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1 **An integrative systematic review of online resources and** 2 **interventions for people bereaved by suicide**

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31 **Author contributions**

32 **Laurène Lestienne:** Conceptualization, Methodology, Investigation, Writing original Draft

33 **Edouard Leaune:** Conceptualization, Methodology, Investigation, Writing Original Draft

34 **Julie Haesbaert:** Conceptualization, Methodology, Writing – Review & editing

35 **Emmanuel Poulet:** Conceptualization, Supervision, Writing – Review & editing, Validation

36 **Karl Andriessen:** Conceptualization, Supervision, Writing – Review & editing, Validation

37 **Abstract**

38 Suicide bereavement is frequent in the general population and it can have deleterious
39 consequences on the mental health and social functioning of the bereaved individuals.
40 However, those bereaved can face substantial barriers to receive support, and online resources
41 may improve the accessibility of support. This systematic review aimed at examining the use
42 and benefits of online resources dedicated to people bereaved by suicide and appraising the
43 quality of the research in this field.

44 Systematic review according to PRISMA guidelines, involving searches in Pubmed, Scopus
45 and Web of Science, conducted in August 2020. The integrative systematic review involved
46 extracting and merging qualitative and quantitative data. Quality assessment was conducted
47 with the Mixed Methods Appraisal Tool (MMAT).

48 The review included 12 studies, mostly of moderate quality. Online resources are
49 predominantly used by middle-aged women, parents who lost their child by suicide, and
50 recently bereaved individuals. Online resources offer a way for help-seeking around the clock
51 for less educated, more disadvantaged and isolated people. People bereaved by suicide use
52 online resources to seek and share support, share and find information, memorialize their
53 loved one and for meaning-making. Negative effects of online resources are rare.

54 The evidence on the use and benefits of online resources for people bereaved by suicide
55 remains scarce but show encouraging results regarding their positive impact on the mental and
56 psychosocial health of the users.

57 **Highlights**

- 58
- The literature on online resources for people bereaved by suicide is scarce.
 - 59 • Online resources are available around the clock, for disadvantaged, isolated people.
 - 60 • Bereaved individuals seek and share support and information on online resources.
 - 61 • The few data on the benefits of online resources show encouraging results.

62

63 **BACKGROUND**

64 Suicide is a major public health problem worldwide with nearly 800,000 people dying by
65 suicide each year (“WHO,” 2014). In addition, a large part of the population has been
66 bereaved by suicide. It has been estimated that one suicide may affect as many as 135
67 individuals (Cerel et al., 2019). A recent meta-analysis found that the prevalence of
68 experiencing suicide was approximately one in 20 people (4.3%) in the past year and one in 5
69 (21.8%) in a lifetime (Andriessen et al., 2017c). People bereaved by suicide have higher risks
70 of adverse outcomes such as mental and physical illness, suicidal behaviors, and impaired
71 social functioning compared to the general population and to people bereaved by other causes
72 (Groot and Kollen, 2013; Pitman et al., 2014).

73 The grief process following a suicide appears to share similarities with the grief after deaths
74 by other causes (Jordan, 2001; Sveen and Walby, 2008). However, people bereaved by
75 suicide may experience more feelings of rejection, shame, guilt, social stigma and difficulties
76 with meaning-making (Andriessen et al., 2017b; Sveen and Walby, 2008). It has also been
77 established that people bereaved by suicide are less likely to receive informal support and
78 more likely to experience delays in accessing any type of help than people bereaved by other
79 causes (Pitman et al., 2017). Despite the fact that suicide bereavement support (named
80 ‘postvention’) is becoming available in numerous countries (Andriessen et al., 2017b), it
81 seems that a gap remains between the need for help and the actual support received by people
82 bereaved by suicide (McMenamy et al., 2008; Pitman et al., 2018; Sanford et al., 2016;
83 Wilson and Marshall, 2010).

84 Online resources may help to overcome obstacles to receiving support, for example, via their
85 geographic independence, offering support around the clock and easier access than off-line
86 resources. Moreover, some web-based support can be anonymous, which could be important
87 for bereaved individuals who feel shame and social stigma. Overall, it has been estimated that
88 more than half of all bereaved people use digital resources (van der Houwen et al., 2010). The
89 resources specifically for people bereaved by suicide are diverse, and include informative
90 websites about grief and loss, memorial websites, online support groups, and online therapy
91 and counseling (Krysinska and Andriessen, 2013). The most commonly used are support
92 groups, social media and memorial websites (Andriessen et al., 2017b). Nevertheless, despite
93 their availability, little is known about their use by people bereaved by suicide, nor about their
94 potential effects. To date, no systematic review has assessed the evidence regarding the use
95 and benefits of web-based support in this population.

96 To address this gap, this systematic review aimed at investigating what is known of the use
97 and benefits of online resources and interventions available for people bereaved by suicide.
98 Our goal was to study their outcomes in terms of grief, mental health, suicidal behavior, social
99 functioning, needs for help and help-seeking in people bereaved by suicide. Additional aims
100 were to identify potentially working ingredients of online resources and intervention for this
101 population, and to appraise the quality of the research in this field.

102

103 **METHODS**

104 The reviews was based on the Preferred Reporting Items for Systematic Review and Meta-
105 Analyses (PRISMA) statement (Moher et al., 2009). In PICOS terms (WHO, 2012), the
106 review focused on people bereaved by suicide in the general population. The main
107 intervention was the use and effect of any online resource for this population. Studies with or
108 without comparator were eligible. Control groups could include a waiting list group, non-
109 intervention group, other interventions or bereavement by other causes.

