

Factors Contributing to Men's Grief Following Pregnancy Loss and Neonatal Death: Further Development of an Emerging Model in an Australian Sample

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Abstract

Background: Historically, men's experiences of grief following pregnancy loss and neonatal death have been under-explored in comparison to women. However, investigating men's perspectives is important, given potential gendered differences concerning grief styles, help-seeking and service access. Few studies have comprehensively examined the various individual, interpersonal, community and system/policy-level factors which may contribute to the intensity of grief in bereaved parents, particularly for men.

Methods: Men ($N = 228$) who had experienced an ectopic pregnancy, miscarriage, stillbirth, termination of pregnancy for foetal anomaly, or neonatal death within the last 20 years responded to an online survey exploring their experiences of grief. Multiple linear regression analyses were used to examine the factors associated with men's grief intensity and style.

Results: Men experienced significant grief across all loss types, with the average score sitting above the minimum cut-off considered to be a high degree of grief. Eight factors significantly contributed to men's grief: type of loss experienced, their age at the time of loss, loss history, marital satisfaction, availability of social support, acknowledgement of their grief from family/friends, time spent bonding with the baby during pregnancy, and feeling as though their role of 'supporter' conflicted with their grief process. Factors contributing to grief also differed depending on grief style. Intuitive (emotion-focused) grief was associated with viewing an ultrasound during pregnancy, ethnicity, and support received from healthcare professionals. Instrumental (activity-focused) grief was associated with time and quality of attachment to the baby during pregnancy, availability of social support, acknowledgement of men's grief from their female partner, supporter role interfering with their grief, and tendencies toward self-reliance.

Conclusions: Following pregnancy loss and neonatal death, men can experience high levels of grief, requiring acknowledgement and validation from all healthcare professionals, family/friends, community networks and workplaces. Addressing male-specific needs, such as balancing a desire to both support and be supported, requires tailored information and support. Strategies to support men should consider grief styles and draw upon father-inclusive practice recommendations. Further research is required to explore the underlying causal mechanisms of associations found.

Trial registration: N/A

Background

Despite continued global advancements in reproductive healthcare, both pregnancy loss and the death of a newborn baby within the first 28 days following birth (neonatal death) continue to be devastating realities for many families. The pervasive psychological and emotional impacts of parents' grief following pregnancy loss and neonatal death are now well-recognised [1–4]. Parents frequently report experiences of stigma, shame and disenfranchisement through minimisation of their loss from others, which can complicate their grief [5–9]. Men's experiences of pregnancy loss and neonatal death have

been under-explored in comparison to women. However, a growing body of research has highlighted the importance of investigating men's perspectives, given potential gendered differences concerning grief, help-seeking and service access [10–17]. For example, quantitative studies comparing heterosexual couples' experiences following pregnancy loss and neonatal death suggest that men typically experience less intense and enduring levels of grief than women [18–23]. However, a smaller number of studies have found similar grief intensity between men and women [24, 25], or even higher levels of grief in men [26]. Broader research on grief also demonstrates potential differences in grief styles for men and women, with a general classification made between instrumental (action-focused coping) and intuitive (emotion-focused coping) styles [27]. Following pregnancy loss and neonatal death, studies suggest that men may engage in more instrumental grieving styles, which includes using activities, distraction or problem-solving approaches to grief, as opposed to intuitive styles which use emotion-focused approaches including outward displays of crying, talking about grief, or seeking social support [9, 16, 28–35].

Our recent systematic review of men's grief following pregnancy loss and neonatal death emphasised the importance of examining grief from a holistic, socio-ecological perspective to understand the varied factors which can contribute to men's experiences [36]. At the individual level, factors contributing to men's grief include demographic elements (e.g., age, religion, ethnicity), pregnancy loss/neonatal death history and number of living children. Regardless of gestational/newborn age of the baby, previous research also suggests that attachment is a particularly strong predictor of men's grief intensity. Although early quantitative research measured 'attachment' using increasing gestational age or whether or not men viewed an ultrasound of their developing baby [20, 22, 23, 37, 38], qualitative studies have suggested that a broader exploration of prenatal attachment (e.g., through everyday interactions with the developing baby) may be more important in determining the intensity of men's grief response [10, 12, 13, 16, 30, 32, 34].

At the interpersonal level, men's interactions with others have been found to have implications for shaping their grief experience. Qualitative studies have pointed to the importance of whether men felt acknowledged as a grieving father from family, friends and healthcare professionals; where there was a lack of recognition for men as grieving fathers, grief intensity worsened [9, 10, 12, 33, 39]. Throughout the qualitative literature, heterosexual men's role primarily as a 'supporter' to their female partner, has remained a consistent and dominant theme. This role has often been reported as hindering men's expressions and experiences of grief [10, 12, 13, 16, 33, 34, 40]. However, a smaller number of studies have suggested potential benefits of this role, particularly among people who are instrumental grievers, for whom this role could provide purpose [30, 41].

At the broader community level, qualitative studies have also consistently noted that men's experiences are shaped by social attitudes concerning the legitimacy of parents' grief, as well as gendered expectations surrounding how (or if) men should openly display emotion [9, 10, 12, 16, 29]. These were related to masculinity ideals, which often prescribed being strong or stoic in the face of loss [12, 13, 16, 32, 33].

