The Wisconsin Star Method: Understanding and Addressing Complexity in Geriatrics

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The Wisconsin Star Method (WSM) is a simple concrete way to map and visually process the numerous interacting factors in the complex situations so typically common in geriatrics. How to effectively address multiple co-occurring problems is one of the greatest challenges facing those who develop models of geriatric care, as well as those who provide such care directly. The number of comorbid medical conditions and psychosocial issues, often inextricably intertwined, seem to multiply with age. Some problems are acute, many are chronic, and most change over time. In addition, what each problem means can vary according to the unique perspectives and feelings of those involved at every level of the care system.

The effort required not only to assess but also to address such a sizable number of simultaneously interacting factors taxes both cognitive and emotional resources. Further compounding these challenges is the high degree of variability from one older adult or population to the next, generated by multiple factors ranging from age-related physiological heterogeneity to different sets of psychosocial experiences over the course of lifetimes. Under such circumstances, evidence-based guidelines, developed from studies of single problems in homogeneous populations, are of limited utility at best. And not only do providers and planners of care for older adults encounter higher levels of complexity with higher degrees of frequency, but they also face higher levels of ambiguity in terms of diagnosis, prognosis, and plausible interventions stemming from those complexities.

This dilemma has long called for the development of a user-friendly method to facilitate addressing such challenging situations more efficiently and more effectively with greater clinical integrity [1–4]. The WSM is not a rigid or static model, but rather a continuously emerging and flexible method, and has been undergoing development with input from care providers, medical educators, students and clinical trainees, administrators, patients, and family members for more than 10 years. Using the WSM can potentially enhance the implementation of the models of geriatric care described elsewhere in this book, especially in how it seamlessly integrates behavioral health into comprehensive geriatric care.

Evidence-Bases for the Wisconsin Star Method

The structure and function of the Wisconsin Star Method (WSM) are supported by the principles of heuristics [5–7], cognitive science [6–9], information visualization [10, 11], visual analytics [12], ecological interface design [13], team functioning [6, 11], and network theory [14, 15]. The method begins with fashioning a low-tech graphic user interface—drawing a small five-pointed star (Fig. 7.1) on a surface, such as paper or whiteboard—then mapping out natural clusters of clinical data in list form [16] in the appropriate field or domain. Each datum becomes an element in a network of potentially interacting variables, with the links between them varying in strength, from very weak (i.e., negligible) to very strong (i.e., directly causal or interdependent). The primary identifiable clinical challenge (e.g., failure to thrive) is written in the center of the star. In some cases, the primary challenge may not be entirely clear at the outset, but emerges gradually as the situation is reviewed.

Each arm of the star represents a single domain: medications, medical, behavioral, personal, and social. The medication arm includes all of an individual's current medications (e.g., prescribed, over-the-counter, and "borrowed") and other relevant substances (e.g., dietary, recreational). The medical and behavioral arms list known diagnoses and/or symptoms, as well as functional status (e.g., abilities to perform activities of daily living [ADLs] and instrumental ADLs).

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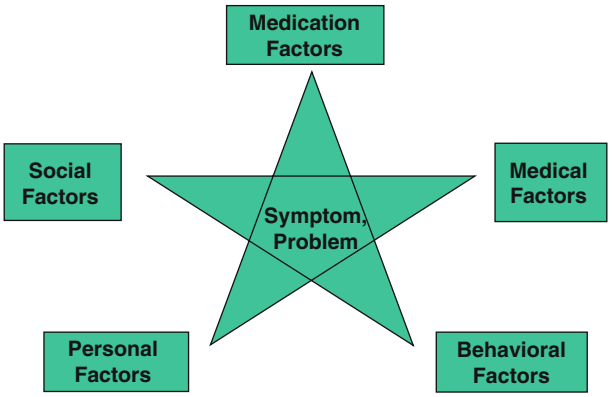

Fig. 7.1 Understanding and Addressing Complex Clinical Problems: The Wisconsin Star Method