110

111 **Inclusion and exclusion criteria**

112 Studies were included if: (a) the study population consisted of people bereaved by suicide
113 from the general community or age-based populations (such as schools and universities), (b)
114 the study used quantitative, qualitative, or mixed-methods, and (c) reported data regarding the
115 use and effects of an online resource or online or social media intervention in the bereaved
116 individuals. Studies were excluded if: (a) the study population did not consist of people
117 bereaved by suicide from the general community or age-based populations, (b) the study did
118 not report on the use or effects of an online resource or intervention, or (c) did not provide
119 original data (such as opinion papers).

120

121 **Article Selection Process**

122 Systematic searches were conducted in Pubmed, Web of science and Scopus. The search
123 string used in Pubmed was [(web OR online OR internet OR digital OR social media) OR
124 (social media OR online systems OR internet [MeSH Terms])] AND ((grief OR grieving OR
125 bereav* OR mourn* OR surviv* OR postvention OR loss) OR (grief OR bereavement OR
126 survivors [MeSH Terms])) AND ((suicid*) OR (suicide [MeSH Terms])). A similar search
127 string was used in the other databases. There were no restrictions regarding location or year of
128 publication. However, the search was limited to peer-reviewed papers published in English
129 and the searches were conducted in August 2020.

130 Two authors (LL and EL) independently selected the studies and extracted the following data:
131 author and year, location (country), study design, study population (demographic variables),
132 intervention setting, inclusion criteria, intervention, outcomes, instruments used, and study
133 results.

134

135 **Data Analysis**

136 We anticipated substantial heterogeneity in study designs, interventions and outcomes
137 reported in the selected studies, which would preclude pooling the statistical data. As the data
138 were expected to be both qualitative and quantitative, we chose to adopt an integrative and
139 convergent method of systematic analysis. Several methods of mixed quantitative and
140 qualitative analysis are available (Dixon-Woods et al., 2005; Mays et al., 2005). Based on the
141 literature, we opted for a data-based convergent synthesis design. Since only one synthesis
142 method is used for all evidence (Hong et al., 2017), data transformation was involved. Hence,
143 quantitative and qualitative data were reviewed, analyzed, and then jointly presented and
144 discussed in the Results and Discussion parts of this review. We conducted a thematic
145 analysis of the qualitative data, following a three-stage process: a) coding text ‘line-by line’,
146 b) development of ‘descriptive themes’ and c) generation of ‘analytical themes’ (Thomas and
147 Harden, 2008). Concerning the measures of use and benefits, we synthesized and combined
148 the data available in each study, weighted depending on the sample size. When possible,
149 quantitative data were aggregated to calculate averages and standard deviations weighted on
150 the sample size of each study. We studied the outcomes of these interventions in terms of
151 grief, mental health, suicidal behavior, social functioning, need for help and help-seeking
152 behaviors.

153

154 **Quality Assessment**

155 The quality of included studies was assessed through the Mixed Methods Appraisal Tool
156 (MMAT) (Hong et al., 2018). The MMAT permits to appraise the methodological quality of
157 five categories of studies: qualitative research, randomized controlled trials, quantitative non-
158 randomized studies (estimating the effectiveness of an intervention or studying other
159 exposures), quantitative descriptive studies (designed to describe the existing distribution of
160 variables without regards to causal relationships) and mixed methods studies (combining
161 qualitative and quantitative methods).

162

163 **Registration**

164 The review protocol was registered in the PROSPERO database (registration number
165 CRD42020188116).

166

167 **RESULTS**

168 **Included Studies**

169 A total of 12 studies published between 2008 and 2020 was included in the review. Figure 1
170 shows the selection process. Four studies had a qualitative design, four were quantitative and
171 four were mixed methods studies (Table 1).

172

173 PLEASE INSERT FIGURE 1 ABOUT HERE

174

175 Three studies were from the United Kingdom (Bailey et al., 2015; Chapple and Ziebland,
176 2011; Hawton et al., 2012), three from Sweden (Silvén Hagström, 2017a, 2017b; Westerlund,
177 2020), two from the United States (Feigelman et al., 2008; Lester, 2012), two from Australia
178 (Bailey et al., 2017; Krysinska and Andriessen, 2015), one from the Netherlands (Kramer et
179 al., 2015) and one from the Netherlands and Belgium (Schotanus-Dijkstra et al., 2014). All
180 studies reported data about the use of online resources, and 8 also reported data about benefits
181 (Bailey et al., 2017, 2015; Chapple and Ziebland, 2011; Feigelman et al., 2008; Hawton et al.,
182 2012; Kramer et al., 2015; Schotanus-Dijkstra et al., 2014; Westerlund, 2020). Included
183 studies focused on online interventions only. No study was found regarding blended
184 interventions (combining online and face to face components) giving data on the online
185 component of the intervention separately from data on the face-to-face component of the
186 intervention.

187 Given the heterogeneity of methods used for data collection, establishing a total sample size
188 of people bereaved by suicide was not possible. Nevertheless, the included studies used two
189 main methods: analysis of written documents posted online and questionnaires and interviews
190 with study participants. Overall, the studies included 1860 chat messages, messages from 21
191 chat threads and 267 memorials, as well as 946 questionnaires and 51 interviews. The
192 characteristics of the included studies are given in Table 1.

193

194 PLEASE INSERT TABLE 1 ABOUT HERE

195

196 **Quality Assessment**

197 The included studies varied in study quality. No total score was calculated as the instrument
198 favors a presentation of the rating of each criterion, detailed in Table 2. Concerning the
199 qualitative and mixed methods studies, the quality criteria were mostly followed. Quantitative
200 descriptive studies showed moderate to high quality with all the criteria met except the
201 representativeness of the population in 3 of the 4 studies (Bailey et al., 2017; Krysinaka and
202 Andriessen, 2015; Schotanus-Dijkstra et al., 2014). Quantitative non randomized studies
203 adhered to few quality criteria, except for the most recent study (Westerlund, 2020).