Finally, at the system/policy level, parents' experiences within the healthcare system following pregnancy loss or neonatal death have been established as fundamental to shaping bereaved parents' grief experience [4, 9, 42]. For some men specifically, the context of woman-centred care in hospital (when applicable to the type of loss) has been found to be isolating and can worsen grief outcomes [10, 12, 34]. Also in relation to systems issues, research indicates that policies regarding bereavement leave within workplaces typically differ for men and women, with some men reporting less access to paid leave following their loss than women [10, 29, 33]. As many men have reported returning to work soon after pregnancy loss or neonatal death, bereavement leave policies may play a role in grief outcomes [36].

In addition to the research on male-specific predictors of grief, several studies have explored the various predictors of grief intensity in women following pregnancy loss and neonatal death [43–50] and couples [23, 38, 51–53]. Most of these studies have examined individual, interpersonal, community or system-related predictors separately, rather than together in a single model. Similarly, with the exception of Riggs et al. [17] who explored relationships between grief, psychological distress, stigma, help-seeking and social support, the studies outlined above concerning predictors for men have also focused on specific predictors such as the duration of pregnancy or viewing an ultrasound image. Importantly, no previous research has considered factors relating to different styles of grief, which may be important, given that studies have suggested gender-specific grieving styles [27]. Using the socio-ecological model of men's grief developed in our previous systematic review as a basis [36], this study aimed to quantify and further explore the factors which contribute to men's grief, with a particular focus on previously under-explored determinants. Specifically, we sought to determine the factors associated with grief intensity following pregnancy loss and neonatal death, as well as the factors associated with intuitive and instrumental grief styles.

Methods

Participants

Ethical approval for the study was granted by the University of Adelaide Human Research Ethics Committee on the 5th of June, 2019 (approval code HREC-2018-273). Participants were Australian men who had experienced the loss of a baby at any stage of gestation to miscarriage, ectopic pregnancy, medical termination of pregnancy for nonviable foetal anomaly (TOPFA), stillbirth or neonatal death. Inclusion criteria were that participants were aged 18 years of age or older and had experienced pregnancy loss or neonatal death in Australia within the last 20 years. Although potentially open to recall bias, this timeframe was selected to maximise the potential pool of eligible respondents. Of 277 participants who commenced the survey, 228 completed all items and were included in the final sample reported here (completion rate = 82%). There were no apparent differences between completers and non-completers on demographic characteristics. At the time of survey completion, participants were aged between 19 and 60 years ($M = 36$, $SD = 7.4$). At the time of loss, they were aged between 18 and 58 years ($M = 32$, $SD = 5.5$). See Table 1 for a summary of participant characteristics at the time of survey completion.

Table 1. Participant characteristics

	Category	N (%)
Ethnicity	Australian	194 (85%)
	Other [^]	34 (15%)
Sexual orientation	Heterosexual	224 (98%)
	Bisexual	3 (1.5%)
	Rather not answer	1 (0.5%)
Highest level of education	High School	54 (24%)
	TAFE/Trade	83 (36%)
	Undergraduate Degree	58 (25%)
	Postgraduate Degree	33 (15%)
Marital status	Married	186 (82%)
	In a relationship	35 (15%)
	Divorced	1 (0.5%)
	Separated	4 (1%)
	Never married/single	2 (2%)
Area of residence [*]	Major city	131 (58%)
	Inner regional	64 (28%)
	Outer regional	28 (12%)
	Remote/very remote	4 (2%)
Number of losses	One	138 (61%)
	Two–three	15 (7%)
	Four–five	47 (21%)
	Six or more	28 (12%)
Loss type reflected on for the survey	Ectopic pregnancy	5 (2%)
	Termination of pregnancy for foetal anomaly (TOPFA)	30 (13%)
	Miscarriage	69 (30%)

	Stillbirth	77 (34%)
	Neonatal death	47 (21%)
Time since loss	Less than one year	65 (28%)
	1-2 years	40 (18%)
	3-5 years	59 (26%)
	6-10 years	43 (19%)
	11-15 years	10 (4%)
	16-20 years	11 (5%)

^Other ethnicities reported by participants include: European (8%), Asian (2%) and New Zealander (2%).

*Based on Australian Bureau of Statistics classification of remoteness.

[Insert Table 1 near here]

Procedure

A web-based survey was developed by the authors, hosted by the online platform *SurveyMonkey*. This survey was developed for the purposes of the current study, and has not been published elsewhere. Extensive piloting was undertaken with members of a reference group (including Australian fathers and mothers who had experienced pregnancy loss/neonatal death, grief counsellors and pregnancy loss/neonatal death support workers and researchers) as part of the broader program of research to form the final survey. Although major concepts remained the same, the ordering, inclusion and wording of questions, and final measures selected, were edited and refined according to feedback to ensure both sensitivity and ease of understanding.

Potential participants were invited to take part in the survey via advertisements through Australian pregnancy loss and neonatal death support and advocacy organisations. These included Pillars of Strength, Bears of Hope, Sands Australia, Still Aware, Miracle Babies Foundation, SIDS and Kids SA, and the Australian Perinatal Loss Centre. Following ethics approval, these organisations were contacted by the first author via email or telephone to discuss the study. All organisations agreed to share a study flyer and information through either social media platforms (primarily Facebook), newsletters, and/or organisation websites. The study flyer contained brief information about the survey and the online survey link, which opened to a covering page explaining the study in more detail. Participants could then consent and commence the survey.

