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TITLE: PEER SUPPORT IN CRITICAL CARE: A SYSTEMATIC REVIEW.

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ABSTRACT

Objective: Identifying solutions to improve recovery after critical illness is a pressing problem. We systematically evaluated studies of peer support as a potential intervention to improve recovery in critical care populations and synthesised elements important to peer support model design.

Data Sources: A systematic search of MEDLINE, CINAHL, PsychInfo, and EMBASE was undertaken May 2017. PROSPERO ID: CRD42017070174.

Study Selection: Two independent reviewers assessed titles and abstracts against study eligibility criteria. Studies were included where 1) patients and families had experienced critical illness and 2) had participated in a peer support intervention. Discrepancies were resolved by consensus and a third independent reviewer adjudicated as necessary.

Data Extraction: Two independent reviewers assessed study quality with the Newcastle-Ottawa Scale and the Cochrane Risk of Bias Tool, and data were synthesized according to the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines (15) and interventions summarized using the Template for Intervention Description and Replication (TIDieR) Checklist.

Data Synthesis: 2932 studies were screened. Eight were included, comprising 192 family members and 92 patients including adults (with: cardiac surgery, acute myocardial infarction, trauma), paediatrics and neonates. The most common peer support model of the eight studies was an in-person, facilitated group for families that occurred during the patients' ICU admission. Peer support reduced psychological morbidity and improved social support and self-efficacy in two studies; in both cases, peer support was via an individual peer-to-peer model. In the remaining studies, it was difficult to determine the outcomes of peer support as the reporting and quality of studies was low.

Conclusions: Peer support appeared to reduce psychological morbidity and increase social support. The evidence for peer support in critically ill populations is limited. There is a need for well-designed and rigorously reported research into this complex intervention.

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INTRODUCTION

Patients experience physical, cognitive and mental health sequelae recognized as Post Intensive Care Syndrome (PICS) following critical illness (1, 2). Significant morbidities can endure for years (3, 4) with a profound impact on survivors' reintegration with their communities and participation in previous familial, social, and professional roles. Although less researched, the impact of ICU care on patients' family members is recognized as PICS-Family (PICS-F), and is associated with negative psychological disorders and emotional burden (5, 6).

Peer support has potential to ameliorate the burdens of PICS (7) through promoting a culture of resilience and enhanced recovery (7). Peer support, based on shared experiential empathy, has been long used in other patient populations, such as cancer (8) and more recently explored in patients with heart failure (9), diabetes (10), and traumatic brain injury (TBI) (11). The introduction of the Society of Critical Care Medicine's Thrive Peer Support Collaborative in 2015, an initiative aimed to support the start-up of peer support groups globally (12), has led to increased interest within critical care.

Despite burgeoning research into outcomes after critical illness, few interventions have been shown to reduce the severity and frequency of PICS or PICS-F (13). Given the potential for peer support to improve outcomes, it is important to identify and evaluate the impact of peer support interventions on patient and family outcomes following critical illness and synthesise key elements of model design and structure.

MATERIALS AND METHODS

Following work in psychiatry, we defined peer support as: *"Peer support services bring together nonprofessionals with similar stressors or health problems for... mutual support or unidirectional support from an experienced peer to a novice peer. Peer support services can be delivered in groups or pairs, and in person, over the telephone, or through the internet"* (14). Peer

support interventions where a professional was involved or facilitated this connection were also included in the review.

We considered patients and families to have experienced “critical illness” if the patient was cared for in an intensive care unit (ICU) (Table 1). We were interested in capturing any health-related outcomes and grouped the types of health outcomes *a priori* as: positive psychological outcomes (coping, resilience, post-traumatic growth); negative psychological outcomes (anxiety, depression, post-traumatic distress syndrome); physical; cognitive; social and health-related quality of life outcomes.

This systematic review was registered on The International Prospective Register of Systematic Reviews (PROSPERO) in advance (CRD42017070174) and conducted and reported according to the Preferred Reporting Items for Systematic Reviews (PRISMA) guidelines (15).

Search strategy and sources

PROSPERO and the Cochrane Library were searched to ensure a previous systematic review of peer support for survivors of critical illness was not published. The Patient, Intervention, Comparison, and Outcome (PICO) question was: What are the outcomes of peer support interventions on patient and family outcomes following critical illness?

A systematic and comprehensive search strategy with relevant terms was developed (Table 1). No search limits were applied.

Medical Literature Analysis and Retrieval System Online (MEDLINE) (1950-2017), Cumulative Index to Nursing and Allied Health Literature (CINAHL) (1982-2017), PsychInfo (1920-2017), Excerpta Medica Database (EMBASE) (1980-2017) were searched via the Western Health Library, Melbourne, Australia by a single reviewer (KR) between May 16-22, 2017. Personal files and reference lists of included studies were used to identify additional relevant citations.

Study selection

Two independent reviewers (KH, SB) assessed titles and abstracts against eligibility criteria (Table 2). Full-text articles were sourced where the abstract contained insufficient information to determine eligibility. Eligible full-text articles were independently reviewed by both reviewers (Table 2). Discrepancies were resolved by consensus between the two reviewers, but where consensus could not be reached, a third independent reviewer adjudicated (RH).

