

**Short Running Title:** Family Involvement in Delirium Management

**The Development of the MENTOR\_D Nursing Intervention: Supporting Family  
Involvement in Delirium Management**

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### 25 **ABSTRACT**

26 **Background.** Although families are increasingly seen as allies to improve delirium management  
27 and reduce its consequences, their involvement in the post-cardiac surgery setting is challenging  
28 considering patients' critical state and short hospital stay. To our knowledge no theory-based  
29 nursing intervention exists that optimally supports the involvement of families in delirium  
30 management in the context of post-cardiac surgery. We aimed to develop MENTOR\_D, a nursing  
31 intervention to support the involvement of families in delirium management.

32 **Methods.** MENTOR\_D was developed based on Sidani and Braden's (2011) intervention  
33 development framework. Narrative literature reviews paired with the clinical experience of an  
34 expert committee were used to inform these three steps: (1) develop an understanding of the  
35 problem under study; (2) define the objectives of the intervention and identify a theoretical  
36 framework for highlighting strategies to be used in the intervention; (3) operationalize the  
37 intervention and identify its anticipated outcomes.

38 **Results.** As a result of the three steps the MENTOR\_D nursing intervention relies on a caring-  
39 mentoring relationship between a nurse and the family. The aim of MENTOR\_D is to increase the  
40 presence of the family at their relative's bedside and their involvement in delirium management.  
41 MENTOR\_D's content is delivered over three phases which are organised around the visits of the  
42 family at the patient's bedside. During these phases, families used their knowledge of the patient  
43 to tailor the delirium management actions. These actions include orientation and reminiscence, and  
44 were aimed at diminishing anxiety and increasing sense of self-efficacy in families and  
45 diminishing delirium severity and improving recovery in patients.

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46 **Conclusions.** A deep understanding of the underlying mechanisms of an intervention is key in its  
47 success to reach the targeted goals of effectiveness in practice. This understanding can be achieved  
48 through the careful development of a theory of the intervention before the operationalisation of its  
49 components and its testing. As delirium continues to be a major complication, this intervention is  
50 a promising solution to increase families' involvement in delirium management and highlights the  
51 support that nurses can offer to facilitate this involvement. With its use in future studies and  
52 practice it can be further refined. The proposed paper presents the theory of the MENTOR\_D  
53 intervention; that is its conceptualization and proposed mechanisms of action.

54 **Keywords.** Nursing intervention, delirium, family caregivers, intervention development

55

56 **SUMMARY STATEMENT OF IMPLICATIONS FOR PRACTICE**

57 **What does this research add to existing knowledge in gerontology?**

- 58       • In the context of delirium following cardiac surgery, families are a valuable resource. Their  
59       knowledge of the patient’s needs, preferences and personality can provide key insights for  
60       tailoring non-pharmacological delirium management.
- 61       • Using Sidani and Braden’s work, we developed MENTOR\_D, a nursing intervention to  
62       support the involvement of families in the non-pharmacological management of post-  
63       cardiac surgery delirium.

64 **What are the implications of this new knowledge for nursing care with older people?**

- 65       • Nurses can use the MENTOR\_D intervention to support families in using delirium  
66       management strategies such as orientation.
- 67       • The MENTOR\_D intervention relies on a caring-mentoring relationship between a nurse  
68       and the family to increase the presence of the family at their relative’s bedside and their  
69       use of delirium management strategies.

70 **How could the findings be used to influence policy or practice or research or education?**

- 71       • Nursing interventions are not well described in current literature, and this leads to issues  
72       related to the evaluation, replication and implementation of these interventions.
- 73       • This manuscript features the development of a nursing intervention and operationalizes  
74       Sidani and Braden’s framework, offering a concrete example that is useful for nursing  
75       researchers.
- 76       • We proposed a theoretical framework with underpinnings that, to our knowledge, were  
77       never used before in complementarity and that may be transferable to nurse-family  
78       relationships in other contexts.

79 **INTRODUCTION**

80 Delirium is a costly complication impeding patients' autonomy and increasing morbidity  
81 and mortality (Neupane, Arora, et Rudolph, 2016). Delirium is defined as an acute change in  
82 attention, awareness, and cognition that fluctuates throughout the day and cannot be explained by  
83 other preexisting neurocognitive disorders (American Psychiatric Association [APA], 2013). Post-  
84 cardiac surgery adults are among the most at risk for delirium due to the highly invasive procedure,  
85 and the intensive care unit stay (Marcantonio, 2017). About one third of post-cardiac surgery  
86 patients will experience delirium, which will result in a complicated recovery for them and anxiety  
87 for their families (Mailhot et al., 2017; Leigh et al 2018; Neupane et al., 2016).

88 A longer duration of delirium has been associated with worsened consequences of delirium  
89 (Girard et al., 2010; Han et al., 2017; van den Boogaard et al., 2012). **The gold-standard in caring**  
90 **for patients with delirium is using non-pharmacological delirium management that is tailored to**  
91 **each patient's needs, preferences, and personality** (American Geriatrics Society [AGS], 2015;  
92 APA, 2013; Registered Nurses Association of Ontario [RNAO], 2016). Non-pharmacological  
93 delirium management consists of measures taken to address the symptoms of delirium and  
94 maintain patient safety, for example, using orientation cues and cognitive stimulation, without  
95 employing pharmacologic interventions (AGS, 2015; APA, 2013; RNAO, 2016). The acute and  
96 short-term nature of post-cardiac surgery care precludes nurses from becoming sufficiently  
97 familiar with these patients to ensure optimal tailoring of non-pharmacological delirium  
98 management. In this context, families are a valuable resource. In the context of this article, a family  
99 member is defined as the primary informal caregiver assisting with the care of the patient. Their  
100 knowledge of the patient's needs, preferences and personality could provide key insights for  
101 tailoring non-pharmacological delirium management (Martins et al., 2014; Steis et al., 2012).