The survey took approximately 30 minutes to complete. Depending on participant responses, skip logic was incorporated to hide questions which were irrelevant to individual experiences, often resulting in a shorter completion time ($M=22$ mins). Participation in the survey was voluntary and anonymous. Data collection occurred between June and August 2019.

Measures

Participants completed questions relating to demographic characteristics (age, ethnicity, education, occupation, sexual orientation, marital status, religion, and postcode), along with questions about their pregnancy and loss history. Definitions for the death of a baby during pregnancy or shortly following birth vary, with gestational cut-offs for classification differing between countries. In Australia, a miscarriage is defined as the death of a baby in-utero before 20 weeks' gestation and occurs for approximately 20% of pregnancies [54]. In 1-2% of pregnancies, an ectopic pregnancy occurs when the fertilised ovum implants outside of the uterus, most commonly in the fallopian tube [54-56]. A stillbirth is defined as the loss of a baby from at least 20 weeks' gestation or over 400g in weight, occurring for between 7 and 8 per 1,000 births [57]. Neonatal death refers to the death of a newborn infant within the first 28 days of life and occurs for between 2 and 3 per 1,000 live births [57]. A congenital anomaly is diagnosed in approximately one in 22 pregnancies in Australia [58]. National data on TOPFA is not collected in Australia; however, it has been estimated that approximately 10-13% of parents elect to medically terminate a pregnancy diagnosed with foetal anomaly, particularly when the diagnosis is considered life-limiting or fatal [59]. Where more than one type of pregnancy loss or neonatal death had been experienced, participants were asked to reflect on only one type of their choice for the remainder of the survey. An option to comment on other losses was provided at the end of the survey. Participants then completed a mix of questions developed by the authors as well as standardised measures.

In line with the literature on the 'supporter role' relating to men's grief [10, 12, 13, 16, 36, 40, 60], two author-developed measures were included to determine the extent to which men perceived this to be their role, and whether they felt it interfered with their grief. Participants responded to these questions on a five-point Likert scale from 1 = *strongly disagree* to 5 = *strongly agree*. Higher scores indicated that men perceived their role to be a supporter to their female partner and family after the loss, and that their supporter role had a larger impact on their ability to grieve. Scales were also developed to determine the extent to which participants felt their grief was recognised by others, namely: their partner, family, friends, health professionals, and the wider community. For these, participants responded on a five-point Likert scale from 1 = *not at all* to 5 = *extremely*. Higher scores were indicative of higher levels of recognition for their grief. Participants were also asked a series of questions about their experiences of returning to work, including whether they were offered leave, and what type of leave they were offered (detailed results under review for publication elsewhere). If they had contact with a hospital as part of their loss experience, they were also asked about the extent to which they felt included (from 1 = *not at all* to 5 = *extremely*, where higher scores indicated a greater sense of inclusion), and whether they were offered information on grief for fathers (yes/no). The six included standardised measures are outlined below.

Paternal Antenatal Attachment Scale (PAAS): A modified version of the Maternal Antenatal Attachment Scale (MAAS), the PAAS assesses both the quality and strength of the subjective experience of the father's attachment to the developing baby [61, 62]. Comprising 16 items forming two subscales (*Quality of Attachment* and *Time in Attachment*), the PAAS is answered using five-point Likert scales, where higher scores indicate stronger attachment to the baby. Although only a small number of papers have used the

PAAS, relationships have been found with related measures including relationship quality, mental health, increasing gestational age, and father identity [63, 64]. Previous research also supports the reliability and validity of the PAAS, with reports of high internal consistency (Cronbach's alpha = 0.83) [62]. For this study, the final question of the scale "If the pregnancy was lost at this time (due to miscarriage or other accidental event) I expect I would feel..." was omitted, given that participants had experienced a pregnancy loss or neonatal death. Internal consistency of this 15-item version in this study was also high (Cronbach's alpha = 0.83).

Perinatal Grief Scale-33 (PGS-33): Designed to quantify bereaved parents' grief based on emotional responses, the PGS-33 assesses thoughts and feelings associated with perinatal loss [65]. The overall scale comprises three subscales: *Active Grief* (outward expressions of grief including crying, sadness and missing the baby), *Difficulty Coping* (difficulties with daily activities and relating to others) and *Despair* (feelings of hopelessness and worthlessness). Participants rate each item on a five-point Likert scale ranging from 1 = *strongly agree* to 5 = *strongly disagree*, with higher scores indicating more intense grief. The PGS-33 is the most common grief scale used among the perinatal loss literature and has been extensively evaluated, with psychometrically sound properties reported (including Cronbach's alphas between 0.92 and 0.96) [66, 67]. Internal consistency for the full measure was also high in this study (Cronbach's alpha = 0.94). Although questions remain surrounding the accuracy of using the PGS among men, as it may not be sensitive to instrumental grieving styles [36], given a current lack of alternative grief measures specifically for men following pregnancy loss/neonatal death, we decided that in conjunction with the Grief Patterns Inventory (described below), this was the best available measure to adopt.

