REVIEW

The association of time since spousal loss and depression in widowhood: a systematic review and meta-analysis

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Abstract

Purpose To conduct a systematic review and meta-analysis examining the association of the prevalence of depression and time since spousal loss in widowed people.

Methods The databases MEDLINE, Embase and PsycInfo were searched (May 2017) for papers reporting on time since spousal loss in widowed people and the prevalence of common mental disorders. A systematic review was conducted according to MOOSE guidelines. Random effects meta-analyses of the prevalence of depression were conducted by intervals of time since spousal loss.

Results The literature search identified 12,982 studies of which 22 were eligible for inclusion in the systematic review. Of these, 14 were furthermore eligible for inclusion in the meta-analysis. The summary estimates found in the meta-analysis for the prevalence of depression in the intervals of time since spousal loss were: ≤ 1 month: 38.2% (21.9–55.8%); > 1 month to 3 months: 25.0% (17.3–33.5%); > 3 months to 6 months: 23.1% (18.0–28.7%); > 6 months to 12 months: 19.4% (15.2–24.0%); > 12 months to 18 months: 11.1% (5.3–18.7%); > 18 months to 24 months: 15.2% (12.3–18.2%); > 24 months to 60 months: 10.5% (4.3–18.5%).

Conclusion Widowhood is associated with a high prevalence of depression and the study identifies a population group needing special attention in daily clinical practice. The prevalence is highest in the first month of widowhood, however, continues to be high at least 5 years into widowhood.

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Introduction

Death of a spouse is a major life event associated with a high prevalence of common mental disorders, including anxiety and depressive disorders [1, 2]. Two systematic review and meta-analyses have shown that the overall prevalence of depression in widowhood is about 17–20% when using full diagnostic criteria [1, 2]. In epidemiologic studies of widowed people in the community, the prevalence of depressive symptoms according to depression screening scales range between 7% in the lower and 88% in the upper end [3, 4]. A recent meta-analysis shows that the pooled prevalence estimate of depression in widowhood is as high as 40% when using screening scales [1]. In comparison, the pooled prevalence estimate of depression in the background population in the community is 8.5% and 17%, respectively, depending on whether full diagnostic criteria or screening scales are used [5]. Thus,

widowed people are at a high risk of suffering from clinically significant depressive symptoms.

To understand this phenomenon, several studies have been conducted examining possible mediators such as a certain age group [6–8], sex [9–11] or even loss by a specific cause of death [12–14]. These are all important measures to understand who are at risk of developing depression in widowhood.

Zisook has examined several risk factors of depression in widowhood including the longitudinal association [15]. That is, the association of time since spousal loss and the prevalence of depression. The study found that when using full diagnostic criteria, the prevalence of depression decreases with increasing time since spousal loss from about 24% 1 month after spousal loss to 14% after 2 years of widowhood [15]. A similar trend of a decreasing prevalence is seen in the studies by Harlow [16] and Turvey [6], who both use the Center for Epidemiologic Studies Depression Scale (CES-D). Although several studies of the longitudinal association exist, there are no reviews or summary estimates of the prevalence of depression and the association with time since spousal loss. This is important as it provides information on not only who is at risk, but also when they are at risk, which is important knowledge when designing and implementing interventions preventing depression.

The aim of this study was to conduct a systematic review and meta-analysis of the longitudinal association of depression or other common mental disorders in widowhood by examining the association of the prevalence and time since spousal loss.

Methods

This systematic review and meta-analysis was conducted in accordance with Meta-analysis of Observational Studies in Epidemiology (MOOSE) guidelines [17]. Before beginning the review, the PROSPERO and the Cochrane database of systematic reviews and MEDLINE were searched (December 13 2016) [18–20]. No existing or on-going reviews with overlapping research questions were found. The protocol was developed guided by Standards for Systematic Reviews by the Institute of Medicine and the PRISMA-P checklist [21–23]. The protocol was registered on PROSPERO prior to conducting the systematic review and can be accessed at http://www.crd.york.ac.uk/prospero/display_record.php?RecordID=65197 [24].

Search strategy

MEDLINE, Embase and PsycInfo were searched from the earliest record in the databases until May 19, 2017. The search strategies consisted of a combination of search terms regarding widowhood and common mental disorders and were reviewed by a research librarian. The full search strategy for each database is available in Online Supplementary 1. Two researchers individually assessed the eligibility of studies according to the inclusion criteria using the literature-screening software Covidence [25]. In cases of disagreement, a third investigator was involved.

Eligibility criteria

Studies were eligible if they: (1) examined the prevalence of common mental disorders in widowed people, (2) stated the time since spousal loss for the widowed people, (3) were conducted in a community setting, (4) using a validated screening scale or full diagnostic criteria of the disorder and (5) were published as an original paper in a peer-reviewed journal. There were no restrictions on age or sex for the participants. There were no predefined restrictions on language. Conference and dissertation abstracts were excluded.

Data extraction and quality assessment

Data were extracted by the first author according to the pre-specified form in the study protocol [24]. For control, a second reviewer independently extracted data from a random sample of 10% ($n = 12$) of all papers screened relevant for inclusion during the full-text screening. No discrepancies between the two extractions were found. The papers screened eligible for inclusion were quality assessed using a version of the Newcastle–Ottawa Quality Assessment Scale [26] modified for this review specifically [27, 28]. The full quality assessment manual and form are available in Online Supplementary 2. Studies were quality assessed by two reviewers independently and were reassessed if disagreement between ratings was found.

