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Protocol for an eHub as an Systemic Intervention for Homeless Shelter Staff and Resident Psychosocial and Behavioral Needs

Celeste Sangiorgio
Rochester Institute of Technology

Cory Crane
Rochester Institute of Technology

Cassandra Berbery
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Abstract: *Homeless shelter performance is presently operationalized as shelter success in linking homeless individuals to housing; however, there is a cluster of individuals with co-occurring serious mental health issues who engage in chronic and episodic re-entry into homeless shelters. Persistent and chronically mentally ill individuals who re-enter shelters increase demands on staff, who are inadequately trained to de- escalate, manage their internal distress, and connect these homeless residents to appropriate services. This protocol outlines an alternative intervention mechanism for shelters that targets a key, untreated pathway where staff and resident symptoms and skills are linked to shelter performance. We propose that a digital skills training, connection, and resource hub can act as a systemic framework that targets staff and resident psychiatric symptoms in tandem. This paper details the design, hypotheses, and potential barriers associated with a digital systemic treatment and training portal.*

Keywords: *digital healthcare, eHealth, homeless adults, marginalized communities, mental health, psychotherapy, training tools*

*Corresponding Author, Celeste Sangiorgio
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Mental health issues are over-represented in the homeless population: 25-35% of homeless individuals meet criteria for Post-Traumatic Stress Disorder (Ayano et al. 2020), 18% meet criteria for Schizophrenia spectrum disorders (Ayano, Tesfaw, and Shumet 2019), 11% display symptoms of bipolar disorder (Ayano et al. 2020, and up to 60% abuse substances (Edwards et al. 2020; The National Coalition for the Homeless 2017). Shelter staff who serve as frontline workers cite residents' trauma histories and psychiatric symptoms as a source of burnout: disinterest and inability to care for residents (Edwards et al. 2020; The National Coalition for the Homeless 2017). Up to 30% of frontline staff report trauma symptoms themselves (Smith 2019; Waegemakers Schiff and Lane 2019). There is a need to develop a systematic framework for intervention designed to increase protective factors among shelter staff in tandem with targeting resident mental illness.

Systemic interventions have demonstrated success in settings where there is a high level of necessary attendance (e.g., academic institutions). Integrated staff and student trainings in school settings demonstrate repeated success in reducing problem behaviors, including substance abuse, attendance, and aggression (Jiménez-Barbero et al. 2016; Najaka, Gottfredson, and Wilson 2001; Wilson, Gottfredson, and Najaka 2001). Though there has been a call for systematic interventions in healthcare facilities, particularly shelters (Phillips, Gordeev, and Schreyögg 2019; Phipps 2016; Sharland 2017), systemic interventions have yet to be adapted for homeless shelters. While preventative and treatment studies exist for other healthcare service workers, they typically do not target shelter workers and infrequently target organizational predictors of burnout (Littleberry 2020).

This new skills training model and digital resource hub proposes innovative technology to develop a host electronic health platform for shelter staff and residents with a series of interactive digital tools that target key skills. Systemic interventions that target externalizing behaviors often use interactive digital tools, such as simulated chats, quizzes, and avatars, as skills training for the target treatment group (Sangiorgio, Everson, Del Vecchio, 2020; see Figure 1, Sapouna et al. 2010). Similarly, digital tools that target trauma and emotional distress are associated with decreases in symptoms when disseminated as treatment protocols or key skills training (Benight et al. 2018; Bush et al. 2016). These training tools are often used directly with individuals who present with mental illness; for example, digital emotional recognition training has shown success in treating hostile attribution (Stoddard et al. 2016). However, these digital training tools are not often adapted for staff training.

Fig. 1. Avatar and chat skills rehearsal from Sapouna et al, 2010

I. SKILLS TRAINING MODEL

Homeless shelter staff have demonstrated responsiveness to a cognitive-behavioral training framework for chronic homelessness (Kim et al. 2018) and evidence-based practice has been linked to burnout (Pontoski Taylor et al. 2016). Therefore, there is

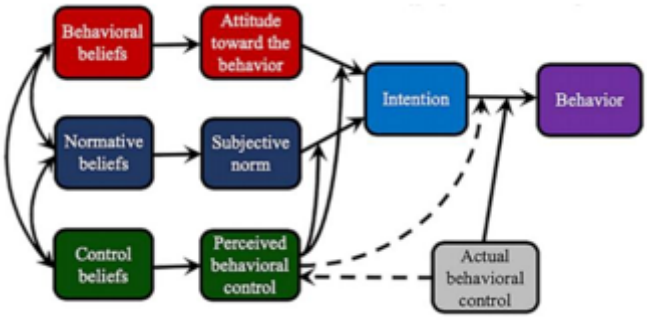

Fig. 2. Theory of Planned Behavior, from Ajzen, 2010

support for targeting each key skill in a training module using cognitive behavioral tools (i.e., self-monitoring, psychoeducation, rationale, rehearsal).