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102 Moreover, a sense of familiarity to delirium care might improve patient outcomes (Carbone et  
103 Gugliucci, 2015). This sense of familiarity can be achieved by increasing not only the presence of  
104 families but more importantly, their direct involvement in delirium management. The involvement  
105 of families in delirium management can facilitate the tailoring of non-pharmacological  
106 interventions, in turn, improving care and patient outcomes

107 Families have reported high levels of distress towards delirium. However, they have also  
108 reported the need to learn how to support their relative with delirium (Cohen et al 2009). More  
109 importantly, supporting families and informing them on delirium and how they can help was  
110 highlighted as being a key factor in limiting the impact that delirium might have on them (Black,  
111 Boore, et Parahoo, 2011; Gagnon, Allard, Gagnon, Mérette, et Tardif, 2012; Rosenbloom-Brunton,  
112 Henneman, et Inouye, 2010; Steis et al., 2012). There is limited evidence on the impact of family  
113 involvement in critical care among patients with delirium (Martinez et al 2012). However, the  
114 involvement of families among patients with dementia suggested that a partnership between nurses  
115 and families helps support family involvement while having beneficial outcomes for both patients  
116 and families. These outcomes include a decrease in disturbing behavioral manifestations of  
117 patients as well as an improvement in the response of family caregivers to them (Brodaty et  
118 Arasaratnam, 2012). It is important to highlight that not all families show interest in being involved  
119 in delirium care and so interventions supporting their involvement should be suggested to families  
120 who want to be involved and never be imposed on someone (Archbold et al 1990; Haines et al  
121 2017; Hetland et al 2017).

122 Involving families in delirium management comes with challenges that need to be  
123 addressed. First, as mentioned, families report distress as well as anxiety and powerlessness when  
124 they are exposed to their relatives experiencing delirium (Martins et al., 2018; Partridge, Martin,

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125 Harari et Dhesi, 2013; Partridge et al., 2019). Second, the precarious state of patients and the  
126 environment of the intensive care units make it challenging for families to deliver tailored non-  
127 pharmacological delirium management. Therefore, support must be offered to families so that they  
128 can become allies in the care of patients with delirium. Unfortunately, no nursing intervention  
129 supporting the involvement of families in post-cardiac surgery delirium management was  
130 identified in the scientific literature. Multicomponent interventions and guidelines that promote  
131 the presence and participation of families in contexts of ICU delirium have recently been  
132 published. Interventions such as the ABCDEF (A2F) bundle or the Guidelines for Family-Centered  
133 Care in the Adult ICU provide general principles on how to communicate with families and  
134 highlights the importance of involving them in ICU care (Ely, 2017, Davidson et al 2017).  
135 However, the support that nurses can offer families to increase their involvement in non-  
136 pharmacological management of delirium is not well described in these interventions and  
137 guidelines. For this purpose, we developed MENTOR\_D (*Mentoring of family caregivers*  
138 *concerning delirium management in post-cardiac surgery patients*), a nursing intervention  
139 supporting the involvement of families in non-pharmacological delirium management in the  
140 context of post-cardiac surgery. We would suggest that the MENTOR\_D intervention  
141 complements the existing literature by suggesting actions that the nurse can put in place to enhance  
142 the involvement of families during delirium, while increasing the families' confidence in being  
143 involved. Moreover, other strengths of MENTOR\_D include the fact that it is nursing driven and  
144 was designed to be much more prescriptive than existing interventions in terms of how to support  
145 families, diminish their anxiety, increase their confidence and involve them in non-  
146 pharmacological interventions.

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147           Nursing interventions are not well described in current literature, as space constraints often  
148 do not allow the reporting of the results with an in-depth description (Sidani, Fox and El-Masri,  
149 2020). This leads to issues related to the evaluation, replication and implementation of nursing  
150 interventions. In this context, experts in the field suggest that the development of nursing  
151 interventions be presented separately from the results to allow a full description of interventions’  
152 components and underpinnings (Sidani et al, 2020). Sidani et al suggest that a complete description  
153 of the development of the intervention must include the following elements: the health problem  
154 that needs to be addressed, the goal of the intervention to understand what exactly it was designed  
155 to achieve, the mechanisms of action that highlights the outcomes expected to result from the  
156 intervention and the factors hypothesized to influence the delivery of the intervention and its  
157 effectiveness (Sidani et al, 2020). The aim of this paper is to report on the development of the  
158 MENTOR\_D intervention theory and the MENTOR\_D intervention components, highlight what  
159 can be done by families at the bedside of their relative with delirium in the ICU, and present  
160 strategies that nurses can use to support families. MENTOR\_D was preliminarily assessed in a  
161 randomized pilot study and deemed feasible and acceptable, while showing potential at increasing  
162 families’ sense of self-efficacy, diminishing their anxiety and improving patient outcomes of  
163 recovery and length of stay (Mailhot et al., 2017). These preliminary results of this intervention  
164 are reported elsewhere (Mailhot et al., 2017).