Definition of time since spousal loss for meta-analysis

Intervals of time since spousal loss for the meta-analysis were defined in terms of what would be meaningful in a clinical setting if preventive interventions were to be made. The intervals of time since spousal loss were: (1) between day zero and 1 month, (2) above 1 month and until 3 months, (3) from above 3 months and until 6 months, (4) from above 6 months and until 1 year, (5) above 1 year and until 18 months, (6) above 18 months and until 2 years, and (7) above 2 years and until 5 years since spousal loss.

Eligible studies were divided into the time intervals according to time since spousal loss stated in the papers. As the different studies reported time since spousal loss differently, the measurements were categorized according to either: (1) the specific point in time stated (2) the mean if the range of the interval was within one of the predefined time intervals or (3) the interval itself if no mean was given and the range of the interval was within one of the predefined time intervals. Measurements overlapping two or more of the predefined time intervals were not eligible for inclusion in the analysis.

Data-analysis

A pooled prevalence estimate was calculated using random effects meta-analysis of proportions for each interval of time since spousal loss in the statistical software Stata 15 [29]. In-group heterogeneity was assessed using I^2 [30]. The association of time since spousal loss and the prevalence of depression was assessed by linear regression of the midpoint of each interval in months and the pooled prevalence estimate for the interval calculated in the meta-analysis. Publication bias was evaluated by visual inspection of the funnel plot of the log-odds against standard error and statistically by Egger's test of small study effect [31, 32]. Level of statistical significance was set at $p < 0.05$. Exploration of subgroups in the review was made in accordance with the protocol.

Results

Literature identification and study characteristics

A total number of 12,982 records were identified in the literature search. Figure 1 shows the flow of the literature screening and selection, which resulted in identification of 22 studies eligible for inclusion in the systematic review [4, 6–8, 10, 11, 15, 16, 33–46]. Of these, 14 studies were furthermore eligible for inclusion in the meta-analysis [6, 8, 11, 15, 16, 33, 35–41, 45].

The 22 studies included 14 longitudinal cohort studies and 8 cross-sectional studies and were conducted between 1968 and 2013. The methods of assessing depression in the studies included both clinical diagnoses according to diagnostic criteria as well as screening scales using cutoff scores. Method of assessment and further characteristics are presented in Table 1. Quality assessment scores are presented in Online Supplementary Table 1.
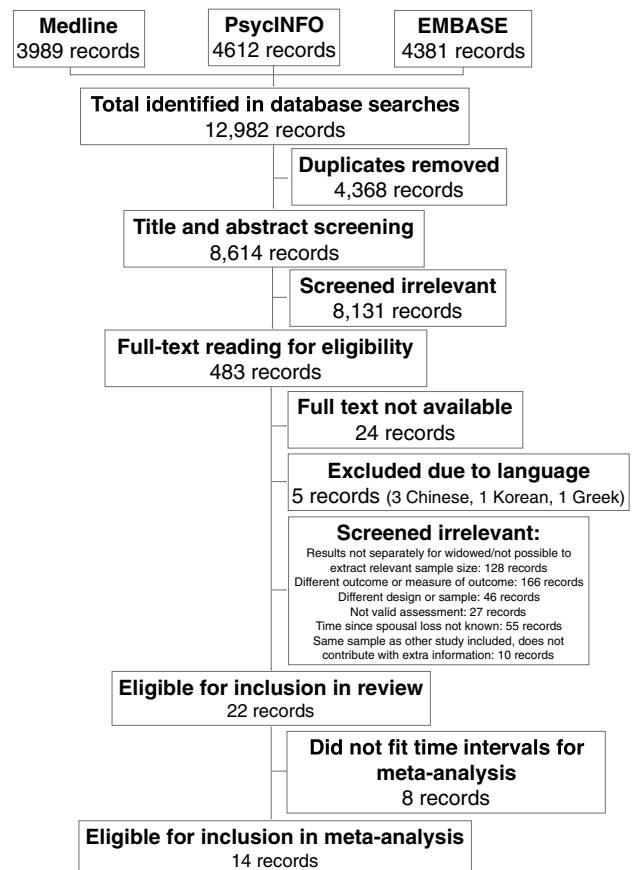

Fig. 1 Flowchart of literature identification and selection

Time since spousal loss

The eligible studies assessed depression at different points in time since spousal loss and used different intervals and times between follow-up limiting the possibilities of direct comparison between studies. Nonetheless, some studies did use similar definitions of time since spousal loss, and since several of the studies were longitudinal it was possible to evaluate on trends over time.

First month of widowhood

Bartrop [33] assessed depression already 2 weeks after spousal loss and found a depression prevalence of 49%, which decreased to 22% at 6 months after spousal loss. Similar to this, other studies assessing depression shortly after spousal loss also found a high prevalence: Harlow [16], Bornstein [36] and Turvey [6] found a prevalence of 58.3%, 34.9% and 33.3%, respectively, 1 month after spousal loss. Compared to these studies, Lund [8] found a lower prevalence shortly after widowhood (3–4 weeks) of 14.6% for men and 19.2% for women, respectively. Thus, the studies