Behavioral skill can be conceptualized as adaptive when they effectively meet an intended behavioral goal. The Theory of Planned Behavior (Ajzen 2019; see figure 2) breaks effective skills into nine components, summarized as: identifying cues for problem behaviors, reference of beliefs (personal, cultural, and related to the salient system), appraising personal responsibility for cues, and finally planning and implementing a behavioral strategy. Assessment of these constructs are typically specific to the target population and generated through identifying patterns in qualitative interviews30- (Montaño and Kasprzyk 2015; Via-Clavero et al. 2019; Weber, Delport, and Cousens 2020). The present protocol identified patterns among existiting, peer- reviewed qualitative analyses of shelter staff to identify foundational key targets along the Theory of Planned Behavior (TPB; Benson and Brennan 2018; Brown, Serpe, and Brammer 2020; Kumalo 2019) framework.

The organizational pathway between key skills and shelter performance can be targeted by engaging in training for all key skills as part of a full, sequential training protocol.

portal design.

II. PORTAL DESIGN

Shelter staff and resident needs can be split into access to resources and need to cope with the distress associated with homelessness and co-occurring mental illness, called service and psychosocial needs respectively (McPherson, Krotofil, and Killaspy, 2018). A systemic protocol can address these needs by creating a "central hub" that allows staff or residents to self-select into different windows based on their in-the-moment needs: a) connection to resources; b) skills training; c) or coordination on cases. Each step in the below protocol taps into different skill sets of a multidisciplinary team: human-machine interaction specialists and designers address the technological components (e.g., website, interface) and psychological professions assess the psychological components.

A. Design of Hub

Organizational factors like workload and amount of time spent at work have been linked to burnout (Kim et al. 2018; Littleberry