165

## **METHODS**

### Sample and setting targeted by MENTOR\_D

168           The sample and setting for this intervention were post-cardiac surgery patients and their  
169 family caregiver hospitalized in both the cardiac surgery ICU and the surgery unit. Delirium in the



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170 cardiac surgery population onsets between one to three days following surgery, while patients are  
171 still hospitalised in the ICU. Once delirium has started and patients no longer require critical care,  
172 they may be transferred to the surgery unit. Therefore MENTOR\_D was designed to be used both  
173 in the ICU and the surgery units. During the intervention, families and patients were accompanied  
174 during this transition by the research nurse who provided MENTOR\_D.

### 175 Development of MENTOR\_D

176 MENTOR\_D was developed based on Sidani and Braden's (2011) intervention  
177 development framework. We completed the following three steps: (1) develop an understanding  
178 of the problem under study; (2) define the objectives of the intervention and identify a theoretical  
179 framework to outline the potential mechanisms of action of the intervention; (3) operationalize the  
180 intervention and identify its anticipated outcomes.

181 To support the development of the MENTOR\_D intervention and complete all three steps,  
182 we performed two narrative reviews as per the definition suggested by Paré et al, 2015. The first  
183 review aimed to understand delirium and how families are involved in contexts of delirium and  
184 the second review aimed to highlight how our theoretical framework was already operationalized  
185 in previous intervention studies (for example: what concepts of Bandura's self-efficacy  
186 enhancement principles were used in previous studies). The detailed narrative summary of these  
187 reviews are presented in length in the thesis work relative to the pilot of MENTOR\_D (Mailhot T,  
188 2016). As this paper focusses on the development of MENTOR\_D, we only mention key elements  
189 of the methods used to complete these two reviews.

### 190 *Step 1: develop an understanding of the problem under study*

191 To complete step 1 of developing an understanding of the problem we performed the first  
192 narrative review. This initial review increased our understanding of delirium risk factors, outcomes

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193 and allowed the identification of targets for intervention in the context of delirium and  
194 interventions carried out with families in the context of delirium using keywords and thesaurus  
195 terms related to delirium, delirium management and family involvement. The following databases  
196 were searched: CINAHL (via EBSCO Host), EMBASE (via OVID SP), PsycINFO (via APA  
197 PsychNET), PubMed (via NCBI), and Web of Science (via ISI-Thomson Scientific) because they  
198 represented both databases with very wide coverage and database that were specialized. We  
199 considered all types of articles published in English or in French as we aimed to get a representative  
200 overview of the literature (Paré et al 2015). Best practice guidelines on delirium care were also  
201 retrieved from the following major healthcare association websites: National Institute for Health  
202 and Care Excellence [NICE], Trip Database, National Guideline Clearinghouse, American  
203 Psychiatric Association Practice Guidelines, and Registered Nurses' Association of Ontario. This  
204 search was performed by one researcher (TM) who was responsible for all steps of screening,  
205 selecting papers, extracting data and creating the narrative summary. As this was a narrative  
206 review, no quality appraisal was performed (Paré et al 2015).

207       To develop an understanding of the problem under study, Sidani and Braden (2011) suggest  
208 identifying the following information: the causative factors, nature, manifestations, and  
209 consequences of delirium. This information was extracted from papers included as a result of our  
210 search. This information then served to identify targets for the intervention. To achieve this,  
211 elements that were highlighted in previous studies as modifiable using non-pharmacological  
212 delirium management were listed and discussed with clinicians (a clinical nurse specialist, a nurse  
213 practitioner, a surgeon, and an intensivist) and intervention development experts (members of the  
214 research teams). In parallel, a master's student performed a research project to assess the needs of  
215 families of patients who presented delirium following cardiac surgery (Dufresne-Beauchamps,

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216 2012). Lists of potential targets for the intervention were provided to the clinicians and expert  
217 panel, who would then comment on this list. The list was then further adjusted until all clinicians  
218 and experts agreed that they were appropriate targets for the intervention. Results of this are  
219 presented in the section below.

220 *Step 2: define the objectives of the intervention and identify a theoretical framework to*  
221 *outline the potential mechanisms of action of the intervention*

222 Step 1 resulted in an understanding of the problem and the identification of the targets of  
223 the intervention. This guided the definition the objectives to be used in the intervention (Sidani  
224 and Braden, 2011). For MENTOR\_D, the objectives corresponded to the targets previously  
225 identified . These targets were discussed with the same group of clinicians and experts involved in  
226 step 1 and underwent several rounds of revision, until all clinicians and experts agreed, and no  
227 further comments were addressed.

228 Following this, we identified a theoretical framework to highlight the strategies to be used  
229 in the intervention that would increase its chances of reaching its intended objectives. For  
230 MENTOR\_D, we focussed on finding a theoretical framework that could prescribe strategies to  
231 increase both the presence of the family at the bedside and their involvement in non-  
232 pharmacological delirium management. The theoretical framework was selected by reviewing  
233 nursing theories and searching the literature. This search is described in more details in the Thesis  
234 relative to this work (Mailhot T, 2016).