Table 1 Study characteristics

Study	Study year	Country	n widowed	% male	Age	Instrument, cutoff score	Time since spousal loss and depression prevalence
Bartrop [33]	Not stated	Australia	55	38.2	Mean 50, range 24–78	Hamilton Depression Scale, ≥14	2 weeks: 49%, 6 months: 22%
Bergdahl [34]	2000–2002	Sweden	225	17.9	Range 85–103*	GDS-15[1], ≥5	<10 years: male: 38.5%, female: 28.57%; > 10 years: male: 9.5%, female: 34.8%
Bonanno [35]	Not stated	USA	39	30	Mean 49.2, range 28–56	BDI[2], cutoff not stated	5 years: 13%
Bornstein [36]	1968–1969	USA	92	29.4	Mean 61	Clinical examination, diagnostic criteria explained	1 month: 34.5%; 13 months: 16%
Bruce [37]	1980 and forward	USA	39	38.5	Mean 73.4 (SD 6.9)	DIS[3], DSM-II	<6 months: 25.5%; 7–12 months: 9.5%
Byrne [11]	Not stated	Australia	57	100	Mean 75, range 65–90*	CID[4], DSM-III-R	6 weeks: 12.3%; 13 months: 1.9%
Carnelley [38]	1986–1989	USA	64	0**	Mean 67.8	DIS[3], DSM-III-R CES-D[5] 11 items, cutoff not stated	<33 months: 12.5%
DiGiacomo [10]	Not stated	not stated	21	0**	Mean 71.4, range 63–82	DASS[6] 21 items, ≥10	14.29 months (SD: 11.07): 40%; 20.14 months (SD 11.10): 42%; 25.8 months (SD 11.16): 47%
Futterman [39]	Not stated	USA	212	46.7	Mean 68.2 (SD 7.84)	BDI[2], ≥11 and ≥17	2 months: 31.6% (11.8% if cutoff ≥17)
Harlow [16]	1979 and forward	USA	136	0**	Range 65–75*	CES-D[5], ≥16	1 month: 58.3%; 6 months: 23.4%; 12 months: 17.5%; 18 months: 17.5%; 24 months: 16.4%
Jacobs [40]	Not stated	USA	111	23	Mean 54	SCID[7], DSM-III	6 months: 32%; 12 months: 27%
Lund [8]	1983 (ended)	USA	192	Not stated	Mean 67.6 (SD 8.2)	ZUNG[8], cutoff not stated	3–4 weeks: 18%; 2 years: 15.2%
Mendes de Leon [7]	1982–1985	USA	98	35.7	Mean 75.8	CES-D[5] 20 items, ≥20	<1 year: 37.5%, 1–2 years: 16.7%
O'Connor [41]	2006	Denmark	296	38	Mean 73 (SD 4.41), range 65–81	BDI-20[2], ≥9	8 weeks: 37%
Onrust [42]	Not stated	The Netherlands	216	36.2	Mean 68.8, range 50–92	CES-D[5] 20 item, ≥16	2–14 months: 49.8%
Somhlaba [4]	Not stated	South Africa	198	9.6	Mean 48.2 (SD 14.6) range 21–99	BDI[2] 21 items, ≥14	1–12 months: 87.9%
Turvey [6]	1993–1994 + 1995–1996	USA	2346	17.9	Mean 77, range 70–103*	CES-D[5] abbreviated form[5], > 6 symptoms	1 month: 33.3%; 2–3 months: 13%; 4–6 months: 14.3%; 7–12 months: 13.5%; 13–18 months: 9.3%; 19–24 months: 12.2%. <2 years: male: 13.9%, female: 13.9%. >2 years: male: 5.5%, female: 7.2%

Table 1 (continued)

Study	Study year	Country	n widowed	% male	Age	Instrument, cutoff score	Time since spousal loss and depression prevalence
Vezina [43]	Not stated	Canada	59	22.8*	Mean 72.2 (SD 7.4), range 60–90*	BDI[2], >10	1–12 months: 48%; 13–24 months: 48%; 25–36 months: 59%
Ward [44]	Not stated	Australia	25	28	Mean 71.4 (SD 4.5)	DASS[6], ≥10	<18 months: 80%
Winterling [45]	2001–2002	Sweden	21	29	Median 69, range 44–83	HADS[9], ≥11	7 months: 14%
Yopp [46]	2012–2013	USA	259	100	Mean 46.1 (SD 7.5) range 28–69	CES-D[5], ≥16	<5 years: 65%
Zisook [15]	Not stated	USA	276	29	Mean 61 (SD 10)	Clinical examination, DSM-III-R, ZUNG[8], >50	2 months: 24%; 7 months: 23%; 13 months: 16%; 19 months: 15%; 25 months: 14%

*includes the entire sample. **100% female sample. Abbreviations explained: [1]Geriatric Depression Scale, [2]Beck Depression Inventory, [3]Diagnostic Interview Schedule, [4]Composite International Diagnostic Interview, [5]Center for Epidemiological Studies Depression, [6]Depression Anxiety Stress Scale, [7]Structured Clinical Interview for DSM, [8]Zung Self-rating Depression Scale, [9]Hospital Anxiety and Depression Scale

that assessed prevalence of depression within the first month of spousal loss ranged from 14.6 to 58.3%.

From 2 months and up to 6 months of widowhood

Within the next weeks, the prevalence varied from 12.6% as found by Byrne [11] 6 weeks after spousal loss to 37% found by O'Connor [41] 8 weeks after spousal loss. Turvey [6] found that the prevalence was 13% at 2–3 months after spousal loss, and almost unchanged after 4–6 months where the prevalence was 14.3%. This is lower than in the study by Jacobs [40] where the prevalence was 32% 6 months after spousal loss. Bruce [37] who assessed 39 widowed people found a depression prevalence within the first 6 months of widowhood of 25.5%.