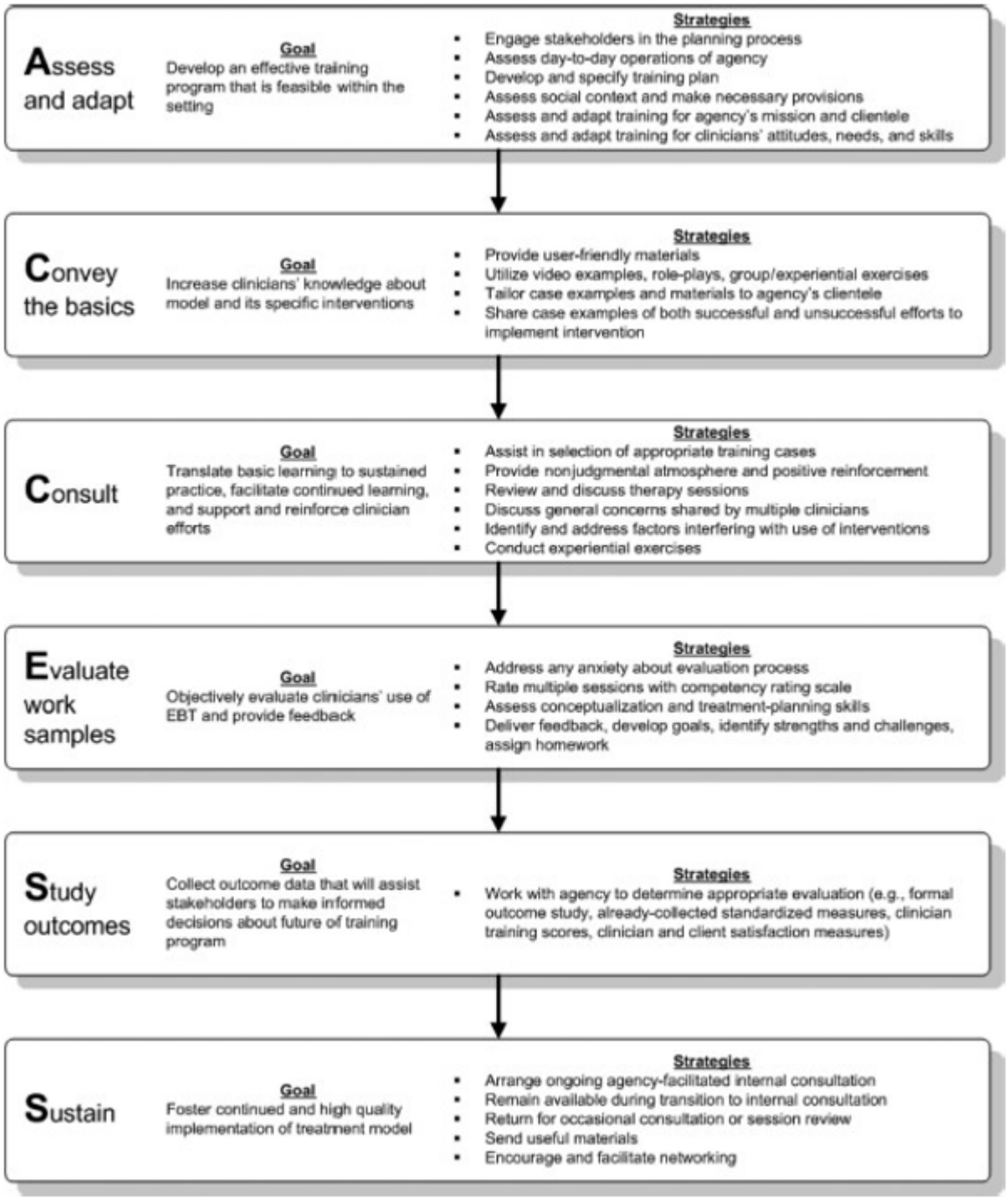

Fig. 3. The ACCESS Model (assess and adapt, convey basics, consult, evaluate, study outcomes, sustain) of training and consultation in evidence based treatments.

Fig. 5. Central hub mock-up formatting

2020). Therefore, occupational training and resources that adds to staff workload while they are at their workplace increase risk for low engagement and can potentially add to work-related distress. Additionally, chronic and episodic shelter users are transient and often leave shelters (Kuhn and Culhane 1998). An online training approach that can be accessed off-site may best meet staff and resident needs.

A website with a home-page that allows individuals to self-select training, resources, a shelter directory/case coordination, or guided coping skills, will maximize portability and accessibility.

Once self-selected into a section of the website, the website will allow for personalization to specific roles and needs using a decision-tree formatting. For example, after selecting "training" staff will select "staff" from a selection of "staff" or "resident." After selecting "coping," individuals can select what type of coping skills they would like to learn (e.g., "behavioral," "distraction," "cognitive," or "relaxation").

B. Resource Network

An online database of resources will maximize portability and accessibility of services designed to meet shelter staff and residents concrete and psychosocial needs. To date, there is no formal evaluation of resources databases used at homeless shelters, however online resources and databases are often used at medical centers (Moja et al. 2014). An online database or resources allows for live updates when there are changes to what community-based agencies offer; it also allows for residents and staff to independently coordinate on cases: residents can look up and contact resources independently. Furthermore, residents who are informed of and can access databases of resources can actively coordinate with shelter staff about resources.

C. Skills Training

Evidence based cognitive behavioral frameworks target cognitions, called thoughts or strategies, and behaviors, called skills. Therefore, the "training" option on the eHub can include singular modules designed to address each key skill correlated for shelter staff and residents. Consistent with existing cognitive behavioral frameworks and electronic skills training

models (Easton, Berbary, and Crane 2018), the modules in a systemic training protocol can progress from rationale to skills rehearsal.

Traditional therapy workshops and tools demonstrate effectiveness in training individuals to use skills when they are structured into sessions that focus on one primary target per session (Addis et al. 2006; Glasner- Edwards and Rawson 2010)). Progression through increasingly complex training targets in the service of changing behaviors is referred to a treatment protocol. . These protocols guide training by presenting information to patients in incremental steps, often starting with knowledge acquisition and then progressing into rehearsal of skills (Cuijpers et al. 2019).

The shelter eHub protocol can be matched to traditional protocol-driven therapy using the "training" section of the eHub. Shelter workers or residents using the eHub can be directed to a protocol-structured menu of introductory modules that progress into teaching and then rehearsal. This component uses a combination of media, including written text, games, and text-based and then virtual avatar training mechanisms. These tools are designed to escalate in complexity in a way that is similar to traditional therapy: concepts are first explained, knowledge acquisition is gamified and rewarded (e.g., match the concept to the skill), and then skills are taught and rehearsed in simplistic simulations (e.g., text-based) and more lifelike simulations (e.g., virtual reality based). Through the use of Unity software, individuals who use the training section of the website can select if they prefer to use virtual simulation displayed on a 2-dimensional screen (i.e., web browser or application) or a 3-dimensional display (e.g., through 3-dimensional hardware compatible with the eHub software).