204

205

PLEASE INSERT TABLE 2 ABOUT HERE

206

207 **Type of Resources**

208 Online support groups was the most described type of resource in the included studies (n=8)
209 (Bailey et al., 2017; Chapple and Ziebland, 2011; Feigelman et al., 2008; Kramer et al., 2015;
210 Schotanus-Dijkstra et al., 2014; Silvén Hagström, 2017a, 2017b; Westerlund, 2020). This
211 included forums, online support groups, and mailing groups. Forums and online support
212 groups were located in websites where users can interact (sometimes anonymous) with each
213 other by posting and replying to messages. They enable users to connect with others
214 worldwide and around the clock. They are mostly managed by moderators, who are frequently
215 users in charge of monitoring posts. Mailing groups operate the same way but use e-mails
216 instead of posts on websites.

217 Five studies focused on online memorials (Bailey et al., 2015; Chapple and Ziebland, 2011;
218 Krysinaka and Andriessen, 2015; Lester, 2012; Westerlund, 2020). Online memorials consist
219 of internet content created in memory of a deceased person. They can be available in web
220 pages dedicated to an individual, memorial web sites and online cemeteries.

221 Three studies concerned the use of Facebook (Bailey et al., 2017, 2015; Chapple and
222 Ziebland, 2011). Facebook is a versatile social media: it can be used both for private
223 messaging and for posting content on public “walls”. Thus, it enables people to communicate
224 with wider networks beyond the immediate relatives of the deceased person. However, it is
225 also possible to maintain an existing account of the deceased person, or to create new pages to
226 memorialize the deceased person, and post messages, photos or links on these pages.

227 Finally, one study was about a booklet for people bereaved by suicide (*Help is at Hand*)
228 available online (Hawton et al., 2012).

229

230 **Use of online resources (n=12)**

231 The use of online resources was aggregated regarding the characteristics of users, the main
232 purposes for using such resources and the description of a particular use compared to control
233 groups.

234

235 *Characteristics of users (n=7)*

236 Information about users of online resources were extracted from the original studies. The user
237 characteristics concerned their age and gender, the person they had lost by suicide and the
238 time since loss (Table 3).

239

240 PLEASE INSERT TABLE 3 ABOUT HERE

241

242 Users were mostly middle-aged individuals, with mean age ranging from 32 to 52 years
243 (Bailey et al., 2017; Kramer et al., 2015; Schotanus-Dijkstra et al., 2014; Westerlund, 2020)
244 or majority around 50 years-old (65% between 41 and 60 years old (Chapple and Ziebland,
245 2011), 49% between 46 and 55 years old (Feigelman et al., 2008)). Seven studies reported
246 information about sex and most participants were female, with rates ranging from 70.0% to
247 96.1% (Bailey et al., 2017; Chapple and Ziebland, 2011; Feigelman et al., 2008; Kramer et al.,
248 2015; Lester, 2012; Schotanus-Dijkstra et al., 2014; Westerlund, 2020). Weighted on the
249 numbers of respondents, the overall average percentage was 87.1 % of females (SD=8.5).

250 In four studies reporting the relationship to the deceased, the larger part of respondents had
251 lost a child (27.6% to 60.8%) (Bailey et al., 2017; Kryszynska and Andriessen, 2015; Lester,
252 2012; Westerlund, 2020). Weighted on the sample size of each study, child bereavement came
253 first with an average of 33% (SD=16.4), followed by the loss of a partner (17%, SD=6.5) and
254 a sibling (17%, SD=3.5), and the loss of a parent (16%, SD=6.9).

255 Five studies provided cross-sectional data about the time since the loss by suicide (Bailey et
256 al., 2017; Kramer et al., 2015; Kryszynska and Andriessen, 2015; Schotanus-Dijkstra et al.,
257 2014; Westerlund, 2020). Around two thirds of users of online resources were bereaved for
258 less than five years (from 64.4% to 72%). More precisely, we measured that 31% (SD=12) of
259 them were in their first year of bereavement, 39% (SD=10.5) between 1 and 5 years and 29%
260 (SD=4.1) were bereaved for more than five years.

261 Regarding accessing other types of support, four studies showed that most users of online
262 resources also benefited from face-to-face counseling or support (Bailey et al., 2017; Chapple
263 and Ziebland, 2011; Kramer et al., 2015; Westerlund, 2020).

264

265 *Purposes of use (n=11)*

266 Four main themes stand out both in quantitative and qualitative studies concerning the
267 purposes of using an online resource. Seeking and sharing support was the most frequently
268 described theme, followed by the needs for information, memorialization, and meaning
269 making.

270

271 *Seeking and sharing support (n=10)*

272 The most frequent reported reason for using online resources was to seek and share support
273 (Bailey et al., 2017, 2015; Chapple and Ziebland, 2011; Feigelman et al., 2008; Kramer et al.,
274 2015; Krysinska and Andriessen, 2015; Schotanus-Dijkstra et al., 2014; Silvé Hagström,
275 2017a, 2017b; Westerlund, 2020). Three main reasons were reported by users regarding help
276 and support offered by online resources, namely: a) being in contact with peers (n= 6); b)
277 provide help and support to others (n= 5) and c) discussing taboo or stigmatized topics (n= 4).
278 Looking for contact with peers (Kramer et al., 2015), having discussions with other people in
279 a similar situation (Silvé Hagström, 2017a, 2017b; Westerlund, 2020), starting new threads
280 of discussion and actively seeking support from other members (Bailey et al., 2017;
281 Westerlund, 2020), were listed as reasons for joining or being active online.

282 Offering help and support to others by replying to messages (Bailey et al., 2017), enabling
283 users to offer help to cope with the pain and sadness of loss (Feigelman et al., 2008), and
284 providing support or empathy (Schotanus-Dijkstra et al., 2014; Westerlund, 2020) was also
285 reported as a reason to use online resources.

286 Four studies raised the importance of the internet offering a safe place to discuss taboo or
287 stigmatized topics (Bailey et al., 2015; Feigelman et al., 2008; Silvé Hagström, 2017a,
288 2017b).