The first years

Several of the studies examined people widowed less than a year and pooled them with people widowed for up to about 2 years. Mendes de Leon et al. [7] examined people who were widowed between two waves in the study and categorized them according to time since spousal loss: (a) being widowed for 1–2 years; or (b) less than 1 year. They found that those who have been widowed for less than a year had a depression prevalence of 37.5% whereas those who were widowed for 1–2 years had a lower prevalence of 16.7%. Vezina [43] used the same categorization of time since spousal loss but found a much higher prevalence of 48% for both people widowed less than a year and those widowed for 12–24 months. Somhlaba [4] examined 198 widowed people in rural South Africa. The time since spousal loss ranged from 1 to 12 months, and the prevalence of depression was 87.9%, with 9.6% scoring mild, 24.2% moderate and 54% severe depression. Although this prevalence was much higher than in any of the other studies, a high prevalence within the first year was also found in the study by Onrust [42] who found a depression prevalence of 49.8% in 216 persons widowed between 2 and 14 months.

The studies that stratified further within the first year such as Byrne [11] found that at 6 weeks after spousal loss the prevalence was 12.3%. However, this decreased to 1.9% at 13 months after spousal loss. A similar pattern was seen in the study by Bornstein [36] where the prevalence decreased from 34.9% at 1 month after spousal loss to 16% after 13 months. Jacobs [40] found that the prevalence decreased from 32% at 6 months since spousal loss to 27% after 12 months. The trend of decreasing prevalence with increasing time since spousal loss within the first year was supported by Zisook et al. [15], who continued to follow-up for up to 2 years, however, a plateau in the decreasing prevalence was reached at 13 months where the prevalence was 16%. The same pattern of a decreasing prevalence from

1 month after spousal loss (58.3%) to 1 year after spousal loss (17.5%) and then stagnation after 18 (17.5%) and 24 (16.4%) months was also seen in the study by Harlow [16] as well as in the study by Turvey [6].

For those widowed two or more years, the prevalence ranged from 0 in Carnelley et al. [38] to 47% in DiGiacomo et al. [10]. Carnelley [38] examined people widowed for 0–33 months and found a prevalence of 12.5%. However, none of those who were considered depressed in the study had been widowed for more than 25 months. Lund [8] who followed people from 3 to 4 weeks after spousal loss found that after 2 years the prevalence was 20% for men and 13.9% for women. The study by DiGiacomo [10] showed an increase in the prevalence of depression from approximately 40% at mean time 14.29 months (SD 11.07) since spousal loss to approximately 47% at mean time 25.8 months (SD 11.16) since spousal loss. The study, however, did not state the ranges of time since spousal loss at each measurement, and, therefore, it was not possible to strictly define time since spousal loss from this study.

Ward [44] examined 25 people widowed for less than 18 months and found a prevalence as high as 80%. The sample, however, was recruited from a support group. This might mean that the sample was not representative of the community but instead reflected those who were more distressed and more likely to have a depression. Yopp [46] followed people widowed for up to 5 years and found a prevalence as high as 65%. A linear regression model was applied to the data but no evidence of the effect of time since spousal loss on the CES-D score was found. The study sample was volunteers taking an online survey on a single fathers support website. Therefore, as in the study by Ward, the sample might reflect those who are more distressed, and more likely to be depressed, explaining the high prevalence seen in this study even after 5 years of widowhood.

Long-term widowhood

Studies defined newly and long-term widowed differently; however, it seems that studies included both people who were newly widowed and people who had been widowed for up to 2 years as described above. In the study by Vezina and colleagues [43], the people widowed for more than 2 years and up to 36 months had a depression prevalence of 59%. Thus, in this study the prevalence increased (from 48% at 0–12 months) over time. Bonanno [35] examined people who had been widowed for 5 years and found a depression prevalence of 13%, lower than what was found in many of the studies of more recent bereavement.

Bergdahl et al. [34] examined people who were widowed for less or more than 10 years. The prevalence for women widowed less than 10 years was 28.6% and 38.5% for men.

For those widowed more than 10 years, the prevalence was 34.8% for women, but 9.52% for men.

Prevalence by method of assessment

The 22 studies included used different methods of assessing depression. This could have had an impact on the estimated prevalence, as different criteria for determining depression were used. Fourteen of the studies assessed depression using a symptomatology screening scale and the prevalences found in these studies varied from 11.8% (2 months post-spousal loss, using BDI with a cutoff score of ≥ 17) [39] to 87.9% (1–12 months post-spousal loss, using BDI with a cutoff score of ≥ 14) [4]. The remaining eight studies used clinical diagnostic criteria to assess depression. The prevalence ranged from 1.9% at 13 months after spousal loss [11] to 34.9% (1 month after spousal loss) [36]. Zisook [15] assessed depression using both Zung Self-Rating Depression Scale (ZUNG) and a clinical assessment according to DSM-III-R criteria. They found that at 2 months after spousal loss the prevalence estimated when using ZUNG was 48%, whereas it was 24% when using full diagnostic criteria. This pattern continued during follow-up: at 7 months the prevalence was 51% and 23%, respectively; at 13 months it was 42% and 16%; at 19 months it was 38% and 15%; and finally at 25 months post-spousal loss, it was 30% using the ZUNG and 14% when using full diagnostic criteria. Thus, the prevalence seemed to more than double when using screening scales compared to full diagnostic criteria, at least in this study. Turvey et al. [6] did not show an obvious difference (not statistically tested) between the prevalence for the newly widowed (< 2 years) when comparing the prevalences from CES-D and DSM-III-R; however, the same trend as shown by Zisook [15] was evident in the long-term widowed (> 2 years) where the prevalence of depression was 5.5% (for men) and 7.2% (for women) when assessed with the CES-D and 1.2% (for men) and 3.4% (for women) when DSM criteria were used.