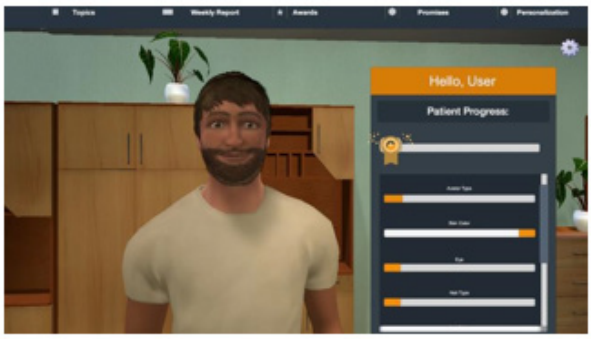

Fig. 6. Avatar used for skills training and rehearsal

Shelter residents will be directed to adaptive skills they can use to replace harmful behaviors and distress (e.g., relaxation skills; replacement behaviors for substance use or aggression); shelter staff will also have access to these training tools, as well as de-escalation training using a simulation of potential crisis scenarios that may occur at the shelter (e.g., aggressive, drunk, or psychotic residents).

The "coping" section of the eHub is designed to facilitate use and rehearsal of coping skills that are taught through the "training" section of the eHub portal. For example, a virtual therapist and gamified components in the training section can teach individuals why, how, and when to use relaxation skills (e.g., deep breathing) but if shelter workers or residents want to use deep breathing in the moment, they can select "coping" and then select "deep breathing" for a menu of relaxation skills; they will then be guided in using deep breathing skills.

D. Case Coordination

Shelter staff burden can be addressed by increasing accessibility of appropriate resources to that are best fit for specific resident needs (e.g., referring residents with mental health episodes to therapists). At

hospital and other healthcare sites, this need is served by coordinating referrals and other healthcare resources through an internal online hub, called an electronic health record (Moja et al. 2014). Electronic health records require layers of encryption to ensure patient privacy that would be beyond the scope of the proposed systemic protocol. However, selection of the "directory" and "provider" option can include a staff-login to a secure database of de-identified shelter residents. The key to this de- identified database would be stored as a physical copy within the shelter.

A database of this kind will act as a reference to specific concerns, needs, and previous referrals of residents, thus increasing accessibility of this information, maximizing ability to refer residents in the limited timeframe shelter staff might work with residents, and decreasing the burden on each shelter staff worker to assess resident history, needs, and previous resources on each contact.

III. EVALUATION

The protocol of the systemic eHub is designed to target key skills and needs as a mechanism to increase shelter performance and decrease staff and resident distress. Evaluation of the effectiveness of the eHub can therefore be completed by assessing changes in the connection of shelter residents to resources and decreases in overall distress and conflict among residents and staff.

A. Tracking Use

Use of the eHub and completion of modules will be incentivized and there will be no cap on the number of times training modules can be completed when they are activated. Preliminary designs for each module will be available or approximately one week. Over the week that training modules are available, digital tracking can be used to record number of times completed, location completed (i.e., on or off site), time completed, and amount of completion (i.e., full or partial). In addition to this objective data, free-response feedback can also be elicited about accessibility.

B. Tracking Effectiveness

Shelter staff will be administered a survey collecting data on coping skills, distress (i.e., burnout and caregiver fatigue), and interventions used approximately once per month. Resident conflict and distress will be measured during weekly therapy appointments. Shelter performance will be recorded on a monthly basis. Taken together, this database will provide average scores of shelter staff and resident functioning and shelter performance.

IV. CONCLUSION

In conclusion, the proposed digital intervention seeks to assess and address an untreated pathway that maintains serious mental illness (substance abuse, psychosis, aggression, and mania) among the homeless, facilitates re-entry into the homeless shelter system among the chronic and persistently mental ill, and contributes to the development of serious mental health problems and impairment of functioning in shelter staff. This protocol uses a multidisciplinary, consultation approach to develop a viable digital skills training tool for shelter staff and residents to decrease risk of re-entry and maintenance of psychiatric symptoms among staff and residents. This protocol is the first of its kind to use and assess digital tools related to staff psychosocial functioning and shelter functioning.

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