Grief Patterns Inventory-Revised (GPI-10): A measure developed to assess an individuals' general grieving pattern, the GPI indicates a tendency toward either an instrumental or intuitive grieving style. The original measure comprised 24 items containing true-false responses; however, a revised version containing ten items (five items each for the instrumental and intuitive styles) was used in the current study to reduce respondent burden [68, 69]. A pilot study of the 10-item version reported moderate inter-correlations between subscale items, along with a significant negative correlation between the intuitive and instrumental subscales ($r = -.525$) [68]. Although alpha coefficients were not reported for the 10-item version, research demonstrates acceptable internal consistency for the original version (Cronbach's alphas ranging between 0.71 and 0.76) [70]. In this study, a similar level of internal consistency was found (Cronbach's alpha = 0.71). Items are rated on a five-point Likert scale from 1 = *Strongly Disagree* to 5 = *Strongly Agree*, with instrumental items reverse-scored. As such, potential total scores ranged from 10 to 50, with lower scores indicating a more instrumental style, and higher scores indicating a more intuitive style. As applied previously [69], categorisation of grief styles was made as follows: 10-23 = instrumental; 24-36 = blended; 37-50 = intuitive.

Crisis Support Scale (CSS): The CSS is a measure of social support received from family and friends following a traumatic event (in this case, pregnancy loss/neonatal death). Comprising seven items relating to the availability of others, emotional support, and practical help, respondents rate their agreement to the items on a seven-point Likert scale, ranging from 1 = *never* to 7 = *always*. In the original

scale, participants responded to two time points: just following the event (T1) and the present time (T2). However, for this study, participants were only asked to provide responses for the support that was available to them most of the time following their loss. Higher scores indicate higher levels of social support. Validation studies indicate robust psychometric properties for the scale across a range of trauma populations, including bereaved parents of infants (Cronbach's alphas ranging between 0.67 and 0.82; in this study, Cronbach's alpha was 0.69) [71].

Conformity to Masculine Norms Inventory (CMNI): Developed based on Mahalik's model of gender role conformity, the CMNI assesses the extent to which an individual male does or does not conform to the actions, thoughts, and feelings reflected by broad masculinity norms [72, 73]. The original scale consists of 144 items forming 11 distinct factors. However, to reduce participant response burden, only one subscale comprising five items from the overall measure was included for this study, to determine respondents' tendencies toward *Self-Reliance*. This subscale was chosen in line with previous literature which suggests men often feel the need to hide their grief from others, preferring to cope in isolation [10, 12, 13, 16, 29, 33]. The questions included: "I never ask for help", and "It bothers me when I have to ask for help". Respondents rated the degree to which they agreed with these statements on a four-point Likert scale from 1 = *strongly disagree* to 4 = *strongly agree*, with higher scores indicating a stronger tendency toward being self-reliant. Widely used in the literature, many studies have reported construct validity for the CMNI, along with discriminant validity between its subscales and high internal consistencies (Cronbach's alpha of 0.85 for the *Self-Reliance* subscale; in this study, Cronbach's alpha was 0.86) [73].

Male Role Norms Inventory Short Form (MRNI-SF): A measure of masculinity ideology developed by Levant et al. [74], the original MRNI comprised 57 items with seven subscales. In 2011, a 39-item revised form was proposed, followed by a 21-item short-form in 2013. For this study, the *Toughness* subscale from the MRNI-SF was used, as items closely aligned with the recurrent theme of needing to be 'strong' or 'tough' reported by men following pregnancy loss in previous literature [10, 13, 16, 32, 33]. The subscale comprises three items, including: "When the going gets tough, men should get tough". Responses are given on a seven-point Likert scale from 1 = *strongly disagree* to 7 = *strongly agree*. Higher scores indicate higher levels of endorsement of traditional masculine ideology [75]. Research has demonstrated sound psychometric properties for the MRNI-SF, including subscale alphas ranging from 0.79 to 0.90 [75]. In this study, Cronbach's alpha for the 3-item *Toughness* subscale was 0.61.

Data analysis

Analyses were performed using SPSS Statistics (V.25). Data were summarised using descriptive statistics and relationships between the variables were assessed using generalised linear modelling with a multiple stepwise approach, including a backward elimination method outlined by Sainani [76]. Variables were entered in four stages, according to the groupings identified in our previous systematic review [36]. Individual-level variables were entered first, and a backward elimination process was carried out until all variables were significant at the 0.5 level as recommended by Harrell [77]. This process was then

repeated with each of the interpersonal, community and policy/system-level variables until all had been entered into the model (see Table 2 for the variables entered at each level).

Table 2. Variables entered into the multiple linear regression analyses

Stage entered into the model	Variables
Stage 1 (individual variables)	Loss type; Grief style ^a ; PAAS <i>Time in Attachment</i> , PASS <i>Quality of Attachment</i> , Whether men attended obstetric appointments; Whether men viewed an ultrasound image of their baby; Age at time of loss; Ethnicity; Importance of religion; Number of previous losses; Number of surviving children at time of loss
Stage 2 (interpersonal variables)	Marital satisfaction; Extent of agreement to the statement: “My role following the loss was to support my partner and family”; Extent of agreement to the statement: “I was unable to grieve, because I was too busy supporting everyone else”; Total CSS score; Extent of acknowledgement from partner; Extent of acknowledgement from family; Extent of acknowledgement from friends
Stage 3 (community variables)	Extent of acknowledgement from community; CMNI <i>Self-Reliance</i> subscale total score; MRNI <i>Toughness</i> subscale total score
Stage 4 (policy/system variables)	Extent of acknowledgement from healthcare professionals; Degree to which participants felt included in the hospital ^b ; Whether employment leave was offered to men; Whether other psychosocial supports were offered to men

Note: ^aEntered only into model 1 (dependent variable = PGS total score); ^bClassified into a high/low level of inclusion based on original Likert scale responses (scores 1-3 = low level of inclusion and 4-5 = high level of inclusion)

Statistical power

There are no consistent rules for sample size requirements in linear regression [78]. However, various general recommendations have been made about minimum sample size, or sample size depending on the number of independent variables included in the model. While one general rule recommends a minimum of 100 participants regardless of the number of independent variables [79], others suggest 50 plus the number of independent variables [80], or at least 100 for less than three independent variables or 300-400 for nine or 10 independent variables [81]. Tabachnick and Fidell also suggested a sample size of $5k$, and Green suggested $50 + 8k$, where k is equal to the number of independent variables [82]. With a sample size of 228, and the number of independent variables included in the models at any one stage not exceeding 16, the current study had sufficient statistical power.