Prevalence by sex

Mendes de Leon [7] examined people widowed either less than 1 year or for 1–2 years. They found that for those widowed less than 1 year the prevalence was 46.2% for men and 31.6% for women. For those widowed 1–2 years the prevalence was 13.6% and 18.2%, respectively. Turvey [6] divided the widowed into newly (0–2 years) and long-term (> 2 years) bereaved. They found that for those widowed < 2 years the prevalence was 13.9% for both men and women. For the long-term widowed, the prevalence was 7.2% for women and 5.5% for men.

Lund [8] also assessed men and women separately. In comparison, they found a prevalence of 20% for men and

13.9% for women after 2 years. Based on these three studies, there was no evident pattern of sex differences in the association of prevalence and time since spousal loss.

Meta-analysis of prevalence by time since spousal loss

The measurements of each study were divided into the predefined intervals of time since spousal loss described in the "Methods" section. Of the 22 studies included in the systematic review, 14 studies fitted the intervals and were eligible for meta-analysis. The 14 studies eligible included a total of 31 measurements of prevalence which fitted the predefined intervals. Five measurements in the 14 studies did not fit the predefined intervals and were, therefore, not included in the meta-analysis.

The meta-analyses for each interval of time since spousal loss are shown in Fig. 2.

The 0–1-month interval included five studies ($n = 454$) and produced a pooled prevalence estimate of 38.2% (21.9–55.8%), with significant in-group heterogeneity ($I^2 = 92.4$, $p < 0.01$). The interval from above 1–3 months also included five studies ($n = 938$). The pooled prevalence estimate was 25.0% (17.3–33.5%). This group also had significant in-group heterogeneity ($I^2 = 84.8$, $p < 0.01$). The above 3–6-month interval included four studies ($n = 252$), with no evidence of in-group heterogeneity ($I^2 < 1\%$, $p = 0.4$). The pooled prevalence estimate in this interval was 23.1% (18.0–28.7%). For the interval of above 6–12 months the pooled prevalence estimate was 19.4% (15.2–24.0%). The interval included 6 studies ($n = 598$), with low in-group heterogeneity ($I^2 = 28\%$, $p < 0.2$). Four studies ($n = 501$) were included in the interval between above 12 and 18 months. The pooled prevalence estimate was 11.1% (5.3–18.7%), with significant in-group heterogeneity ($I^2 = 76.6$, $p < 0.01$). The above 18-month to 2-year interval included four studies ($n = 589$) with a pooled prevalence estimate of 15.2% (12.3–18.2%). There was no evidence of in-group heterogeneity ($I^2 < 1\%$, $p < 0.9$).

Finally, the interval above 2–5 years since spousal loss included three studies ($n = 329$) with a pooled prevalence estimate of 10.5% (4.3–18.5%). Due to the low number of studies included in this interval, it was not possible to estimate in-group heterogeneity.

The longitudinal association of time since spousal loss and the pooled prevalence estimates (with 95% confidence intervals) are illustrated in Fig. 3. Linear regression showed a significant decrease in the prevalence of depression with increasing time since spousal loss ($p = 0.048$).

Assessment of publication bias

There was no evidence of reporting bias in studies included in the meta-analysis (Egger's test $p = 0.063$) (Online Supplementary Fig. 1). It was not possible to do reporting bias assessment individually for each interval as they all included fewer than ten studies each [47].

Discussion

This systematic review and meta-analysis examined the association of time since spousal loss and the prevalence of depressive disorders in widowhood. The meta-analysis showed that the pooled prevalence estimate of depression was highest within the first month of widowhood with a pooled prevalence estimate of about 40% and decreased within the first 5 years of widowhood to a pooled prevalence estimate of about 10%. Although decreasing over time, this review showed that throughout the first 5 years of widowhood prevalence estimates remained higher than what is found in the community [5, 48, 49].

For the meta-analysis, intervals of time since spousal loss were defined in terms of what would make sense in a clinical setting if preventive interventions were to be targeted at a specific time since spousal loss. Due to this restriction into intervals, eight studies that were eligible for inclusion in the review could not be included into the meta-analysis, as they did not fit into these intervals [4, 7, 10, 34, 42–44, 46]. Although this does limit the finding of the meta-analysis to a fewer number of studies, this exclusion did not depend on the findings of the studies and is unlikely to have introduced any bias. On the contrary, the review of the literature including all 22 eligible studies also supported the trend that the prevalence decreases with time since spousal loss but remains stable at a high prevalence compared to what is known from the background population [5]. In fact, the study by Bergdahl et al. [34] who examined people who were widowed either less or more than 10 years found almost the same prevalence for the two groups (31.71% vs. 29.35%). This stresses that some people are at risk of developing depressive symptoms even into long-term widowhood and is in line with the previous findings of a high prevalence of depression (about 40%) in widowhood overall when not considering time since spousal loss [1].