Table 7.1 Executive functions of the human brain

• Attention
• Response inhibition: blocking distractions
• Working memory
• Abstract thinking
• Planning: sense of the future, generating options
• Implementing plans: deciding/initiating/sustaining/stopping
• Set-shifting: flexibility
• Organizing: categorizing, sequencing
• Multi-tasking: divided attention
• Problem-solving: new (vs. familiar/learned)
• Monitoring: awareness of self (internal) and others (external)
• Evaluating: assessing
• Modulating: perceptions; feelings/emotions; thoughts; actions; ego

The personal arm highlights a person's situation awareness, individual personality traits, values, loyalties, and usual ways of coping. These include the conscious and unconscious rules of thumb used to guide responses to situations, learning and communication styles, and general approaches in dealing with stressful experiences. The social arm covers interpersonal and environmental problems, assets and access to needed resources (e.g., family support, finances, housing, transportation, legal issues, etc.).

Each arm of the star also represents a different network at a different ecological level within the nested hierarchy of the network of networks that constitute each person. The medication arm corresponds to the biochemical or molecular interface; the medical arm, the level of organ systems; the behavioral, the interface mediating between the brain, the body, and the environment; the personal arm, the interface of the "mind and heart"; and the social arm, the interactions of interpersonal and environmental factors. The WSM's visual approach, by mapping multiple interacting factors onto a single field, affords a bird's eye view, taps into the most powerful information processing system of the human brain. It can facilitate insight into the ways in which the elements in these networks are influencing each other, switching easily between focusing on the linear–causal links and viewing the holistic, overall "big picture" [10, 13, 17].

Note that it is essential for the data be written down—effective implementation is simply not possible in complex cases by attempting to keep all the data in one's head, because the carrying capacity of the conscious human brain is limited to about four simultaneously interacting variables [14]. The WSM flattens the nested hierarchy of networks into a user-friendly [10] two-dimensional map. This map becomes an extension of the users' working memory [8] and, whether used by individuals or a team, enhances executive functioning (Table 7.1) for situation awareness and problem-solving. Writing the elements down also creates a small but significant distance between the user(s) and the problems, thus providing both cognitive and affective perspectives.

Using the Wisconsin Star Method

With its visual approach, the WSM facilitates attending simultaneously to multiple interacting variables and identifying those data that are most relevant. One simply travels around the star, assessing and highlighting those elements in each arm that appear to connect significantly with the challenge at hand. Recursive iterations of this process additionally allow the user(s) to identify potentially relevant data that are missing (e.g., can the person manage all the steps required to refill a prescription?), thereby reducing the risks stemming proverbially from "not knowing what you don't know." Such processing also enables reconsiderations of whether data initially considered noncontributory may be relevant after all.

Some factors by themselves may not be sufficient to contribute to the central problem, but become so by interacting synergistically with other factors. One can identify these by using a process of triangulation (analogous to surveying and navigation procedures) to "connect the dots." Having discovered a possible connection between such two factors, one can look for additional factors that may also be contributing causes or emergent consequences. These additional factors may be already known—e.g., relocation to a long-term care facility (LTCF) and high personal value on autonomy → refusing cares (Fig. 7.2)—or has not yet occurred but could be predictable—e.g., high loyalty to family and conscientiousness plus pending snowstorm → shoveling snow to help family → angina (Fig. 7.3)—and potentially preventable by an astute intervention.

There may also be factors not yet perceived, but about which hypotheses can be generated and checked out—e.g.,