Results

Descriptive statistics

Descriptive statistics for continuous variables are presented in Table 3. Overall, grief scores were high, with the average score sitting above the minimum cut-off considered to be a high degree of grief according to population norms (cut-off = 91) [67]. In particular, the highest mean grief scores occurred on the Active Grief subscale (indicating feelings of sadness and missing the baby), and the lowest scores occurred on the Despair subscale (indicating feelings of worthlessness and hopelessness). On average, men experienced the least grief following miscarriage; however, the mean score still represented a high degree of grief. The average grief score following stillbirth was the highest, followed by neonatal death and TOPFA.

According to the GPI, average scores were significantly higher for the intuitive grief items compared to the instrumental grief items ($t(223) = 4.611, p < .001$). Men's total reported attachment to their baby was also generally high. Specifically, scores on the *Quality of Attachment* subscale were also significantly higher than those on the *Time in Attachment* subscale ($t(223) = 38.9, p < .001$).

Men felt the most acknowledgement for their grief from their partners, and the least acknowledgement from the wider community and healthcare professionals. Average agreement concerning the extent to which men felt they had a supporter role following the loss was high. However, agreement regarding the extent to which this role impacted men's ability to grieve was in the mid-range.

Table 3
Descriptive statistics for continuous variables

	<i>N</i>	Mean	Range	<i>SD</i>
Total PGS score according to loss type				
Ectopic pregnancy	5	93.2	50–127	31.5
Miscarriage	67	91.4	47–152	22.9
TOPFA	29	105.2	65–158	21.9
Stillbirth	71	111.2	72–147	18.4
Neonatal death	46	107.0	65–151	23.4
Individual-level variables				
Age at loss (in years)	225	32	17–58	5.5
Time since loss (in months)	228	4.3	1–20	55
PGS total score	218	103	47–158	23.0
Active Grief subscale	222	42.8	22–55	6.3
Difficulty Coping subscale	226	32.7	12–53	9.8
Despair subscale	226	27.2	11–54	9.1
GPI – Intuitive	225	19.6	8–24	3.8
GPI – Instrumental	227	17.6	5–25	4.1
PAAS total score	224	58.5	35–72	8.0
Quality of Attachment subscale	224	30.1	15–35	3.6
Time in Attachment subscale	228	19.7	5–28	4.5
Interpersonal-level variables				
Marital satisfaction at time of loss	228	4.8	1–5	0.6
Acknowledgement from partner	228	3.9	1–5	1.0
Acknowledgement from friends	228	3.0	1–5	1.1
Acknowledgement from family	228	3.4	1–5	1.2
CSS total score	226	30.9	10–48	8.3

	<i>N</i>	Mean	Range	<i>SD</i>
Extent of agreement to: “My role following the loss was to support my partner and family”	228	4.5	1–5	0.8
Extent of agreement to: “I was unable to grieve, because I was too busy supporting everyone else”	228	3.3	1–5	1.3
Community-level variables				
Acknowledgement from community	228	2.1	1–5	1.1
CMNI Self-Reliance subscale	227	13.1	5–20	3.1
MRNI Toughness subscale	228	11.7	3–21	3.7
Policy/system-level variables				
Perceived extent of inclusion in the hospital	189	3.6	1–5	1.3
Acknowledgement from healthcare professionals	228	2.7	1–5	1.3

Multiple linear regression models

Multiple stepwise linear regression analyses were performed to determine which variables were associated with total grief (PGS total score), instrumental grief, and intuitive grief (GPI scores). Results for the three resulting models are presented below.

Model 1: Total grief (PGS)

Of 14 variables which were below the 0.5 significance cut-off for inclusion in the final model, eight were statistically associated with men’s total grief scores (see Table 4). When adjusting for all other predictors, men who lost a baby to miscarriage had a mean total PGS score of 13.6 points less than men who experienced a neonatal death. Men who had experienced a higher number of previous pregnancy losses/neonatal deaths also had higher levels of grief. While quality of attachment did not meet the 0.5 significance cut-off for inclusion in the final model, time in attachment was associated with a significant increase in grief. Higher grief scores were also associated with lower levels of overall support (according to the CSS), and more specifically, lower levels of marital satisfaction and acknowledgement of grief from friends. However, the opposite was observed for acknowledgement from family, with men experiencing higher levels of grief with more acknowledgement. Although the extent to which men felt their role was to support their female partner and family was not significant in the final model, higher

levels of agreement to the statement: "I was unable to grieve, because I was too busy supporting everyone else" was associated with a significant increase in men's total grief scores.