The prevalence found in both the study by Bergdahl et al. [34], and the pooled estimates from the meta-analysis only reflect the overall longitudinal association and do not give any information on individual trajectories. Studies examining changes over time in individuals by measuring the mean score of depressive symptoms also support an initial increase in depressive symptoms followed by a decrease in symptoms over time [50, 51]. Sasson and
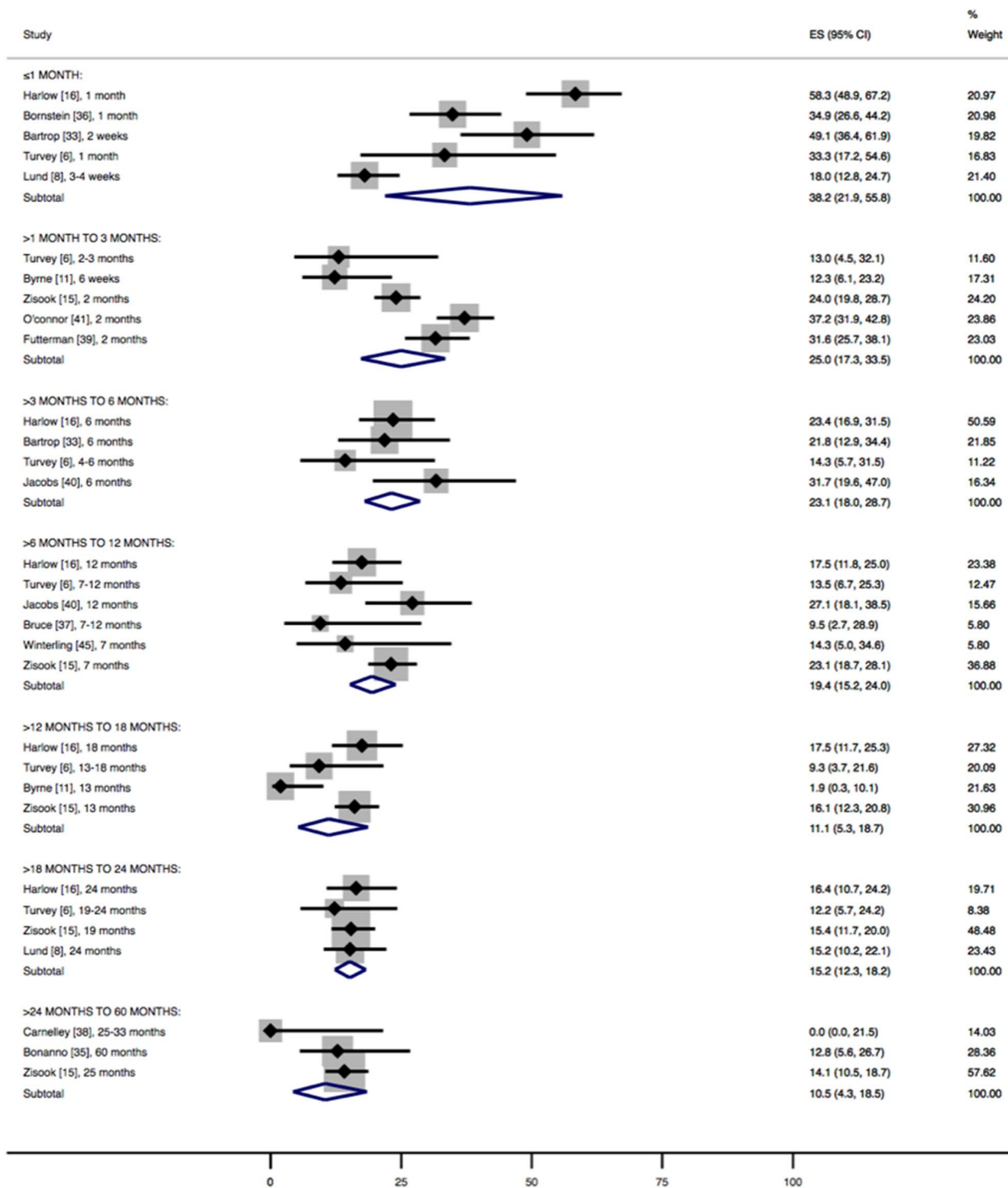
Study	ES (95% CI)	% Weight
≤1 MONTH:		
Harlow [16], 1 month	58.3 (48.9, 67.2)	20.97
Bornstein [36], 1 month	34.9 (26.6, 44.2)	20.98
Bartrop [33], 2 weeks	49.1 (36.4, 61.9)	19.82
Turvey [6], 1 month	33.3 (17.2, 54.6)	16.83
Lund [8], 3–4 weeks	18.0 (12.8, 24.7)	21.40
Subtotal	38.2 (21.9, 55.8)	100.00
>1 MONTH TO 3 MONTHS:		
Turvey [6], 2–3 months	13.0 (4.5, 32.1)	11.60
Byrne [11], 6 weeks	12.3 (6.1, 23.2)	17.31
Zisook [15], 2 months	24.0 (19.8, 28.7)	24.20
O'connor [41], 2 months	37.2 (31.9, 42.8)	23.86
Futterman [39], 2 months	31.6 (25.7, 38.1)	23.03
Subtotal	25.0 (17.3, 33.5)	100.00
>3 MONTHS TO 6 MONTHS:		
Harlow [16], 6 months	23.4 (16.9, 31.5)	50.59
Bartrop [33], 6 months	21.8 (12.9, 34.4)	21.85
Turvey [6], 4–6 months	14.3 (5.7, 31.5)	11.22
Jacobs [40], 6 months	31.7 (19.6, 47.0)	16.34
Subtotal	23.1 (18.0, 28.7)	100.00
>6 MONTHS TO 12 MONTHS:		
Harlow [16], 12 months	17.5 (11.8, 25.0)	23.38
Turvey [6], 7–12 months	13.5 (6.7, 25.3)	12.47
Jacobs [40], 12 months	27.1 (18.1, 38.5)	15.66
Bruce [37], 7–12 months	9.5 (2.7, 28.9)	5.80
Winterling [45], 7 months	14.3 (5.0, 34.6)	5.80
Zisook [15], 7 months	23.1 (18.7, 28.1)	36.88
Subtotal	19.4 (15.2, 24.0)	100.00
>12 MONTHS TO 18 MONTHS:		
Harlow [16], 18 months	17.5 (11.7, 25.3)	27.32
Turvey [6], 13–18 months	9.3 (3.7, 21.6)	20.09
Byrne [11], 13 months	1.9 (0.3, 10.1)	21.63
Zisook [15], 13 months	16.1 (12.3, 20.8)	30.96
Subtotal	11.1 (5.3, 18.7)	100.00
>18 MONTHS TO 24 MONTHS:		
Harlow [16], 24 months	16.4 (10.7, 24.2)	19.71
Turvey [6], 19–24 months	12.2 (5.7, 24.2)	8.38
Zisook [15], 19 months	15.4 (11.7, 20.0)	48.48
Lund [8], 24 months	15.2 (10.2, 22.1)	23.43
Subtotal	15.2 (12.3, 18.2)	100.00
>24 MONTHS TO 60 MONTHS:		
Carnelley [38], 25–33 months	0.0 (0.0, 21.5)	14.03
Bonanno [35], 60 months	12.8 (5.6, 26.7)	28.36
Zisook [15], 25 months	14.1 (10.5, 18.7)	57.62
Subtotal	10.5 (4.3, 18.5)	100.00