235 *Step 3: operationalize the intervention and identify its anticipated outcomes*

236 The last step of the development of this intervention was to operationalize the intervention  
237 and identify its anticipated outcomes. Operationalizing the intervention consists of defining how

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238 the intervention strategies identified previously will be delivered and in what dosage in addition  
239 to the outcomes expected for intervention (Sidani and Braden, 2011). To achieve this, we  
240 performed a second narrative review of intervention studies in which the strategies previously  
241 identified had already been operationalized. Databases used in the initial narrative review were  
242 searched again using the same search strategy. Additionally, additional keywords were added to  
243 include any nursing intervention that used Bandura's principles to enhance self-efficacy among  
244 adult hospitalized patients (Mailhot, 2016). The clinical experience of our committee members  
245 served to ensure that the operationalization was transferable to the ICU context.

## 246 **RESULTS**

247 **Develop an understanding of the problem under study.** Figure 1 illustrates the problem  
248 under study. In our understanding of the problem, we would argue that the observable  
249 manifestations of delirium should be targets for its management and should guide the choice of  
250 non-pharmacological interventions used to address these manifestations (Figure 1). In the  
251 following paragraphs, we detail each element suggested by Sidani and Braden to develop an  
252 understanding of the problem.

253 The causative factors of delirium include a combination of patient characteristics, and a  
254 combination of stressors related to the acute illness (Gosselt, Slooter, Boere, et Zaal, 2015; Inouye,  
255 2006; Inouye, Westendorp, et Saczynski, 2014). Patients' characteristics that increase their  
256 vulnerability to delirium and that are more frequently reported among cardiac surgery or ICU  
257 populations include age, having comorbidities, such as dementia or impaired cognitive  
258 functioning, hypertension, cerebrovascular disease and psychiatric impairment (Gosselt et al.,  
259 2015; Zaal et al., 2015). Stressors related to the acute illness strongly associated with delirium  
260 among cardiac surgery and ICU populations include highly invasive cardiac surgical procedures

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261 under general anesthesia, cardiopulmonary bypass circulation, positive liquid balance during and  
262 after surgery, low cerebral oximetry, mechanical ventilation, organ failure and metabolic acidosis  
263 and medications such as analgesics and anti-cholinergics (Mailhot et al., 2019; Mailhot, Cossette,  
264 Lambert, Cournoyer et Denault, 2016; Schoen et al., 2011; Zaal, Devlin, Peelen et Slooter, 2015).  
265 The ICU stay following cardiac surgery also increases the risk of developing delirium due to the  
266 involvement of additional stressors such as sensory overload, an unfamiliar and highly  
267 technological environment, postoperative pain, and multiple tubing, such as thoracic drains  
268 (Kanova, Sklienka, Roman, Burda et Janoutova, 2017; Zaal et al., 2015).

269 The manifestations of delirium, including confusion and agitation, are presented in  
270 Figure 1. Finally, the consequences of delirium for patients include reduced patient autonomy and  
271 recovery after surgery, and increased length of stay and mortality (Gosselt et al., 2015; Neupane,  
272 Arora, et Rudolph, 2016; Tse, Schwarz, Bowering, Moore, et Barr, 2015). Family caregivers who  
273 witness delirium report anxiety, distress and powerlessness (Martins et al., 2018; Partridge et al.,  
274 2013; Partridge et al., 2019). They express a need for increased involvement in delirium care  
275 (Abuatiq, 2015).

276 Current literature suggests that reducing the severity of the manifestations of delirium also  
277 reduces its consequences (Kiely, Jones, Bergmann et Marcantonio, 2007; Marcantonio, Ta, Duthie  
278 et Resnick, 2002). These targets for the intervention were presented in the form of a list to the  
279 clinicians and experts involved in our intervention development to be discussed. As a result of the  
280 evidence from the literature and discussions with the committee, the consequences of delirium for  
281 patients and families were identified as targets for the intervention. Non-pharmacological delirium  
282 management to reduce the severity of the manifestations of delirium and its consequences are

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283 reported in best practice guidelines and systematic reviews (AGS, 2015; APA, 2013; Clegg,  
284 Siddiqi, Heaven, Young, et Holt, 2014; Siddiqi et al., 2016) (see Table 1).

285 Guidelines unanimously recommended that non-pharmacological delirium management be  
286 tailored to a patient's needs, preferences and personality (AGS, 2015; APA, 2013; RNAO, 2016).  
287 However, this is challenging in the context of the ICU. The tailoring of non-pharmacological  
288 delirium management can be achieved by the presence of families at the patient's bedside (on the  
289 unit, in the patient's hospital room) and their use of non-pharmacological delirium management  
290 that are adapted to the patient based on their knowledge of their relative with delirium.

291 The masters' student project on the assessment of the needs of families in context of  
292 delirium among the cardiovascular population concluded that families described a need for  
293 increased information on delirium and a need to be involved in delirium care (Dufresne-  
294 Beauchamp, 2012).

295 **Defining the objectives and strategies to be used in the intervention.** Three objectives  
296 were identified for MENTOR\_D in coherence with specific aspects of the health problem  
297 identified which was delirium following cardiac surgery: (1) To decrease the severity of the  
298 manifestations of delirium; (2) To improve patient outcomes increase (decrease complications,  
299 length of stay and improve recovery); (3) To improve family outcomes (decrease anxiety, increase  
300 self-efficacy). We aimed to achieve these objectives by increasing the presence of families at the  
301 bedside and their involvement in tailored non-pharmacological delirium management.