Table 4
Multiple stepwise linear regression for PGS total score ($n = 204$)

	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Variables				
Loss focus	-4.09	7.49	-.02	.59
Ectopic pregnancy				
TOPFA	-6.41	3.91	-.09	.10
Miscarriage	-16.48	3.33	-.32	<.001
Stillbirth	1.42	3.06	.03	.64
Neonatal death	Ref	-	-	-
PAAS <i>Time in Attachment</i>	2.10	.26	.44	<.001
Age at loss (in years)	0.39	.23	.09	.09
Number of previous losses experienced	1.84	.85	.10	.03
Marital satisfaction at the time of loss	-3.60	1.74	-.10	.04
Agreement to the statement: My role following the loss was to support my partner and family"	-2.48	1.52	-.09	.10
Agreement to the statement: "I was unable to grieve, because I was too busy supporting everyone else"	3.45	1.02	.21	<.01
CSS total score	-.69	1.02	-.24	<.01
Extent of acknowledgement of grief from family	3.39	1.36	.16	<.01
Extent of acknowledgement of grief from friends	-2.89	1.46	-.13	.05
Extent of acknowledgement from wider community	-1.92	1.28	-.11	.13
CMNI <i>Self-Reliance</i>	.47	.40	.07	.25
Workplace leave	21.44	16.61	.47	.19
Employment leave offered				

	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Employment leave not offered	21.12	16.70	.39	.21
Did not inform employer of loss	Ref	-	-	-
Other workplace supports Other supports offered	-23.42	16.85	-.49	.17
Other supports not offered	-25.75	17.05	-.58	.13
Did not inform employer of loss	Ref	-	-	-

Model 2: Intuitive grief (GPI)

Thirteen variables met the 0.5 significance cut-off for inclusion in the final model for intuitive grief. However, of these, only three were significantly associated with a change men's scores on intuitive grief items when adjusting for all predictors (see Table 5). Men who viewed an ultrasound image of their baby, and men who identified with an ethnicity other than Australian, had higher levels of intuitive grief. Lower intuitive grief scores were associated with higher levels of acknowledgement from healthcare professionals.

Table 5
Multiple stepwise linear regression for intuitive grief (*n* = 210)

	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Variables				
Ultrasound viewing				
Ultrasound viewed during pregnancy	1.5	.77	.15	.05
Ultrasound not viewed during pregnancy	Ref	-	-	-
Ethnicity				
Other	1.17	.60	-.13	.05
Australian	Ref	-	-	-
PAAS <i>Quality of Attachment</i>	.10	.06	.12	.09
Age at loss (in years)	.07	.05	.07	.10
Number of surviving children at loss	-.20	.24	-.05	.40
Agreement to the statement: "My role following the loss was to support my partner and family"	-.37	.27	-.08	.16
CSS total score	.06	.04	.15	.10
Extent of acknowledgement for grief from family	.26	.26	.11	.31
CMNI <i>Self-Reliance</i>	-.14	.08	-.12	.08
MRNI <i>Toughness</i>	-.05	.06	-.07	.37
Workplace leave				
Employment leave offered	4.98	3.16	.73	.11
Employment leave not offered	4.93	3.19	.62	.12
Did not inform employer of loss	Ref	-	-	-
Other workplace supports				
Other supports offered	-3.38	3.23	-.57	.29
Other supports not offered	-3.78	3.27	-.67	.25
Did not inform employer of loss	Ref	-	-	-
Extent of acknowledgement from healthcare professionals	-.46	.20	-.18	.02

Model 3: Instrumental grief (GPI)

Sixteen variables met the 0.5 significance cut-off for inclusion in the final model for instrumental grief, of which, seven were statistically significant (see Table 6). While increased quality of attachment was associated with a slight decrease in men's grief scores, higher scores on time in attachment were associated with an increase in grief. Although the supporter role itself was not associated with instrumental grief, men who perceived their supporter role as interfering more with their ability to grieve experienced higher levels of instrumental grief. Lower grief scores were associated with higher levels of total support (according to the CSS). More specifically, higher perceived acknowledgement of men's grief from their partner was associated with a reduction in grief. Higher endorsement of masculine ideals on the CMNI *Self-Reliance* subscale was associated with higher levels of instrumental grief. Finally, men who did not inform their workplace of their loss had higher levels of grief in comparison to those who did; this was regardless of whether workplace leave was offered to those who informed their employer.

Table 6
Multiple stepwise linear regression for instrumental grief ($n = 210$)

Variables	<i>B</i>	<i>SE B</i>	β	<i>p</i>
Loss focus				
Ectopic pregnancy	-.91	1.48	-.03	.54
TOPFA	-.38	.76	-.04	.62
Miscarriage	-1.12	.67	-.12	.09
Stillbirth	.21	.61	.02	.73
Neonatal death	Ref	-	-	-
Ethnicity				
Other	-.41	.60	.06	.49
Australian	Ref	-	-	-
PAAS <i>Quality of Attachment</i>	-.15	.07	-.15	.03
PAAS <i>Time in Attachment</i>	.16	.06	.17	<.01
Age at loss (in years)	-.84	.05	-.12	.06
Importance of religion	-.25	.17	-.11	.13
Marital satisfaction at the time of loss	.43	.42	.07	.31
Agreement to the statement: "My role following the loss was to support my partner and family"	.49	.27	.09	.07
Agreement to the statement: "I was unable to grieve, because I was too busy supporting everyone else"	.51	.20	.18	<.01
CSS total score	-.08	.04	-.18	.03
Acknowledgement of grief from partner	-5.29	.24	-.17	.03
Acknowledgement of grief from friends	.27	.24	.07	.29
CMNI <i>Self-Reliance</i>	.19	.08	.16	.02
MRNI <i>Toughness</i>	.07	.06	.08	.22
Workplace leave				.09
Employment leave offered	-2.01	.83	-.14	.02
Employment leave not offered	-2.25	.89	-.15	.01
Did not inform employer of loss	Ref	-	-	-
Perceived degree of inclusion in the hospital				.33
High level of inclusion	-.103	.66	-.04	.88
Low level of inclusion	-.48	.68	-.11	.48
No contact with a hospital	Ref	-	-	-