289

290 *Information (n=7)*

291 It seemed that the type of information sought through the internet evolved according to the
292 time elapsed after the death. In the immediate aftermath of the loss, studies highlighted e-mail
293 and social networking as ways to inform relatives about the death, with easy and simultaneous
294 access for a wider network beyond the immediate entourage (Bailey et al., 2015; Chapple and
295 Ziebland, 2011). Seeking information for bereaved people, such as explanations about the
296 grief process, how to tell others, or other practical issues were also cited as important reasons
297 for using online resources (Feigelman et al., 2008; Hawton et al., 2012; Kramer et al., 2015;
298 Westerlund, 2020). Finally, a few studies reported about sharing information with others, such

299 as advice or links related to suicide prevention in order to raise awareness and improve the
300 availability of mental health resources (Bailey et al., 2015; Feigelman et al., 2008; Krysinska
301 and Andriessen, 2015; Westerlund, 2020).

302

303 *Memorialization (n=5)*

304 Memorializing one's lost loved one was mostly reported in the studies concerning online
305 memorials and Facebook use (Bailey et al., 2015; Chapple and Ziebland, 2011; Krysinska and
306 Andriessen, 2015; Westerlund, 2020), but it was also valued in one study concerning online
307 forums (73% of study participants reported it) (Feigelman et al., 2008). It was pointed out that
308 online resources enabled to commemorate the deceased and facilitated the continuing social
309 presence of the deceased person. Studies also highlighted the use of online memorials in
310 addition to traditional physical memorials (Bailey et al., 2015; Chapple and Ziebland, 2011).

311

312 *Meaning making (n=4)*

313 Meaning making was reported as a challenging aspect of the grief process and a reason for
314 using online resources (Feigelman et al., 2008; Krysinska and Andriessen, 2015; Silvén
315 Hagström, 2017a, 2017b). Forums enabled discussions between members about the meaning
316 of the suicide, and allowed expression of personal feelings such as guilt, shame, and anger.
317 Members discussed suicide, for example, as an involuntary act caused by depression, a failure
318 of society and health care, or a voluntary, intentionally and blameworthy act (Silvén
319 Hagström, 2017a, 2017b). One study analyzed the content of 250 memorials and found that
320 34.4% of memorials expressed the desire to understand "why" the suicide had happened and
321 presented the bereaved person's perceived explanations for the suicide (Krysinska and
322 Andriessen, 2015).

323

324 *Particular use compared to control groups (n=2)*

325 One cross sectional study compared 17 online memorials written by people bereaved by
326 suicide with 17 memorials written by people bereaved by other causes (Lester, 2012). Over
327 the 73 items compared 13 were significantly different, showing that postings from suicide
328 survivors had longer sentences and longer words, fewer references to the deceased person
329 ("you"), more references to death, anger and sadness, and fewer references to insight and
330 understanding.

331 Another cross sectional study compared people bereaved by suicide attending face-to-face
332 groups with those attending online groups in the USA (Feigelman et al., 2008). The study

333 reported that users of Internet support groups were significantly younger ($p=0.002$), more
334 frequently women ($p<0.001$), less educated ($p=0.02$), with lower incomes ($p=0.02$), less
335 religious ($p=0.002$), more often divorced or separated ($p=0.03$) and living alone ($p<0.001$).
336 Online support group users also reported to have experienced more unhelpful responses from
337 their families ($p=0.006$) and other relatives ($p=0.0001$). Lastly, these users were more recently
338 bereaved with an average time since loss of 4 years compared to 6 years in face-to-face
339 groups ($p=0.001$).

340

341 **Benefits (n=8)**

342 Studies assessed the effects of resources in different ways, including perceived benefits,
343 measurement of benefits, one comparison with a control group, and negatives aspects.

344

345 *Perceived benefits (n=7)*

346 Seven studies reported beneficial aspects of using online resources (Bailey et al., 2017;
347 Chapple and Ziebland, 2011; Feigelman et al., 2008; Hawton et al., 2012; Kramer et al., 2015;
348 Schotanus-Dijkstra et al., 2014; Westerlund, 2020). The easy access and the possibility to use
349 it around the clock were most frequently mentioned (Bailey et al., 2017; Chapple and
350 Ziebland, 2011; Feigelman et al., 2008; Westerlund, 2020), followed by the anonymity
351 offered by the Internet, as well as being able to openly discuss grief-related issues and being
352 able to find recognition without feeling judged (Chapple and Ziebland, 2011; Kramer et al.,
353 2015; Westerlund, 2020). One study involving online forum users reported that more than
354 80% of participants agreed that using the online forum helped them to feel less alone, to cope
355 with distress and sadness, to go through difficult times (such as an anniversary), and found it
356 beneficial to help others who were struggling (Bailey et al., 2017). However, the study of
357 Kramer et al. (2015) found that 22.3% of users of an online forum experienced benefit from
358 taking part in the forum, 40.1% experienced “a bit of profit” and 37.6% did not experience a
359 benefit after 12 months of participating in the forum. One study evaluated the usefulness of an
360 online booklet for people bereaved by suicide (Hawton et al., 2012). All users rated the
361 content of the resource as helpful or extremely helpful, especially within the first month
362 following the loss.