302 Based on studies supporting the involvement of families among patients with conditions  
303 similar to delirium (e.g., dementia), learning a new role appeared central to make families  
304 comfortable enough to increase their presence at their relative bedside (Brodaty and Arasaratnam,  
305 2013). Mentoring can support one's transition into a new role. Thus, we proposed that the new

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306 role of families could be best supported through a mentorship between a nurse mentor and the  
307 family. To guide the nurse mentor in her interaction with the family, a novel framework was  
308 proposed and comprised of a combination (Figure 2) of three theories that were epistemologically  
309 and ontologically coherent and complemented one another. The first two theories were used to  
310 understand how to best facilitate the transition of families to a new active role which was thought  
311 to result in their increased presence at the bedside. The third theory explained how to increase the  
312 family's confidence in their ability to fulfill their new role in tailored non-pharmacological  
313 delirium management.

314 *Strategies to increase the presence of families.* To increase the presence of families,  
315 MENTOR\_D included a nursing approach based on Watson's Human Caring Theory, which is  
316 anchored in a mentoring relationship as defined by Anderson and Shannon (Anderson et Shannon,  
317 1988; Watson, 2008). In Human Caring Theory, Watson describes a *caring* relationship as an  
318 intersubjective human-to-human relationship which is susceptible to promote wholeness and  
319 healing of the family caregiver (Watson, 2008). Therefore, we hypothesized that a *caring*  
320 relationship would create a context that was favorable for families to learn their new role and  
321 increase their presence at the bedside. Watson suggests that a nursing practice guided by the ten  
322 *caritas* processes results in a *caring* relationship. These *caritas* processes were retained as strategies  
323 that could be used in MENTOR\_D (Watson, 2008a). These strategies were expected to translate  
324 into a nurse mentor being highly interested in the family and patients' experience, while  
325 respectfully facilitating and encouraging the expression of feelings and thoughts from the family  
326 and patient. This was thought to create a context favorable to a supportive relationship between  
327 the family and the nurse mentor and thus leading to increased presence of the family at the bedside.

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328           Although Watson’s theory informs on how the nurse should interact with patients and  
329 families in a *caring* relationship, it does not provide guidance regarding the context of mentorship,  
330 a key element in facilitating transitions into a new role. A caring relationship can be developed  
331 within a mentorship (Wagner and Seymour, 2007). In fact, the underlying principles of a *caring*  
332 relationship as described in the Human Caring Theory were coherent with the functions of a mentor  
333 as described by Anderson and Shannon (Anderson and Shannon, 1988; Wagner and Seymour,  
334 2007). Therefore, we theorized the caring relationship within a mentorship in which the mentor  
335 would have functions as described by Anderson and Shannon. According to Anderson and  
336 Shannon, mentorship is an interpersonal relationship between an experienced person, the nurse  
337 who becomes a nurse mentor, and a novice, the family. The functions are to teach, sponsor,  
338 encourage, counsel and befriend (Anderson and Shannon, 1988). The teaching function includes  
339 information transferred from the nurse mentor to the family on delirium and non-pharmacological  
340 delirium management. This function implies to facilitate questioning from families and to  
341 encourage their reflection, while acting as a role model. Sponsorship consists of three essential  
342 behaviors of the nurse mentor, to protect the family, by providing them with an environment that  
343 facilitates success, to support them in their preparation before intervening with their relative with  
344 delirium and, finally, to promote the family’s expertise to other nurses. Encouraging includes  
345 highlighting the family’s strengths and providing concrete examples of practice that will inspire  
346 them. The nurse-mentor can also propose challenges so that the families are involved in  
347 experiences that promote their development in their new role. To offer counsel is part of the  
348 problem-solving process and includes listening, clarifying concepts related to the new role, and  
349 suggesting solutions to problems. Finally, Anderson and Shannon propose to befriend the family  
350 and remain available for them (1988). The functions of a nurse mentor based on Anderson and



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351 Shannon's model served as strategies of MENTOR\_D to support the acquisition of a new role by  
352 the family and achieve objective 1 of increased family presence.

353 *Strategies to increase the involvement of families in tailored non-pharmacological delirium*  
354 *management.* Principles from Bandura's Socio-cognitive Theory (Bandura, 1982, 1997, 2001)  
355 served to explain how this caring mentorship between a nurse and family could increase the  
356 family's confidence in their ability to fulfill their new role in tailored non-pharmacological  
357 delirium management (Figure 2). Bandura elaborated the concept of self-efficacy which refers to  
358 a person's confidence in their ability to be successful in an action. Self-efficacy is a key  
359 determinant in a person's choice to initiate and repeat an action. Bandura highlights four sources  
360 of information on which a person relies to build their self-efficacy. These sources of information  
361 were selected as strategies of the intervention. They include other people's performance (vicarious  
362 experience), other people's feedback (verbal persuasion), personal experience (performance  
363 accomplishment) and emotional response.