Discussion

Main findings and implications

Using multiple linear regression analyses, this study explored the associations between men's grief following pregnancy loss/neonatal death and a range of previously identified socio-ecological factors [36]. Findings demonstrated that the severity of men's grief (as measured by the PGS) was significantly associated with nine variables. Men who had experienced previous losses, lower levels of social support and lower marital satisfaction, little acknowledgement of their grief from friends, or felt their role as a 'supporter' prevented them from grieving, had higher grief scores. More time spent bonding with the baby during pregnancy, as well as higher levels of acknowledgement from family, were also significantly associated with increased intensity of grief. Men's grief scores also differed depending on the type of loss experienced, with later gestation losses and neonatal death generally associated with higher grief scores.

Factors associated with men's grief also differed depending on grief style. Only three variables were significantly associated with intuitive grief. Viewing an ultrasound image of their baby during pregnancy and identifying with an ethnicity other than Australian were related to higher levels of intuitive grief, while support from healthcare professionals was associated with lower levels of intuitive grief. Seven variables were significantly associated with instrumental grief. Men who had higher levels of social support, high quality of attachment to their baby during pregnancy, and acknowledgement of grief from their partner, had reduced instrumental grief. In contrast, perceptions of their supporter role interfering with their grief, higher tendencies toward self-reliance, as well as an increased amount of time spent bonding with their baby during pregnancy, were associated with higher levels of instrumental grief. Men who did not inform their workplace of their loss also had higher levels of instrumental grief than men who did. While it is possible that informing an employer leads to lower grief levels (e.g., through enhancing recognition of grief), this finding may also be reflective of the instrumental grief style itself, which typically involves coping in isolation and privacy [27].

These findings relating to grief styles imply that strategies to best support men may need to vary depending on men's grieving style. For example, intuitive grievers may benefit from higher levels of healthcare professional support and acknowledgement in the hospital, whereas instrumental grievers may benefit more from external social supports and higher levels of partner acknowledgement for their grief. This idea is in line with research on grief styles, which suggests that intuitive grievers more frequently access professional counselling services, whereas instrumental grievers rely on informal social supports [27, 83]. However, this is not to say that counselling cannot be beneficial for instrumental grievers. Rather, traditional counselling services may need to better target and support the unique needs of instrumental grievers and use tailored marketing strategies to increase their appeal/accessibility among men [83-85]. In addition, receiving adequate informal social supports may be a useful first step to providing recognition and validation to instrumental grievers, which could then lead to accessing more formal support services where required.

It is important to note that although men who had experienced a miscarriage had the lowest average grief score, their scores still met the cut-off for a high degree of grief. Standard deviations also indicated a

wide variation in scores across loss types, supporting the view than grief is a highly individualised experience, not necessarily dependent on the gestational age of the baby [10, 12, 36]. The average grief score following TOPFA was particularly high; this is in line with previous research which suggests that parents faced with TOPFA experience specific challenges which can contribute to high and/or prolonged levels of grief [86, 87]. Given these findings, further investigation is warranted to understand the potential difficulties associated with this type of loss – particularly for men, for whom limited research to date has focused on [87-89]. Overall, men who experienced a stillbirth had the highest average grief scores. Such high levels of grief may be related to both the unexpected nature of stillbirth, along with the stigma and disenfranchisement that many bereaved parents experience [1, 5-8, 10, 17]. In comparison to a neonatal death, which may be due to known medical complications and managed through a formal Neonatal Intensive Care Unit (NICU) with commensurate levels of support, parents who experience stillbirth also continue to report variation in care received and availability of support services [42, 90-93].

Men's role as a 'supporter' to their female partner has been a consistent finding across studies [10, 12, 13, 36, 39, 40, 60]. However, our findings suggest that this role in and of itself was not a significant contributor to men's grief intensity. Instead, it was the extent to which men perceived the supporter role to interfere with their grieving that was significant, particularly for instrumental grievers. Assuming a supporter role is not necessarily a negative contributor to the grief experience but, where this role takes precedence over men's needs, it may become detrimental to their grief. It is therefore imperative that healthcare professionals are equipped to assist men to balance their desire and need to support their partner, while also addressing their grief and need for support. Healthcare professionals may assist men to achieve balance by not only providing them with tailored practical tips for supporting their partner but also acknowledging their grief and making efforts to provide active, ongoing support in the weeks/months following the loss.

In line with previous research, degree of men's attachment to their baby during pregnancy was significantly associated with grief [10, 16, 36]. Although viewing an ultrasound was associated with instrumental grief, broader measures of attachment, including both time in attachment and quality of attachment, had stronger associations with grief in general. These findings are in contrast to early research suggesting that viewing an ultrasound and attending obstetric appointments were the main drivers of men's attachment to a developing baby [24, 25, 37], demonstrating that many men develop a prenatal attachment to their baby, regardless of gestational age.