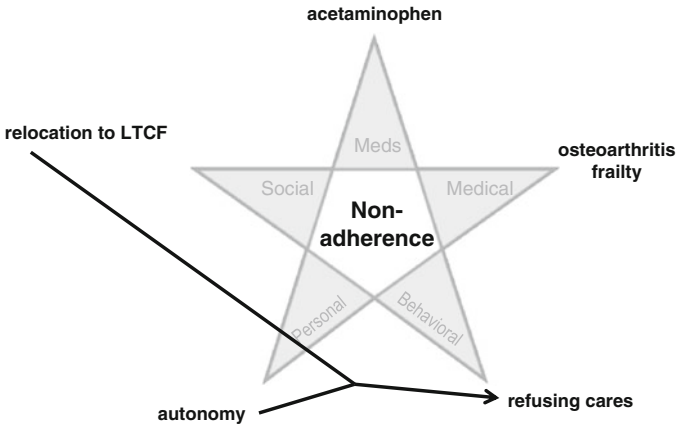

Fig. 7.2 Star map for an elderly patient refusing cares

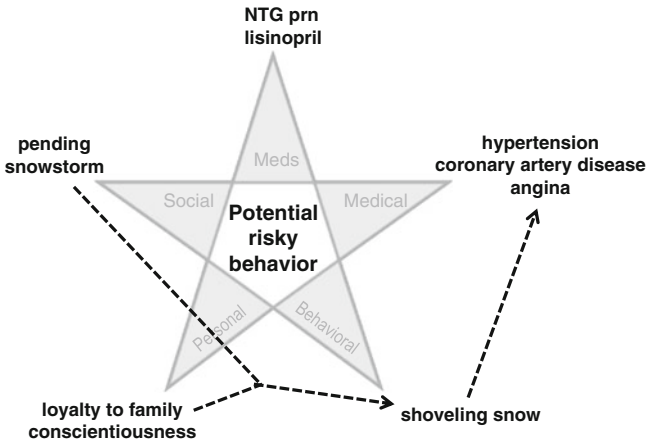

Fig. 7.3 Star map for very old patient with angina planning to help family with shoveling snow

dementia + relocation to a LTCF + ? → wandering, where the unknown factor(s) might be a medication side effect, pain, a delusion (e.g., of having to go to work), and/or an effort to return home (Fig. 7.4).

Using the WSM helps to ascertain which problems have multifactorial origins (e.g., where the triangulated factors turn out to be a cluster of causal factors) and thus avoid a common error in complex situations, that of coming to premature closure [8, 18]. It can ease shifting sets when considering pairs of problems at different levels that might have linear–causal relationships (e.g., poor blood pressure control despite three antihypertensive medications + an inability to afford medication and/or an unrecognized problem with alcohol abuse). It can also be applied holistically to identify how multiple problems may be interconnected, such as parkinsonian gait instability, falls, loss of usual means for coping, depression (low mood and motivation), and social isolation. The resulting map provides a big picture of the case, with strong and weak ties highlighted, and can be viewed as the person's unique ecosystem.

By integrating holistic and linear–causal perspectives into an ecological approach, the Wisconsin Star Method can enhance the recognition of diagnostic patterns both within and between domains, including the identification of vicious cycles, e.g., recurrent falls + concern about appearance → embarrassment about using a walker → declining to use walker → decreased activity → physical deconditioning → recurrent falls (Fig. 7.5).

The WSM also facilitates novel problem-solving: generating hypotheses, prioritizing and sequencing interventions, integrating clinical pearls [19] with evidence-based guidelines [20]. Using the WSM to more readily recognize vicious cycles as well as to identify and address their most critical link(s), care providers can work together on transforming them into virtuous cycles—e.g., arranging for a friendly visitor (someone who also needs a walker) to visit and walk with the person regularly.