364 Through vicarious experience, observation of other people's successful performance,  
365 especially those considered as role models, can reinforce one's self-efficacy. Observing that others  
366 succeeded because of sustained efforts can convince people that they too can be successful if they  
367 persist in adopting the new behavior (Bandura, 1997). The predictable and controllable  
368 characteristics of a situation can also be assessed from watching others perform a certain behavior.  
369 Observing others in difficult situations allows the observer to know the possible results and  
370 solutions to possible problems. This information may result in diminished anxiety. Hearing other  
371 people's feedback can also influence their perception of their self-efficacy. Finally, people who  
372 feel negative emotional reactions while adopting the behavior can perceive their performance as a

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373 failure, which could in turn lead to doubts about their abilities, thus lowering their self-efficacy  
374 (Bandura, 1997).

375         **Operationalize the intervention and identification of its anticipated outcomes.** The  
376 final selection of strategies that were included in MENTOR\_D is presented in Table 2. Our  
377 literature search did not reveal any structure or mode of delivery, except for interventions  
378 operationalizing the self-efficacy enhancement principles, all of which included at least one face-  
379 to-face meeting with the nurse (Mailhot, 2016). In terms of timing, authors generally opted for  
380 interventions with very early encounters in the health continuum. Because results from the  
381 literature search for the structure or mode of delivery were not informative, we looked at previous  
382 studies of nursing interventions with families involved with other populations with  
383 symptomatology like delirium, for example dementia (Brodaty and Arasaratnam, 2013). An initial  
384 structure that seemed feasible for post-cardiac surgery patients and for a context of caring  
385 mentorship between a nurse and family was presented to the expert committee.

386         The final structure extended over three phases: pre-bedside phase of 30 minutes, the  
387 bedside phase of 15 minutes, and the post-bedside phase of 15 minutes. This sequence was  
388 repeated twice daily for three consecutive days following the onset of delirium as this was deemed  
389 by the committee to be an intensity that was sufficient and feasible. The purpose of the pre-bedside  
390 phase was for the nurse mentor to guide the family in identifying and practicing appropriate  
391 tailored non-pharmacological delirium management that could be used during the bedside phase.  
392 The purpose of the bedside phase was for the nurse mentor to model the non-pharmacological  
393 delirium management and for the family to feel confident enough to tailor this non-  
394 pharmacological management. The purpose of the post-bedside phase was for the nurse mentor  
395 and family to reflect on the bedside phase, while offering feedback and preparing for the next visit.

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396 *Anticipated Outcomes of MENTOR\_D*

397 Family participation, in terms of increased presence and use of tailored non-  
398 pharmacological delirium management, was highlighted as an immediate outcome resulting from  
399 MENTOR\_D. Outcomes among families included diminished anxiety and increased self-efficacy  
400 and, among patients, included diminished delirium severity, complications, length of stay and  
401 increased recovery.

### 402 **DISCUSSION**

403 This paper presented the development of MENTOR\_D, a nursing intervention to support  
404 the involvement of families in delivering tailored non-pharmacological delirium management in  
405 the context of post-cardiac surgery care. Nurses in post-cardiac surgery ICU or surgery unit are  
406 not in contact with the patient long enough to develop a knowledge of the baseline cognitive status  
407 and preferences of the patients. In fact, in this setting, nurses generally do not interact with the  
408 patient before the procedure, thereby limiting her knowledge of the patient. Therefore, increasing  
409 the presence of families and having them involved in non-pharmacological interventions has the  
410 potential to result in an optimal delirium management approach in which familiarity and tailoring  
411 of interventions are key.

412 Current literature is sparse on exactly how families should be involved in the management  
413 of delirium, specifically on what these families should do and how nurses can support them as  
414 allies in the management of delirium. The MENTOR\_D intervention answers this need by  
415 suggesting how families can be supported and involved. This intervention has the potential to  
416 complement existing literature that suggests the involvement of families without being specific on  
417 how they should be supported and involved. Besides providing an example of the use of Sidani  
418 and Braden's framework for intervention development, two important contributions result from

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419 the work presented in this paper. First, it highlights strategies that nurses can use to support family  
420 participation in non-pharmacological delirium management and what can be done by families at  
421 the bedside of their relative with delirium. Second, we proposed a theoretical framework with  
422 underpinnings that, to our knowledge, were never used before in complementarity and that may  
423 be transferable to nurse-family relationships in other contexts.

424 The MENTOR\_D intervention shows promise in terms of clinical effectiveness. Results  
425 from the pilot study of MENTOR\_D (#ISRCTN95736036) showed a potential of the intervention  
426 to decrease of the anxiety of families and an increase of their self-efficacy in participating in  
427 tailored non-pharmacological delirium management in the context of post-cardiac surgery care  
428 (Mailhot et al 2017). In terms of patient outcomes, MENTOR\_D showed the potential to decrease  
429 length of stay and improve recovery (Mailhot et al., 2017).

430 While completing the pilot study of MENTOR\_D, there was a need to adapt some of the  
431 planned strategies. One of the sources of information influencing self-efficacy—feedback on the  
432 family caregivers’ performance—had to be adapted to the context of delirium. Because patients  
433 who experience delirium are often hypervigilant and suspicious of healthcare staff, the nurse  
434 mentor was often unable to offer feedback to the family during the bedside phase. However, we  
435 hypothesized that having the nurse-mentor offer positive feedback afterwards would still positively  
436 influence the caregiver’s self-efficacy. Bandura highlights the fact that feedback has a greater  
437 impact on self-efficacy when it is formulated in terms of gains and offered by someone who is  
438 credible to the person; two characteristics of the feedback the nurse mentor offered the family  
439 (Bandura, 1997).