Fig. 2 Meta-analysis of depression prevalence by intervals of time since spousal loss. The left column in the figure shows author name, reference number in paper, and time since spousal loss at time of measurement in the study. The x axis shows the prevalence estimates for each study. ES: Prevalence estimate with 95% confidence intervals

Umberson identified lack of anticipation of spousal death as a possible risk factor for persisting increased depressive symptomatology [50]. However, further studies of individual trajectories are needed to understand pathways into widowhood-associated depression and to identify possible differences between those who are suffering primarily in the early phases and those who continue to do so into long-term widowhood.

Fig. 3 Association of time since spousal loss and prevalence of depression. Figure showing the pooled prevalence estimates (with 95% confidence intervals) from the meta-analysis for each interval of time since spousal loss
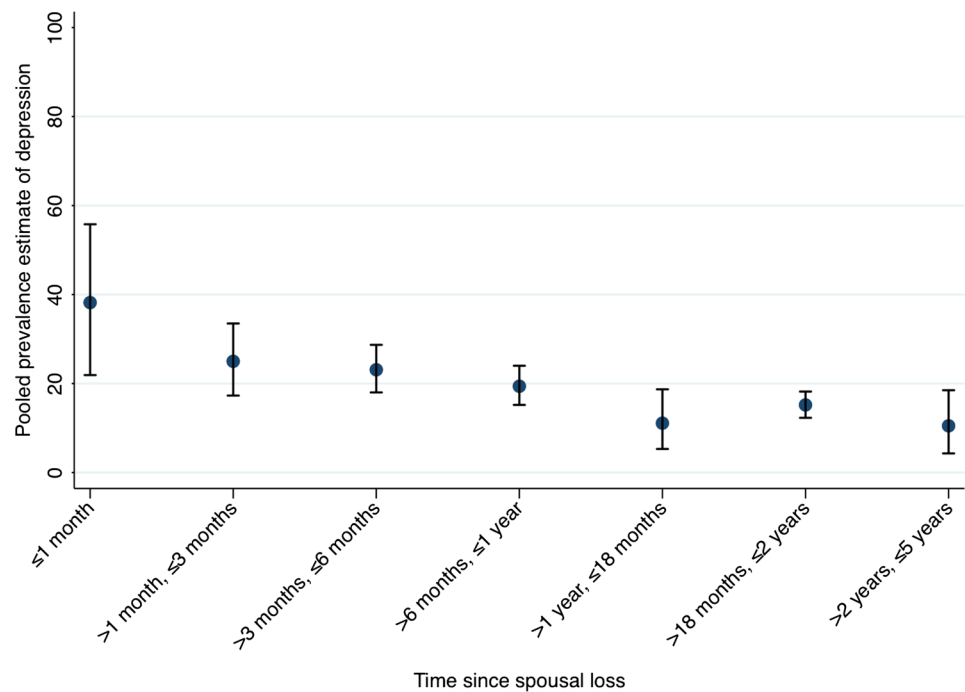
Only few studies stratified the prevalence of depression and time since spousal loss by sex and, therefore, a conclusion about a possible sex interaction was not possible in the review or in the meta-analysis. Likewise, it was not possible to examine how age interacts with the prevalence of depression and time since spousal loss. Previous studies that examined prevalence of depression in widowhood without considering time since spousal loss found that men are more likely to experience widowhood-related depression than women [51, 52]. A recent cross-cultural study supports that this is also the case in terms of the longitudinal trajectories [53]. Whereas increased depression scores were initially seen for both sexes in widowed people compared to married, the scores decreased for women to levels similar to their married counterparts but remained increased for widowed men for up to 10 years of widowhood [53]. Notwithstanding this, in the three studies that presented depression prevalence by time since spousal loss and sex, there was no evident pattern and further studies of the impact of sex are still needed.