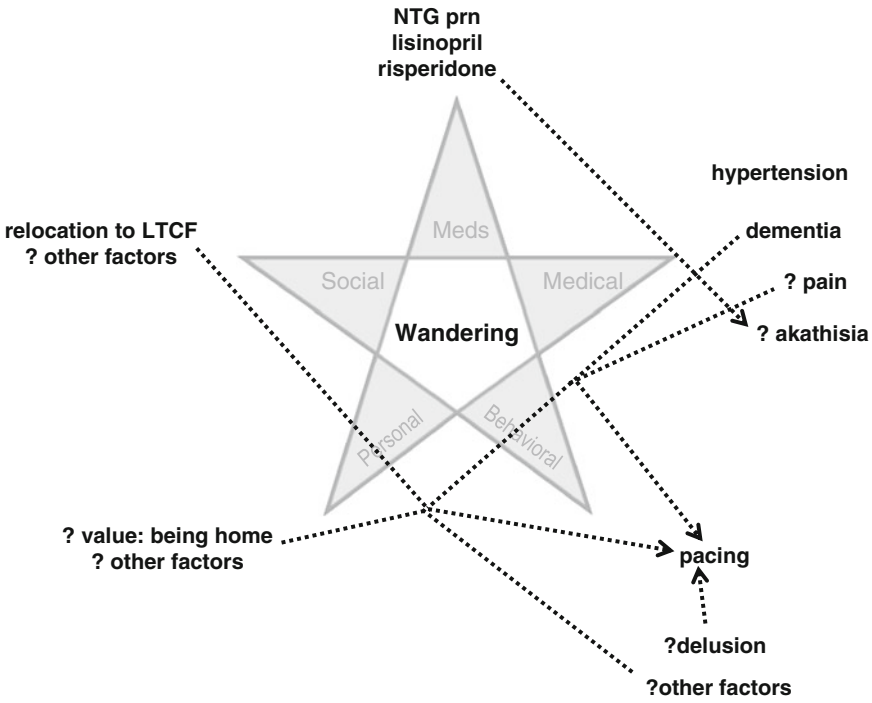

Fig. 7.4 Star map for a patient with dementia who is wandering

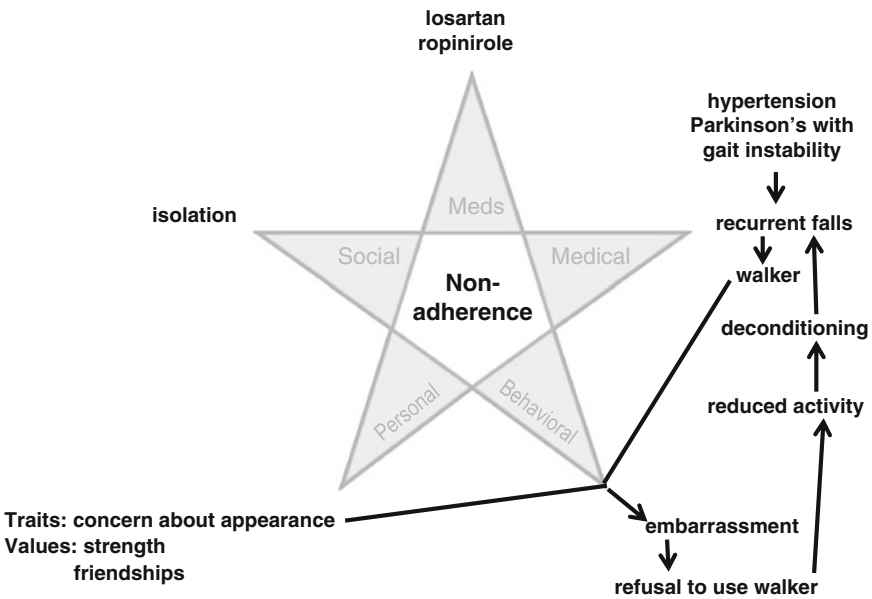

Fig. 7.5 Star map for patient with frequent falls who declines using a walker

Meaning-Centered Care with the Wisconsin Star Method

The factors clustered in the personal arm of the star can be thought of as those which contribute to what any given situation means to an individual or a team. Attending to their personal knowledge (e.g., health literacy) and experiences, traits, values [21], loyalties, and rules of thumb which inform their usual ways of coping can promote better appreciation of the meaning of otherwise puzzling behaviors and the underlying anxieties that drive them, such as a patient's refusal to use a walker despite recurrent falls stemming from feelings of embarrassment at being seen in public as dependent on a walker.

An important adjunct to the WSM is listening to how one feels when confronted with a challenging situation. Doing so can enhance one's emotional effectiveness and reduce the likelihood of affective errors [22]. The stress responses of patients, teams, and systems are driven by underlying anxieties generated by the gaps between perceived challenges and perceived resources, with these perceptions strongly colored by how they construe the meaning of the situation. Listening to how one feels can provide valuable additional clues to more readily and effectively understand the how and why of the responses to stressors, by means of measured reflecting (vs. just immediately reacting) on the emergent feelings and then generating testable hypotheses. If one feels sad with an elderly male patient, one may be indirectly picking up on his sadness. For care providers and planners of models of care who experience some anxiety or confusion emerging from interactions with others, these feelings may reflect the latter's underlying anxiety or confusion about some issue that they are having trouble identifying or directly communicating.