440 Although advanced practice nurses were involved in determining the structure of  
441 MENTOR\_D, limitations of our work include the fact that we did not involve nurses in direct

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442 clinical practice or families. Previous work from our team informed us on the family's experience  
443 and recommendations to increase their involvement in the context of cardiac surgery delirium  
444 (Dufresne-Beauchamp, 2012). Furthermore, current literature provided us with evidence on nurses  
445 and family experience in delirium contexts other than cardiac surgery; therefore, we chose not to  
446 include families in the development of MENTOR\_D (Martins et al., 2018; Partridge et al., 2013;  
447 Partridge et al., 2019). For the preliminary testing of MENTOR\_D, the same nurse mentor  
448 provided the intervention for all families. Thus, the feasibility of having MENTOR\_D delivered  
449 by bedside nurses will have to be assessed. The applicability of our intervention is limited to  
450 patients who have family caregivers available. Other interventions strategies should be developed  
451 for patients who do not have families or friends available. We used literature among patient with  
452 conditions similar to delirium to understand how to support families in their involvement in  
453 delirium care. The literature search performed in the context of this intervention development also  
454 presents limitations. Only one researcher was involved in all steps of identifying, including and  
455 extracting from the literature and the quality of evidence was not assessed. Strengths of this work  
456 include the operationalization of Sidani and Braden's work on nursing intervention development  
457 and a rigorous intervention that is reproducible. The transferability of the nursing-mentoring  
458 approach developed for MENTOR\_D to support families in contexts other than delirium, such as  
459 dementia, is another strength of this work. Finally, the fact that MENTOR\_D was designed so that  
460 it could be provided by the bedside nurse during the potentially restrictive visiting hours of the  
461 ICU is another strength of this work.

### ***Implications for research, practice and policy***

463           The current COVID-19 pandemic stresses the need to review current policies and practices  
464 in terms of family involvement in care. While it is more important than ever to keep families

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465 involved in care, the current pandemic context limits the access to families. New technologies in  
466 terms of video conference and the use of mobile devices at the patient's bedside could support the  
467 translation of the MENTOR\_D intervention to a complete virtual or hybrid intervention. We would  
468 suggest the theoretical underpinnings of MENTOR\_D are transferable to a virtual setting in which  
469 the nurse-mentor would interact virtually with the families and the families could engage virtually  
470 in non-pharmacological interventions with their hospitalized relative. Translating and piloting a  
471 completely virtual MENTOR\_D intervention or a hybrid format should be the next step in terms  
472 of further development for this intervention.

473 Another important takeaway from our experience in developing this intervention is the  
474 need for acute care units to be welcoming to families. Acute care units that replicate models of  
475 care in dementia or pediatric settings, including health professionals willing to collaborate with  
476 families, is a prerequisite for the eventual transfer of interventions involving a family approach  
477 such as MENTOR\_D.

478

## **CONCLUSION**

480 To our knowledge, studies examining family involvement in non-pharmacological delirium  
481 management in the ICU and the support needed to facilitate this involvement are lacking. This  
482 makes it challenging for families to become allies in delirium management in the ICU. There is a  
483 need to develop nursing interventions to support families' involvement and alleviate the  
484 consequences of delirium for both patients and families. MENTOR\_D aims to fill that gap by  
485 providing clear guidance on strategies that can be used by nurses to offer support to families while  
486 highlighting several strategies that families can use at the bedside of a relative with delirium in the  
487 ICU. The refinement process of MENTOR\_D is underway before moving on to a larger trial.

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**TABLES**

**Table 1. Non-pharmacological interventions to support relatives with delirium that could be tailored and used by families.**

- Explain to their relative where he/she is and why
- Use simple and small sentences
- Use close-ended questions
- Stimulate their relative cognitively three times a day, for example by discussing current events, playing games with words, and using reminiscence
- Promote orientation to reality by leaving familiar objects in the room or discussing with their relative while he or she is hospitalized.
- Promote sleep by reducing noise on the unit of care, using ear plugs, or with soothing music
- Mobilize their relative three times a day, for example by helping him or her move from the bed to the chair for each meal, if possible
- Make sure their relative is wearing their visual and hearing aids, if he or she has any
- Encourage adequate hydration
- Split activities in small steps
- Provide clear and precise explanations before beginning any activity
- Promote the presence of the family by encouraging them to visit when possible and call when not possible to visit
- Provide family education on delirium (explain to other relatives who visit the patient in the hospital; remind other relative of the fluctuating nature of delirium)
- Develop and maintain an alliance with the family (or with nursing staff)
- Discuss delirium and associated memories

Note. Barr et al., 2013; Cook et APA, 2004; Inouye et al., 1999 ; AGS, 2014; CCSMH, 2014; NICE, 2012; RNAO, 2016; Bol, Edwards et Heuvelmans, 2003, Brown, 2014, NICE guidelines, 2012

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1 **Table 2. Operationalized strategies for MENTOR\_D.**