363

364 *Measured benefits (n=2)*

365 Two studies investigating well-being and psychosocial health of users measured benefits
366 (Kramer et al., 2015; Westerlund, 2020). Kramer et al. (2015) evaluated in a longitudinal

367 cohort the changes in well-being, depressive symptoms, grief and suicide risk, at baseline, 6
368 months and 12 months after using an online forum. The study reported a significant increase
369 in well-being (*WHO-5 Well-being Index*: 38.45 (SD=21.81) to 46.27 (SD=23.48); $p<0.001$)
370 and a decrease in depressive symptoms (*Center for Epidemiological Studies depression Scale*:
371 23.59 (SD=12.21) to 20.12 (SD=12.81); $p<0.001$) at 12 months. The pre-post effect was small
372 to medium for well-being (6 months: $d= 0.24$; 12 months: $d=0.36$) and small for depressive
373 symptoms (6 months: $d= 0.18$; 12 months: $d=0.28$). There were no significant changes in grief
374 symptoms (*Inventory of Traumatic Grief*: 80.66 (SD=20.24) to 78.18 (SD=21.11; $p=0.08$)),
375 and suicide risk (Mini International Neuropsychiatric Interview assessed medium to high risk
376 for suicide : 20,8% at baseline and 17,2% at 12 month).

377 Westerlund (2020) conducted a cross sectional survey to investigate potential predictors of
378 satisfaction with psychosocial health (Westerlund, 2020). Online support group activity was
379 found to be significantly associated with satisfaction regarding psychosocial health ($p<0.001$),
380 while memorial website activity showed a tendency to a negative association, almost reaching
381 significance ($p= 0.05$).

382

383 ***Comparison to control group (n=1)***

384 Feigelman et al. (2008) evaluated the differences in grief difficulties reported by users of
385 online support groups compared to face-to-face affiliates in a non-randomized cross sectional
386 survey. The users of online support groups scored higher on the Grief Experience
387 Questionnaire (GEQ) (Barrett and Scott, 1989) compared to users of face-to-face groups
388 ($M=43.9$ vs $M=38.4$, measure of significance not reported). Nevertheless, the interpretation of
389 the result was hampered as there were differences between the two groups regarding
390 demographic characteristics, time since loss, and greater stigmatization felt by users in the
391 online group, which may operate as confounding factors.

392

393 ***Negative aspects (n=6)***

394 Some studies raised concerns about the potentially negative effects of Internet use, even if no
395 adverse effect was reported (Bailey et al., 2017, 2015; Chapple and Ziebland, 2011; Hawton
396 et al., 2012; Kramer et al., 2015; Schotanus-Dijkstra et al., 2014). A major concern was about
397 the content of the messages, which could be too negative or depressing (Chapple and
398 Ziebland, 2011; Kramer et al., 2015) or upsetting for some people reading conversations or
399 talking to others (the only concern rated by more than 10% of the sample) (Bailey et al.,
400 2017). Users also reported as a limitation of forum use the presence of people who

401 deliberately start arguments, or post material intended to offend or upset others (9.5% agreed),
402 the lack of action of moderators to help members who indicated they were upset (5.4%
403 agreed) and to remove upsetting posts (4.5% agreed) (Bailey et al., 2017).

404 The need for more structure (Kramer et al., 2015) and for a sooner and more widely
405 availability (Hawton et al., 2012), as well as the fear that accessing resources via a screen
406 might not be as helpful as face-to-face for some people (Chapple and Ziebland, 2011),
407 highlighted the concern that online resources may be a good way for reaching people, but
408 should complement rather than replace other resources (Hawton et al., 2012). Some studies
409 raised specific fears: using online resources could be too time consuming; there could be a
410 risk of becoming overly attached to an online content that may disappear, or a risk of
411 increasing loneliness if responses to messages were too slow or when the online activity
412 would slow down over time (Bailey et al., 2015; Chapple and Ziebland, 2011). Finally, one
413 study found that most users (90% of 222 respondents) disagreed with a statement that the use
414 of online forums increased the risk of suicidal ideation in the users, and less than 2% agreed
415 with the statement (Bailey et al., 2017).

416

417 **DISCUSSION**

418 This first review systematically assessed the reported use and benefits of online resources for
419 people bereaved by suicide. The review identified a limited number of studies, mostly of
420 moderate quality. Second, it appeared that online resources were mostly used by middle-aged
421 people, women, parents who have lost a child by suicide, and recently bereaved individuals.
422 Online resources offer a way for help-seeking for people who may be less educated, more
423 socially disadvantaged and isolated. People bereaved by suicide use online resources mostly
424 to seek and share support, share and find information, memorialize their loved one and for
425 meaning-making. Few studies have reported on the benefits of online resources. However, the
426 findings showed mixed but encouraging results on the mental health and psychosocial health
427 of the users.

428 Despite an increase in suicide bereavement research over the last decades (Andriessen, 2014;
429 Maple et al., 2018), there is a lack of evidence concerning online resources in this field,
430 making it difficult to establish robust conclusions. The generalizability of the findings must
431 thus be considered with caution. However, both quantitative and qualitative data were
432 consistent across studies. This lack of evidence indicates the urgent need to perform high-
433 quality research, as our review showed that people bereaved by suicide actively use online
434 resources in their grief process.

435 Concerning the use of online resources, our results are consistent with the reported need for
436 support after a suicide of someone close (Oexle and Sheehan, 2020; Pitman et al., 2018). They
437 also confirm the importance of discussing the meaning of the suicide and the struggles with
438 “why”-questions (Andriessen et al., 2017b; Jordan, 2001). However, despite the sources of
439 information available online (Krysinska and Andriessen, 2010), the need for information for
440 oneself or to share with others seems to remain unfulfilled. Interestingly, we found that online
441 resources may enhance early access to help and support for people bereaved by suicide, for
442 whom the need for early and pro-active postvention initiatives was recently reported (Ligier et
443 al., 2020). However, this result has to be interpreted with caution due to the cross-sectional
444 design of studies. When comparing participants in online supports groups to face-to-face
445 groups, Feigelman et al. (2008) found that users of Internet groups were significantly
446 younger, more frequently women, less educated, with lower incomes, less religious, more
447 often divorced or separated and living alone. They were more recently bereaved and had
448 experienced more stigmatizing responses from their family and other relatives. As such, the
449 finding indicates that online resources may be particularly interesting to reach people who
450 might otherwise not be able to access the support they need due to social barriers. Moreover,
451 our review demonstrated that online resources for suicide bereavement are an addition, rather
452 than a substitute for other sources of support.