The way to effective clinical outcomes is often through the personal arm of the star. Exploring the factors operative in this arm of the star can guide clinicians, teams, and planners to sounder appreciation for what problems mean to someone else, in contrast to what they mean to themselves. By monitoring and reflecting on the differences, they can reformulate their explanations and recommendations with greater sensitivity and specificity, to be "on the same page," thereby enhancing mutual communication via shared meaning.

Remembering in dialogs to take time to paraphrase what someone has said, before proceeding with articulating answers, explanations, or plans, demonstrates not only that one has been listening well and truly heard what has been said, but also communicates what one has understood. This either provides confirmation of shared meaning or the opportunity to correct any misunderstandings through further dialog. Thus use of the WSM to provide "meaning-centered" care or planning can help to cultivate collaborative relationships, and avoid relationships characterized by misunderstandings or confrontations (e.g., blaming them for refusing to use a walker or adopt a guideline). Sharing star maps with others, and developing such maps even further with their help, may further enhance the likelihood of those involved becoming literally, as well as figuratively, "on the same page," through shared ownership as well as shared meaning.

Applying the Wisconsin Star Method to Teams and Systems

There are additional levels to the WSM. One is the ad hoc team star (Fig. 7.6) and the others are the system level stars (Fig. 7.7). The figures include potential members, and are not exhaustive lists. Most teams consist of only a few members, but a key to their effectiveness can be the extent to which their membership is diverse. There is evidence that teams (especially those with diverse membership, as opposed to a panel of experts) generally address complex issues more effectively than individuals [6]. Systems stars are analogous to team stars, and can be thought of as "team of teams" or "community of practice star" maps. These can be deployed on an ad hoc basis to delineate factors at higher or lower levels which frequently have a bearing on any particular star