Theory of the intervention for MENTOR_D		Operationalised MENTOR_D	
Carative Processes <sup>a</sup>	Functions of a mentor <sup>c</sup>	Information self-efficacy <sup>d</sup>	List of nurse actions <sup>b</sup>
CP 1 Practice of loving-kindness/compassion and equanimity with self/other	Befriend	Emotional state	<ul style="list-style-type: none"> <li>• Show interest towards the family caregiver and their relative’s situation of delirium</li> <li>• Show the family caregiver respect</li> <li>• Avoid judgments</li> </ul>
	Befriend	Emotional state	
	Befriend	Emotional state	
CP 2 Being authentically present; enabling belief system and subjective world self/other	Encourage	Verbal persuasion	<ul style="list-style-type: none"> <li>• Emphasize the efforts of the family caregiver</li> </ul>
CP 3 Cultivating own spiritual practices; beyond ego-self to authentic transpersonal presence	Sponsor	Emotional state	<ul style="list-style-type: none"> <li>• Ask the family caregiver how he or she feels and validate his or her feelings</li> </ul>
CP 4 Sustaining a loving, trusting, and caring relationship	Sponsor	Verbal persuasion	<ul style="list-style-type: none"> <li>• Use active listening</li> <li>• Present oneself</li> </ul>
	Teach		
CP 5 Allowing for expression of feelings; authentically listening and “holding another person’s story for them”	Sponsor	Verbal persuasion	<ul style="list-style-type: none"> <li>• Encourage the expression of the family caregiver’s thoughts and feelings</li> </ul>
CP 6 Creative solution seeking through caring process, full use of self; all ways of knowing/doing/being; engage in artistry of human caring-healing practices and modalities	Sponsor	Verbal persuasion	<ul style="list-style-type: none"> <li>• Help the family caregiver to choose realistic goals</li> <li>• Help the family caregiver to see the difficulties in using interventions</li> <li>• Help the family caregiver to find possible solutions to promote their success in the use of interventions</li> <li>• Provide feedback during the family caregiver’s use of interventions</li> </ul>
	Counsel		
	Counsel		
CP 7 Authentic teaching-learning within context of caring relationship; stay within other’s frame of reference; shift toward a health-healing-wellness coaching model	Teach	Vicarious experience	<ul style="list-style-type: none"> <li>• Share knowledge about delirium and provide specific information on interventions to use (give an example)</li> <li>• Validate the family caregiver understanding of the proposed interventions and set a goal</li> </ul>
	Teach		
	Teach	Performance accomplishment	<ul style="list-style-type: none"> <li>• Assist the family caregiver in formulating questions about the use of delirium management interventions</li> <li>• Suggest to the family caregiver to imagine themselves doing the interventions</li> </ul>
	Teach		
	Teach		
	Teach	Vicarious experience	<ul style="list-style-type: none"> <li>• Suggest to the family caregiver to carry out the intervention with his or her relative</li> <li>• Raise an element that the family caregiver could improve at the next visit with a solution track</li> <li>• Highlight strengths of the family caregiver while he or she uses the interventions</li> <li>• Highlight the caregiver’s strengths during difficult situations that could come up during the use of the interventions</li> <li>• Act as a role model: carry out the interventions with the patient in front of the family caregiver</li> </ul>



**Short Running Title: Family Involvement in Delirium Management**

CP 8 Creating healing environment at all levels; physical/nonphysical, subtle environment of energy, consciousness, wholeness, beauty, dignity, and peace are potentiated	Sponsor	Performance accomplishment	<ul style="list-style-type: none"> <li>• Validate observations of the patient’s condition with the care team to propose adequate interventions to be used by the family caregiver and share this information with the family caregiver</li> </ul>
	Teach	Performance accomplishment	<ul style="list-style-type: none"> <li>• Teach the family caregiver how to use adequate interventions in relation to the patient’s current situation</li> </ul>
	Teach	Performance accomplishment	<ul style="list-style-type: none"> <li>• Offer teaching to the family caregiver in a quiet place</li> </ul>
CP 9 Reverentially and respectfully assisting with basic needs, holding an intentional, caring consciousness of touching the embodied spirit of another as sacred practice, working with life force/life energy/life mystery of another	Befriend	Emotional state	<ul style="list-style-type: none"> <li>• Assist the family caregiver in his or her verbalization of his or her teaching and information needs</li> </ul>
CP 10 Opening and attending to spiritual, mysterious, unknown, and existential dimensions of all the vicissitudes of life, death, suffering, pain, joy, transitions life change; “allowing for a miracle”. All of this is presupposed by a knowledge base and clinical competence.	Befriend	Emotional state	<ul style="list-style-type: none"> <li>• Offer encouragement</li> </ul>

B: operationalised from the literature *Note.* <sup>a</sup> Watson 2008a; Cara et O’Reilly, 2008 <sup>b</sup> Cara, 2003; Watson, 2008b, <sup>c</sup>Anderson et Shannon, 1988, <sup>d</sup> Bandura, 1997.

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5 **FIGURE LEGEND**

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7 **Figure 1. Understanding the Problem**

8 Understanding the problem includes the causative factors of delirium, the nature of the problem,  
9 in addition to the manifestations and consequences.

10

11 **Figure 2. Mentoring-Caring Relationship in MENTOR\_D**

12 The Mentoring-Caring Relationship at the basis of the MENTOR\_D intervention represents the  
13 intersect between the three theoretical components of the framework.