453 Despite a shortage of evidence of effectiveness of online resources, most studies reported
454 perceived benefits (Bailey et al., 2017; Chapple and Ziebland, 2011; Feigelman et al., 2008;
455 Hawton et al., 2012; Kramer et al., 2015; Schotanus-Dijkstra et al., 2014; Westerlund, 2020)
456 such as the possibility to use the resources around the clock and to discuss grief-related topics
457 without being judged. Having online access to support from other people bereaved by suicide
458 was also highly valued, which is in line with what is known about the experienced value of
459 peer suicide bereavement support (Bartone et al., 2019). Finally, some potentially negative
460 aspects of web-based resources were reported as concerns rather than actual experiences. The
461 need for a sooner and more widely access to the resources was reported, the risk to spend too
462 much time on the Internet or to become overly attached to it, (Bailey et al., 2015; Chapple and
463 Ziebland, 2011; Hawton et al., 2012), as well as the content which could be too negative,
464 depressing or upsetting (Bailey et al., 2017; Kramer et al., 2015). We also found that people
465 bereaved by suicide who use online resources are more vulnerable and at-risk regarding
466 psychosocial and mental health, so that their exposure to online content could be damaging
467 (Feigelman et al., 2008). However, this seemed to be mitigated by the work of moderators

468 who facilitate the use of online resources and guarantee the safety for the users (Bailey et al.,
469 2017).

470

471 Studies included in this review reported various outcomes and used a range of measures and
472 methods, which may hinder a univocally interpretation of the results. However, the data fitted
473 the criteria for outcomes defined a priori for this systematic review.

474 In terms of grief reactions, most users of online resources confirmed the importance of finding
475 information about mourning and discussing grief-related topics, which could be taboo or
476 stigmatized topics offline. However, only one prospective longitudinal cohort (Kramer et al.,
477 2015) assessed the evolution of grief reactions measured with the Inventory of Traumatic
478 Grief and reported no improvement after 12 months.

479 This raises the question of assessing grief reactions after suicide more precisely. While there
480 are commonalities in grief reactions across modes of death (Jordan, 2001; Sveen and Walby,
481 2008), people bereaved by suicide may experience more feelings of rejection, guilt, shame
482 and stigma (Andriessen et al., 2017b; Sveen and Walby, 2008). Assessment of suicide grief
483 should take these grief reactions into consideration in addition to measurement of more
484 generic grief reactions such as feelings of sadness and anger. People bereaved by suicide are
485 also more susceptible to complicated grief reactions (Mitchell et al., 2005) and face specific
486 mental health challenges compared to complicated grief from other causes of death (Tal et al.,
487 2017). To enhance the effect of online grief support after suicide, accurate assessment is
488 essential to evaluate the impact of online resources and to identify and orientate users who
489 may need these or other sources of support. Future studies should involve standardized
490 instruments of grief after suicide, control groups, randomization, and both short- and long-
491 term follow-up.

492 Concerning mental health, both perceived benefits and evaluated increases in well-being and
493 decreases in depressive symptoms indicate positive effects associated with the use of online
494 resources. However, no significant effect on grief symptoms was reported. Although negative
495 aspects on mental health were raised, few were actually reported. While further investigations
496 may shed light on the occurrence of such negative effects, clinicians should stay vigilant
497 about their appearance. In this context, the role of moderators should be more specifically
498 studied and defined as they monitor the use of online resources. This implies making sure that
499 there are no posts intended to offend or upset users, which may contribute to the prevention of
500 negative effects. Also, the ability to identify the appearance of potential adverse effects would
501 improve quality control.

502 It is remarkable to note that only two studies collected data on suicide risk (Bailey et al.,
503 2017; Kramer et al., 2015), which is known to be increased in people bereaved by suicide
504 (Andriessen et al., 2017b; Groot and Kollen, 2013). No change in suicidal risk was measured
505 (Kramer et al., 2015) and having suicidal thoughts after using forums was the least reported
506 negative aspect (Bailey et al., 2017). Nevertheless, suicide risk in the context of online
507 resources represents an important issue, which warrants further attention from clinicians and
508 researchers.

509 Finally, both qualitative and quantitative findings identified the need for help and help-
510 seeking, as the most important reason for joining and being active in online resources. It
511 confirms that the important need for support in people bereaved by suicide is often not
512 fulfilled, and that online resources are a much-needed addition to available, mostly in-person,
513 resources.

514

515 **Strengths and limitations**

516 This first systematic review addressed an important gap in the literature regarding the use and
517 effects of online resources on people bereaved by suicide. The integrative and convergent
518 analysis of both quantitative and qualitative data, offering an in-depth understanding of the
519 use and benefits of web-based resources for people bereaved by suicide, constitutes a major
520 strength of this review.

521 Nonetheless, the review has several limitations. First, the number of included studies is rather
522 low. The overall sample of people bereaved by suicide was difficult to assess given the
523 diversity of data reported by each study. Second, included studies had heterogeneous
524 methodological designs and outcome assessments. Their quality was moderate, which limits
525 the strength of our conclusions. Third, the studies have been conducted in four countries,
526 which may restrict the generalizability of our findings. However, the ability to access web-
527 based resources regardless of country of origin, and the resources often being available in
528 different languages could potentially reduce this bias. Fourth, only two studies used control
529 groups in their assessment and none used randomization.

530

531 **Implications**

532 This review provided clues concerning potentially working ingredients of online resources,
533 valued by users. More specifically, it identified a need for widely and easily accessible
534 resources, available shortly after the loss and around the clock, and including practical
535 information and ways to seek and share supports between users. These type of resources are

536 particularly important to explore in the context of COVID-19 pandemic, both with regard to
537 the impact of physical distancing on face-to-face resources and the self-isolation
538 consequences on mental health. Further high-quality research using standardized measures
539 and comparators, must be conducted to assess the acceptability and effectiveness of such
540 resources.