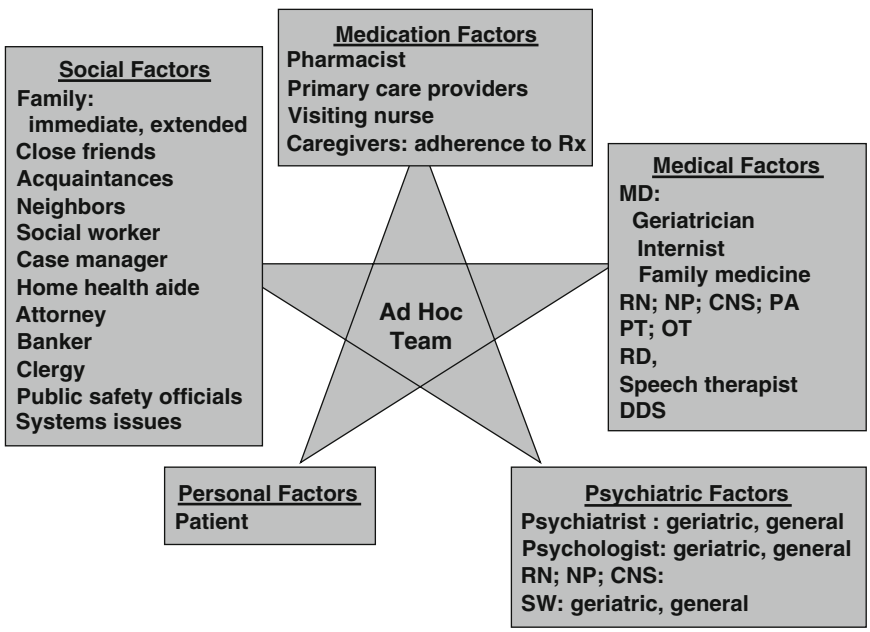

Fig. 7.6 Ad hoc team star map

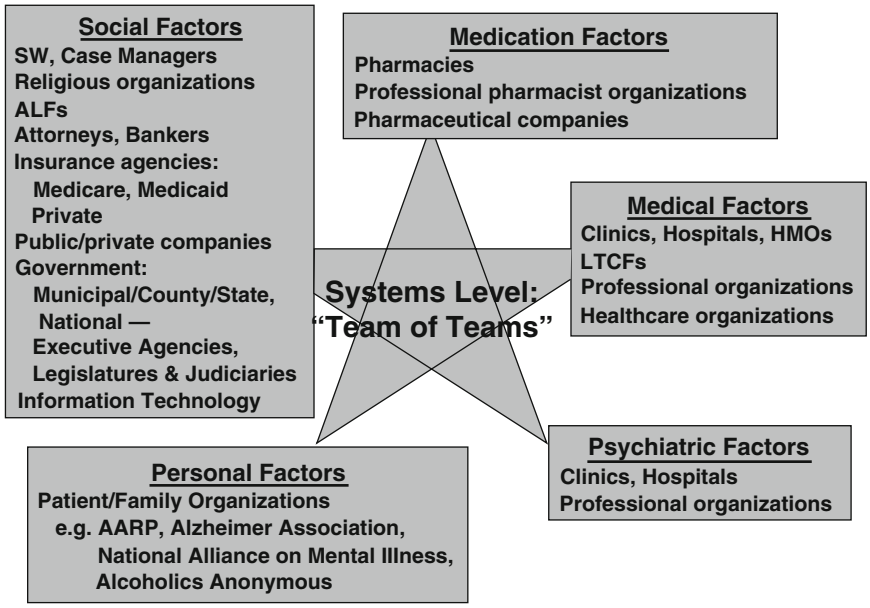

Fig. 7.7 Systems star mapping: "team of teams" or community of practice star map

map. Problems at the patient and team levels may be affected by factors at higher levels, such as organizational constraints locally, and/or state, regional, or national policies, and vice versa. Team and systems star mapping can also help to identify missing resources.

Even in situations where there is no formal team, one can create an ad hoc team star map to identify other individuals, teams, or organizations who may be of assistance. Those who spend the most time with the patient (e.g., primary caregivers such as family or care staff) or working on the frontlines of the care organization may be the richest sources of some kinds of important information. In clinical or organizational situations which seem intractable, one can seek out a "weak tie," such as a colleague or an acquaintance, through whom to connect with someone beyond one's local network, who can provide knowledge or resources not locally available (e.g., a chaplain for pastoral counseling), and/or the perspective of someone at a greater distance from the situation (e.g., a colleague working in another system). This is often helpful in complex sets of problems, and not infrequently essential. Where problems are multi-factorial, one can organize and mobilize a team, officially or unofficially ("ad hoc") to take on the interacting issues—different people are helpful for different issues—to assist with monitoring, implementing plans, and advocacy. One can use analogous methods with organizations to address systems level issues.

Using the WSM has the potential not only to enhance proficiency at providing comprehensive care, but also to reduce cognitive and emotional burdens and errors [8, 23]. It can assist individuals and teams, as well as patients and their families, to become more confident, mindful, and resilient in addressing the complex interacting physical, emotional, and social issues of older adults with greater sensitivity and specificity to each one's uniqueness. The WSM also has the potential to be integrated into electronic health record systems, which are currently quite limited in their abilities to facilitate situation awareness in complex clinical situations [24].

Since 2002 the Wisconsin Geriatric Psychiatry Initiative (WGPI) has been developing and refining the application of the Wisconsin Star Method to challenging problems at a number of systems levels [25]. The WGPI is a small but growing group of geropsychiatry and geriatrics professionals (including state and local government staff) attempting to develop systems to enhance mental health services for older adults in Wisconsin and beyond. Given the widespread and growing shortage of expertise in the mental health and substance abuse problems of older adults, the WGPI is dedicated to widely disseminating basic principles of geriatric psychiatry to care providers in different settings, including health care, long-term care and aging network.

The WGPI approach consists of a collaborative effort to develop, from existing resources, a sustainable geriatric mental health infrastructure by means of an indirect care model with three basic components: (1) evidence-based teaching, via on-site, case-based consultations, of evidence-based principles of geriatrics and geriatric psychiatry, utilizing the Wisconsin Star Method; (2) providing external validation and moral support to frontline care teams struggling to cope with scarce resources; and (3) employing a social entrepreneurial approach to enhance the effectiveness of limited existing resources through network weaving.

