home health care (HHC) and impede infection prevention and control (IPC) efforts.²⁻³
- Timely assessment of environmental risks is crucial, yet no specific tools exist for HHC clinicians to evaluate home infection risk factors.
- We developed a questionnaire assessing IPC-related knowledge, attitudes, and practices of HHC patients and caregivers, administered by trained interviewers.
- The questionnaire includes **an observational component that assesses environmental factors, including clutter and cleanliness**, which may impact IPC practices.

OBJECTIVE

To develop **clutter and cleanliness scales** for use in HHC patient homes.

METHODS

- We reviewed existing clutter and cleanliness scales, noting that most validated scales focused on hoarding.⁴⁻⁶
- After **adapting and developing observational items focused on IPC in the home environment**, we conducted a pilot test with 15 HHC patients and caregivers from an urban HHC agency.
- During the pilot, **the uniform rating scale for both clutter and cleanliness items posed challenges** due to variable home environments and interviewer biases, affecting the consistency in assessment.
- After collecting team feedback, these **items were revised to have distinct rating scales.**
 - Clutter is rated on percentages of free space.
 - Cleanliness is rated from visible clean to not clean.
- After revision, the team used Mentimeter⁶ to review images demonstrating different cleanliness and clutter levels.
 - The middle scale points were still challenging to rate consistently.
- To improve coding consistency, interviewers received procedural manual training and completed a home observation quiz with example pictures.

RESULTS





Final Cleanliness Scale



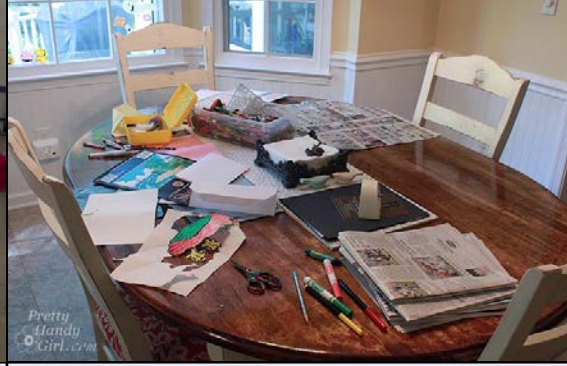

Please indicate the cleanliness of the following areas within the patient's home. (One answer per row)	Visibly Clean	Mostly Clean	Moderately Clean	Not Clean	Not Present in the Home	Unable to Observe
a. Kitchen counter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Kitchen sink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Dish cloth or sponge	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Dining table surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Bathroom sink(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Bathtub(s) / Shower(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Toilet(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final Clutter Scale

Please indicate clutter in the following areas within the patient's home. (One answer per row)	No Clutter (90 – 100% free space)	Some Clutter/ Items Present (75 – 89% free space)	Moderately Cluttered (50 – 74% free space)	Very Cluttered (10 – 49 % free space)	Not Present	Unable to Observe
a. Kitchen counter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Kitchen sink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Dining table surface	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Bathroom sink(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Bathtub(s) / Shower(s)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The images below reflect what interviewers would code under each category using the final cleanliness and clutter scales.

Cleanliness	Mostly	Moderately	Not Clean
			
Kitchen sink is visibly clean, no dirt or marks on the sink itself. What you can see of the counter and sponge appear to be visibly clean.	Kitchen counter and sink appear to be mostly clean. Some dirty items present around sink (milk carton and dirty knife). Sink appears to be clean/ free to dirty dishes.	Kitchen sink is mostly free of items but appears stained/ streaked and only moderately clean.	Visible dirt or mold/ discoloration around tub/tile grout which means automatic 4 (not clean).

No clutter (90-100% free space)	Some Clutter (75-89% free space)	Moderate Clutter (50-74% free space)	Very Cluttered (0-49% free space)
			
There are no items present in the sink. Nothing restricts access or use of the sink for handwashing or other activities.	Some items present but nothing appears to restrict tub/shower use. No items visible (in photo) within the tub itself.	Many items present, some space still available to sit and eat without moving these items.	Dishes piling out of sink and onto counter. Kitchen sink itself is unable to be used because of the number of dirty dishes in the sink.

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The research team participated in a training exercise utilizing the software **Mentimeter**. This allowed the team to view everyone's responses in real time and discuss why they selected a certain rating.

DISCUSSION

- Initial clutter ratings yielded a high level of inconsistency among interviewers, revealing the **subjective nature of observational assessments of home environments**.
- Adding objective ratings, as well as enhanced interviewer training with a quiz, helped **reduce interviewer bias and improve consistency**.
- After these changes, home observation quiz answers among interviewers were **consistent at least 80% of the time**.
- The study highlights **the importance of balancing subjective judgement with objective measures** when assessing home environment.

CONCLUSION

- Our scales represent the first observational items designed to assess home cleanliness and clutter for IPC purposes.
- If widely adopted, these scales could enable HHC clinicians to effectively assess **environmental hazards, informing patient/caregiver educational needs and enhancing patient safety** by reducing infection risks.

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