541 Prospective randomized controlled studies are especially needed to better examine the use and
542 benefits of online resources for people bereaved by suicide in both short- and long-term. User-
543 centered studies evaluating the design and implementation of innovative, adaptive and
544 blended resources would be of great interest to offer an in-depth understanding of how
545 effective support can be proposed for suicide bereavement. The impact of online resources on
546 grief reactions and suicide risk should notably be more widely evaluated as evidence is
547 lacking for these outcomes.

548 Moreover, it is essential to identify and orientate users who may need further outreach, and
549 the potential role of moderators in this context should be clarified. In addition, machine
550 learning may be another way of identifying suicidal ideation in online media (Tadesse et al.,
551 2019). Its involvement in monitoring suicide risk for people bereaved by suicide using online
552 resources would increase quality control and safety of such resources.

553 Finally, previous research identified priorities for the future of postvention, such as
554 intercultural collaboration, theory-driven research and building bounds between research and
555 practice (Andriessen et al., 2017a). The development of online resources could fit well within
556 such priorities, as their development requires collaboration between practice and research and
557 may result in resources available across geographical boundaries.

558

559 **Conclusion**

560 This systematic review found some evidence on the use and benefits of online resources for
561 people bereaved by suicide, with mixed but encouraging results on their positive impact on
562 the mental and psychosocial health of the users. High-quality research is urgently needed to
563 strengthen the evidence-base in this field as people bereaved by suicide actively use online
564 resources in their grief process.

565

566 **Figure 1. Flow chart diagram of study selection according to the PRISMA guidelines**

567 **Table 1. Characteristics of the studies included in the integrative systematic review**

568 **Table 2. Quality assessment following the MMAT criteria**

569
570

Table 3. Characteristics of users of online resources for people bereaved by suicide

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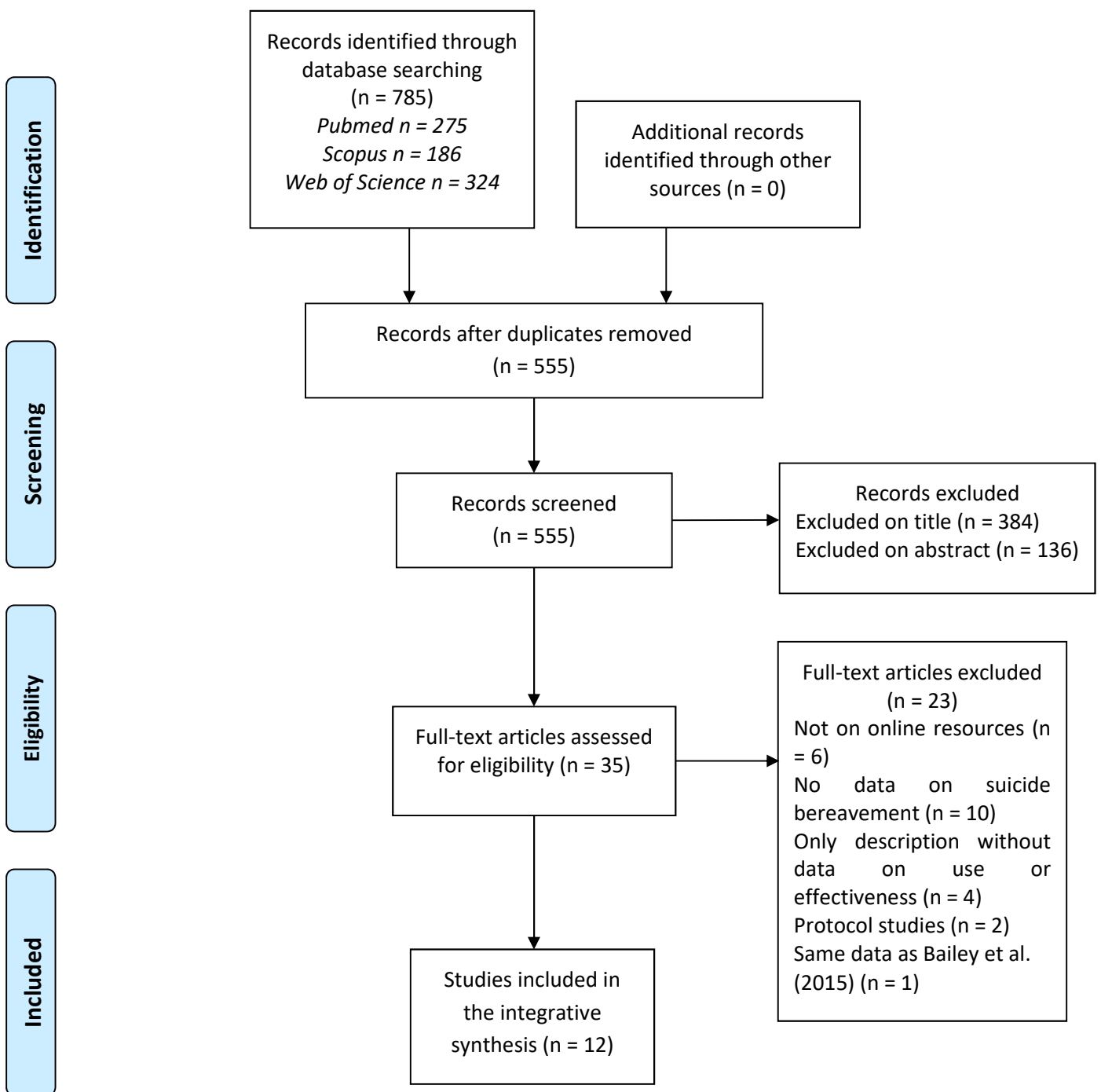