One of the more unexpected findings was that higher levels of grief were associated with more acknowledgement from family. This relationship could be purely correlational, in that men who experienced higher grief sought more acknowledgement and support from family members. However, it could also be that although men received support from their family, the type of support received did not address their needs. For example, previous research suggests that although family members may be available to support men, the support may not be effective. Challenges to providing effective support reported by men have included a lack of understanding or unhelpful comments despite well-meaning intentions [10-12, 32, 94], feeling as though they needed to support their family members through their

grief [10, 13, 16, 32, 94, 95], not feeling comfortable discussing their feelings with family members (where family referred to people other than their female partner) [12], and a desire for practical support (e.g., cooking, cleaning, childcare) as well as emotional support [16]. In line with research exploring the impact of pregnancy loss and neonatal death on extended family members including siblings and grandparents [96-99], this finding supports a family-centred approach to providing information and support for loss and grief, so that all family members involved in the experience of loss are better able to support one another.

Strengths, limitations and future research

Previous research involving bereaved parents has noted difficulties in representing men's perspectives, with female participants, more often than not, outweighing men [7, 9, 92, 100]. This study is one of the largest samples of men to have been surveyed on their experiences of grief following pregnancy loss and neonatal death in Australia. In line with father-inclusive practice recommendations [85, 101], targeting the research directly for 'men/fathers' specifically, rather than 'parents' collectively, was a successful approach. However, although the sample is sizeable, the convenience nature of sampling is open to potential bias in that participants may have been unique from other men who chose not to participate. For example, one third of participants in this study had experienced four or more previous losses. High levels of internal consistency were observed for the majority of included measures. However, a low Cronbach's alpha was observed for the *Toughness* subscale of the MRNI. Although this measure of 'toughness' did not emerge as a significant predictor in any of the models in the current study, it may still be an important factor to consider, as a low alpha value may indicate that this measure did not adequately capture men's experiences of needing to be 'strong' or 'tough' as reported in previous qualitative studies [10, 12, 13, 31, 36]. Future research could explore alternative ways to measure this construct and assess whether it is important in explaining men's grief.

Although the majority of men reflected on losses within the last five years, this study relied on retrospective accounts of grief which may be open to recall bias, especially for the small number of losses which had occurred up to 20 years ago. Longitudinal studies which follow men during pregnancy and in the event of a pregnancy loss or neonatal death would be useful to identify the factors associated with grief at the time of loss, as well as to trial support services which may be useful. The cultural diversity of the sample was also limited. Although men who identified as "Australian" had higher levels of intuitive grief, no other significant associations were identified in relation to ethnicity. There is an ongoing and pressing need to examine the experiences of culturally and linguistically diverse men following pregnancy loss and neonatal death, as well as men in low- and middle-income countries where pregnancy and childbirth are still very much considered 'women's business' [33, 60, 102]. This is despite increasing evidence of the health benefits for both mother and baby when male partners are engaged in pregnancy and birth [102-106]. Finally, although this study was open to non-heterosexual men, only one participant identified as bisexual, and none as gay or transgender. Given research to suggest that gay and transgender men may face unique challenges concerning pregnancy, birth and loss [107-110], there is a need for research specifically targeting the experiences of these under-represented groups.

Conclusions

As this is one of the first studies to comprehensively explore multiple socio-ecological factors associated with men's grief intensity and style, many of the findings are relatively novel and require further research to understand the pathways underlying relationships. However, what is clear is that men often experience significant grief following a pregnancy loss or neonatal death. Strategies are needed to engage individually with men both immediately in hospitals, and in the weeks/months following a loss, to ensure they have access to tailored support and services where these are needed. To best assist men, genuine acknowledgement and engagement of men as equal partners throughout pregnancy, and in loss and grief, is required. Taking a public health or socio-ecological approach to understanding grief will also be beneficial in identifying target areas for strategies in all areas of men's lives that may be affected by their grief.

List Of Abbreviations

CMNI: Conformity to Masculine Norms Inventory; CSS: Crisis Support Scale; GPI: Grief Patterns Inventory; MRNI: Male Role Norms Inventory; NICU: Neonatal Intensive Care Unit PAAS: Paternal Antenatal Attachment Scale; PGS: Perinatal Grief Scale; SD: Standard deviation; TOPFA: Termination of pregnancy for foetal anomaly.

Declarations

Ethics and consent to participate

Ethical approval for the study was granted by the University of Adelaide Human Research Ethics Committee on the 5th of June, 2019 (approval code: HREC-2018-273). Participants provided written informed consent to be involved in the study. One participant provided verbal consent over the phone prior to the interview, as he did not have access to a printer. The University of Adelaide HREC provided approval for this consent procedure.

Consent for publication

Not applicable.

Availability of data and material

The datasets generated and/or analysed during the current study are not publicly available, as participants in the study did not provide consent for their data to be shared with other researchers.

Competing interests

The authors have no competing interests to declare.

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Authors' contributions

All authors were extensively involved in the development of the survey, including devising research questions, selection and development of included measures, piloting and revision to form the final survey. KO prepared the survey for online distribution and completed data cleaning and analysis, with the assistance of MO. All authors contributed to organisation and presentation of the data and final results. KO wrote the paper and prepared the manuscript for journal submission; all authors substantially contributed to editing the draft. All authors read and approved the final manuscript.

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- [AppendixOnlineSurvey.pdf](#)