It was beyond the scope of this review to assess how further mediators influence on the longitudinal association of depression and time since spousal loss. Previous research focused on risk or protective factors in general including the role of marital quality, caregiving and cause of death of the deceased spouse. Good marital quality is generally found to be a protector of health for both men and women. However, in widowhood good marital quality is associated with higher levels of negative psychological consequences [54]. In opposition to this, caregiving is associated to lower levels of depression in widowhood, which is opposite of its

effect on health in general [54]. At least some of this could be due to preparedness for the death of the spouse, as it is known that sudden death can lead to poorer mental health outcomes in the bereaved [55, 56]. More personal factors such as personality traits and the influence of health prior to bereavement still need further research [57].

Limitations

The categorization of time since spousal loss into intervals has some limitations besides excluding eight studies from the meta-analysis as mentioned under study identification. Although the intervals were defined from what would be meaningful in a clinical setting for an example if preventive interventions were to be made the categorization is nonetheless a forced subdivision. Thus, had the intervals been defined otherwise, the pooled prevalence estimates might have been different. The prevalence estimates found in this study are, therefore, comparable only to groups who also fit the defined intervals of time since spousal loss. The longitudinal association shown in Fig. 3 does, however, show a decreasing trend crossing over several intervals, indicating that although the prevalence estimates for each interval should be interpreted with some caution the trend of a decreasing prevalence with time since spousal loss is highly reliable also supported by the review including all 22 eligible studies.

The aim of the study was to assess the longitudinal association of widowhood and common mental disorders

including both depression and anxiety disorders. However, we identified only six studies that examined the prevalence of anxiety disorders and time since spousal loss [4, 10, 33, 44, 45, 58]. Due to the limited number of studies it was, therefore, not possible to analyze the longitudinal association for anxiety disorders and time since spousal loss. Therefore, the study examined only depressive disorder. To understand the association of time since spousal loss and anxiety disorders in widowhood further studies are needed.

Implications of the findings

The continued high prevalence of depression according to both screening scales and full diagnostic criteria adds important evidence to the debate regarding the bereavement exclusion criteria when diagnosing major depressive disorder.

In this review, we found a high pooled prevalence estimate in the first month of almost 40%, which decreased shortly after at 2–3 months, but that continued to be higher than what is found in the community throughout the follow-up period. The rapid decrease in prevalence within the first few months questions whether the pooled prevalence estimate found within the first month represents true depressive disorders. As the studies included used both clinical diagnoses based on diagnostic criteria and symptomatology screening scales, the estimates should be interpreted with some caution, as the studies that use screening scales found a higher prevalence than the one found in studies using full diagnostic criteria. This is both evident from the present systematic review and from previous studies of depression in widowhood where screening scale studies found a prevalence approximately twice as high as those using full diagnostic criteria [1].

It could be argued, whether some of those categorized as depressed in the included studies would be more correctly diagnosed with a diagnosis of complicated or prolonged grief disorder rather than depression. This might especially be the case in some of the studies using screening scales rather than full diagnostic criteria for depression. This is, however, not possible to assess in the present study and is beyond the scope of the research question.

There are overlaps in the symptoms of both normal—or uncomplicated—grief, complicated—or prolonged grief—and depression [59] and especially during early bereavement it can be damaging to mislabel and intervene in a normal process [60]. Yet, identifying those with significantly elevated depressive symptoms even in early bereavement can be important in terms of monitoring people at risk for developing a persisting full blown major depressive disorder. Although overlapping in some symptoms [59], only about 50–70% of those who met the criteria for complicated grief also met the criteria for major depressive disorder [61], emphasizing, that they are distinct disorders and should

be considered as such, since treatment of the two disorders differs both regarding psychological and pharmacological therapy [60].

Previous studies have identified that bereavement-related depression and depression without preceding bereavement show no differences in terms of symptoms or duration [62, 63].

Both the present and former studies find that for a large proportion of the bereaved widowhood is associated with clinically significant depressive symptoms from shortly after bereavement, and that this proportion continues to be high even into long-term widowhood [34, 53]. Although the specific prevalence estimates must be interpreted with some caution regarding what is the true prevalence, it is evident that widowed people have a high risk of developing impairing symptoms, which should be identified and intervened against early, to avoid prolongation into long-term widowhood as currently seen.

Existing interventions including self-help and support groups focusing on psychosocial and emotional expressions as well as more educational interventions have shown little effect compared to passing of time itself [64]. This could be because the samples are in general including all those who are bereaved and not only those who are most distressed, which is not necessarily beneficial or necessary in bereavement interventions [57, 64]. As suggested by Stroebe [57], interventions should instead target those especially at risk based on empirical findings. The findings of the present review suggest that interventions could be targeted those widowed within the first year, as this is where the prevalence of depression is highest.

Conclusion

This systematic review and meta-analysis examined the longitudinal association of the prevalence of depression and time since spousal loss in widowhood from 0 to 1 month and up to 5 years after spousal loss. For the longitudinal trajectories, we found that the prevalence of depression is highest within the first month of widowhood (about 40%) and lowest after 2–5 years (about 10%). Although there is a decreasing prevalence with increasing time since spousal loss, the prevalence of depression was high throughout the time studied compared to the prevalence of depression in community settings in general. Future research should focus on risk group identification in early widowhood and individual trajectories in depressive symptoms to understand the continued high risk of depression in widowhood.

Compliance with ethical standards

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