Figure 1. Flow chart diagram of study selection according to the PRISMA guidelines

Author (year)	Country	Study design	Sample	Type of resource(s)
Feigelman et al. (2008)	USA	Quantitative non-randomized: online survey	104 participants	Forums
Chapple et al. (2011)	UK	Qualitative: individual interviews	40 participants	Forums, memorials, Facebook
Hawton et al. (2012)	UK	Mixed-method: survey, focus-groups and individual interviews	23 participants	Booklet available online
Lester (2012)	USA	Quantitative non-randomized: quantitative analysis of memorial messages	17 memorials	Memorials
Schotanus-Dijkstra et al. (2014)	Netherlands and Belgium	Mixed-method: qualitative and quantitative analysis of forums messages	1250 messages 165 bereaved people	Forums
Bailey et al. (2014)	UK	Qualitative: individual interviews	11 participants	Facebook, memorials
Krysinka and Andriessen (2015)	Australia	Mixed-method: qualitative and quantitative analysis of memorials messages	250 memorials	Memorials
Kramer et al. (2015)	Netherlands	Mixed-method: online cohort and individual interviews	270 participants	Forums
Hagström et al. (2016)	Sweden	Qualitative analysis of forums messages	610 chats messages	Forums
Hagström et al. (2017)	Sweden	Qualitative analysis of forums messages	Messages from 21 chats threads	Forums
Bailey et al. (2017)	Australia	Quantitative descriptive: online survey	222 participants	Forums, Facebook
Westerlund (2020)	Sweden	Quantitative non-randomized: online survey	327 participants	Forums, memorials

Table 1. Characteristics of the studies included in the integrative systematic review

Methodological quality criteria for each type of study**	Chapple et al. (2011)	Bailey et al. (2014)	Hagström et al. (2016)	Hagström et al. (2017)	Hawton et al. (2012)	Schotanus-Dijkstra et al. (2014)	Krysinka and Andriessen (2015)	Kramer et al. (2015)	Lester (2012)	Feigelman et al. (2008)	Bailey et al. (2017)	Westerlund (2020)
S1. Are there clear research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S2. Do the collected data allow to address the research questions?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1.1. Is the qualitative approach appropriate to answer the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
1.2. Are the qualitative data collection methods adequate to address the research question?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
1.3. Are the findings adequately derived from the data?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
1.4. Is the interpretation of results sufficiently substantiated by data?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
3.1. Are the participants representative of the target population?	-	-	-	-	-	-	-	CT*	CT*	Yes	-	CT*
3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	-	-	-	-	-	-	-	Yes	No	Yes	-	Yes
3.3. Are there complete outcome data?	-	-	-	-	-	-	-	No	Yes	Yes	-	Yes
3.4. Are the confounders accounted for in the design and analysis?	-	-	-	-	-	-	-	No	No	No	-	Yes
3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	-	-	-	-	-	-	-	Yes	CT*	CT*	-	Yes

4.1. Is the sampling strategy relevant to address the research question?	-	-	-	-	Yes	Yes	Yes	-	-	-	Yes	-
4.2. Is the sample representative of the target population?	-	-	-	-	CT*	CT*	CT*	-	-	-	CT*	-
4.3. Are the measurements appropriate?	-	-	-	-	Yes	Yes	Yes	-	-	-	Yes	-
4.4. Is the risk of nonresponse bias low?	-	-	-	-	No	Yes	Yes	-	-	-	Yes	-
4.5. Is the statistical analysis appropriate to answer the research question?	-	-	-	-	Yes	Yes	Yes	-	-	-	Yes	-
5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	-	-	-	-	Yes	No	Yes	Yes	-	-	-	-
5.2. Are the different components of the study effectively integrated to answer the research question?	-	-	-	-	Yes	Yes	No	Yes	-	-	-	-
5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	-	-	-	-	Yes	Yes	Yes	Yes	-	-	-	-
5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	-	-	-	-	Yes	Yes	Yes	Yes	-	-	-	-
5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	-	-	-	-	No	Yes	Yes	No	-	-	-	-

*CT stands for “can’t tell”, meaning the study do not report appropriate information to answer.

** Each type of study is evaluated with specific criteria. Letter/Number before it refers to the type of study as followed : Sx : Screening questions for all types of studies ; 1.x : Qualitative study ; 3.x : Quantitative non randomized study ; 4.x : Quantitative descriptive study ; 5.x : Mixed Methods study ; Number 2 doesn’t appear because it refers to Quantitative randomized study, not represented in this review

Table 2. Quality assessment following the MMAT criteria

Author (year)	Lester (2012)	Schotanus-Dijkstra et al. (2014)	Krysinka and Andriessen (2015)	Kramer et al. (2015)	Bailey et al. (2017)	Westerlund (2020)
Age (mean)	-	32.0	-	42.9	52.3	47
Female (%)	88.2	70.0	-	87.2	94.6	90.0
Person lost* (%)						
Child	52.9	9.0	27.6	20.4	60.8	40.1
Partner	11.8	21.0	8.0	27.0	13.5	16.5
Parent	5.9	24.0	9.6	25.2	8.6	13.8
Sibling	23.5	19.0	13.6	21.1	11.7	18.7
Friend	-	6.0	8.4	7.8	28.4	4.0
Other	5.9	11.0	10.0	7.8	34.7	7.0
Acquaintance	-	-	-	-	26.6	-
Unknown	-	10.0	22.8	-	-	-
Time since loss (%)						
< 12 Month	-	47.0	44.8	32.2	14.9	21.4
1-5 Years	-	25.0	26.4	37.4	49.5	49.9
> 5 Years	-	20.0	28.8	30.4	34.7	28.7
Unknown	-	8.0	-	-	-	-

* Total may exceed 100% as some respondents were affected by more than one loss

Table 3. Characteristics of users of online resources for people bereaved by suicide