WGPI educational activities utilizing the Wisconsin Star Method have included: (1) biweekly geriatric psychiatry colloquia at the Geriatric Medicine and Geriatric Psychiatry Fellowship Programs at the Geriatric Research, Education, & Clinical Center (GRECC) of the Madison VA Hospital

(MVAH) and the University of Wisconsin-Madison (UW-Madison), and the Geriatric Medicine Fellowship Program at Aurora Health Care in Milwaukee; (2) difficult cases conferences (averaging nearly 100/year) with community health care teams, such as Community Care, Inc. (PACE, Partnership, and Family Care teams) in the southeastern Wisconsin region; (3) three monthly Geriatrics Fellows' Most Difficult Case Conferences coordinated by the Aurora Health Care in Milwaukee, each telephonically linked to teams at up to ten other geriatric medicine fellowship sites in the Eastern, Central, or Pacific Time zones [26]; (4) quarterly telephonic Most Difficult Case Conferences at memory clinics throughout Wisconsin affiliated with the Wisconsin Alzheimer's Institute; (5) a continuing education program at UW-Madison's Department of Professional Development, the Mental Health and Older Adult Certificate Series; (6) periodic presentations at regional and national meetings (including the American Geriatrics Society, the American Association for Geriatric Psychiatry, and the International Psychogeriatric Association); (7) a pilot project to reduce the need to hospitalize patients with dementia-related behavioral problems, by creating behavioral health collaboration teams composed of behavioral health teams from participating nursing homes and hospitals in Ladysmith, WI; and (7) a geriatric behavioral health resource website (currently wgpi.org, with plans for wgpi.wisc.edu later in 2015).

Over the past decade, the Wisconsin Star Method has been implemented in geriatric clinics and geriatric services at the MVAH (in Madison, Wisconsin); the Aurora Health Care System (in the eastern Wisconsin region); and Ladysmith Nursing Home and Rusk County Memorial Nursing Home in Ladysmith, Wisconsin. Since 2006, Abundant Life Manor, a community-based residential facility in Milwaukee for older adults with chronic mental illnesses and/or dementia-related behavioral problems, as well as multiple medical comorbidities, has based its system of care on the Wisconsin Star Method. This has been associated with significantly lower staff turnover compared with similar local facilities, and with marked enhancement of outside reviews by staff of the state's Division of Quality Assurance [27]. Most recently, the Wisconsin Star Method has been incorporated into the MVAH's GRECC-Connect program, which is designed to enhance geriatric health care for aging veterans in rural areas by means of interdisciplinary team-based support for primary care providers in community-based outpatient clinics.

Summary

In contrast with the usual piecemeal approaches to problems involving multiple interacting comorbidities, the Wisconsin Star Method represents a user-friendly way for clinicians and planners of care models to obtain a grasp on complex situations, not only more rapidly but also more effectively, in terms of providing initial and ongoing care and planning with greater sensitivity and specificity. Using the Wisconsin Star Method requires mindfully mapping and iteratively processing the numerous interacting factors that comprise the increasingly common challenge of clinical complexity. As such, adopting and using it has the potential to achieve clinical and systems outcomes that are more meaningful to all involved. It could do so by helping to reintegrate the otherwise disparate, fragmented efforts and communication barriers that tend to characterize current healthcare systems.

The WSM also has the potential to help care providers and planners to acquire clinical wisdom. Among the components of wisdom identified in a recent cross-cultural review were a "prosocial attitude" (altruism), a rich body of factual knowledge and procedural skills, "emotional homeostasis," a capacity for reflection, an openness to different perspectives, and the ability to acknowledge and deal effectively with uncertainty and ambiguities [28]. Using the WSM cannot guarantee a prosocial attitude. Nor does it does add much to the clinical knowledge and skills base of its users. But it can facilitate the implementation of those skills and knowledge in the face of complex situations, by more effectively engaging their capacities for reflection and consideration from multiple perspectives.

Higher levels of complexity increase the cognitive and affective loads on the human brain. By providing a useful tool to address complex situations, the WSM can lower the level of complexity-induced stress, thereby enhancing cognitive and emotional effectiveness. This, in turn, can reduce the likelihood of errors. Finally, by not being a static model employing too-rigid guidelines, but rather becoming a flexible, continuously emerging "open" method, capable of undergoing modifications to more effectively fit varying circumstances, the Wisconsin Star Method retains the potential for further development. This can continue to come through input from a diverse virtual "team" comprised of those involved in providing and receiving care—be they clinicians, educators, patients, families, administrators, advocates, developers of geriatric care models, teams, organizations, or systems—well into the future.

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