Study screening and data extraction (including risk of bias)

Data extracted into a standardised form and independently crosschecked. Data items included: 1) study details (author, publication year, study geographic location and design); 2) participant (patient and/or family) demographics, eligibility criteria; sample size; 3) details of the peer support intervention (reported using the Template for Intervention Description and Replication (TIDieR) Checklist (16) (Supplemental Tables 1 and 2) patient and/or family outcomes. Narrative findings from qualitative studies were independently extracted by the reviewers and synthesised into broad descriptive themes (17).

Both reviewers independently assessed risk of bias, using the Newcastle-Ottawa Scale (NOS) (non-randomised trials) (18), and the Cochrane Risk of Bias Tool (randomised controlled trials (RCTs) – rated as high, low or unclear risk) (19).

Analysis

Reviewer agreement was measured with Kappa statistic (κ) and was interpreted according to Landis and Koch (20). Excel for Mac 2011 (Version 14.1.0, Microsoft Corporation, Santa Rosa, CA) was used to store and manage references and data extraction. SPSS™ for Macintosh statistical software package (Mac SPSS™ Statistical Version 20, IBM, New York, NY) was used for analyses.

RESULTS

Study Selection

The search retrieved 3573 citations. After de-duplication, 2932 titles and abstracts were screened for eligibility. One hundred and ninety-one abstracts and 20 full-text articles were reviewed; eight full-text articles were included (Figure 1). Kappa for reviewer agreement on abstract and full-text articles was excellent (0.92 n = 191, p < 0.001) and moderate (0.47 n = 12, p 0.098), respectively. Eight articles were adjudicated by the third reviewer; all were excluded.

Characteristics of included studies

Most studies were conducted in the United States (21-24) and Canada (25-27) with one study conducted in Sweden (28). One study was a RCT (26); four were comparative cohort studies (22, 24, 27, 28) and three were qualitative studies (21, 23, 25). The included studies enrolled 192 family members (21-25, 27) and 92 patients (25, 26, 28) treated in ICU between 1994-2001 (Table 3) of whom 56 patients were included in the RCT.

The most common model of peer support was an in-person, facilitated support group where a professional led the group (21-24) (4 studies). One study used a similar facilitated support group but delivered this via a web-based video conference (25); two studies used a buddy peer-to-peer model (26, 27) and one study used a combined model of group-based peer support and physical rehabilitation (28). Four of the five quantitative studies included a description of the control conditions, which was usual care (no support group) (Table 4) (22, 26-28). The most common assessed outcome for the five quantitative studies was anxiety (22, 26, 27).

Outcome Measurement

Three of five quantitative studies included standardised outcome instruments (22, 26, 27) while the others administered investigator-developed questionnaires (24, 28) (Table 4). Anxiety, the most common outcome of interest, was measured via the State-Trait Anxiety Inventory (STAI) in three studies and was not measured in the other two studies. Three studies measured social support (24, 27, 28) although only one used a standardised outcome instrument—the Multidimensional

Scale of Perceived Support (27); the other two used an investigator-developed instruments (24, 28). Outcome measurement generally occurred at study enrolment and immediately following peer support program completion (depending on intervention delivery timing which was variable) (Table 4).

Quantitative Outcomes of Peer Support

Both studies utilising a buddy peer-to-peer model reported significant differences in favour of peer support (26, 27), although only one study randomised participants (26). A reduction in anxiety and depression, and an increase in perceived social support (27) and self-efficacy (26) was observed in these two studies. In contrast, no difference in anxiety was found using a group peer support model (Table 4) (22). Two studies reported mixed results but did not use standardised outcome measures (Table 4) (24, 28). For example, Sabo and colleagues found no difference in stress, feelings of hope, or social support between controls and group peer support (24). It was difficult to ascertain the effect of peer support in the study (combined with physical rehabilitation), as no scores were reported for their investigator-developed questionnaire (28).

Quantitative Synthesis of Results

Due to study heterogeneity and inclusion of only one RCT, meta-analyses could not be undertaken.

Qualitative Outcomes of Peer Support and Synthesis of Results

Three qualitative studies provided a descriptive analysis of participation in the peer support groups (21, 23, 25). Two key themes were identified: universality of experiences and shared coping. Peer support participation facilitated recognition that many problems were shared by other peers, and reduced feelings of isolation: "*I felt the group really understood what I was feeling. Other parents in our group have experienced similar situations; I feel less alone*" (21). Shared coping occurred through problem-solving, comparison and reframing of participants own experiences: "*I*

thought my situation was bad, but hearing the other parents, I'm not as bad off as I thought" (21). This was enhanced through *"former patients returning to the group to talk about what made significant differences to them"* (23).

Models of Peer Support

The models of peer support are reported according to the TIDieR template for complex interventions (Supplemental Tables 1 and 2).

Why: Across all studies the shared rationale for investigating peer support interventions was based on the restorative aspects of social support - cohesion, altruism and universality leading to informational exchange, facilitation of individual growth, and discovery of coping mechanisms.

What (Materials): Most studies did not report any physical or informational materials used in the intervention except Damianakis and colleagues who described in detail their website content and educational/informational handbooks (25).

What (Procedures): All studies provided detailed descriptions of how participants were invited into the peer support interventions, how the group or model ran and facilitation techniques used. For the five studies reporting group-based peer support, participants were invited to the group by staff or brochure advertising. The groups followed a structure where introductions occurred and participants were invited to share their stories (21-24, 28). One study used a similar model delivered by online videoconference to overcome common barriers to support group attendance (such as distance, transportation issues, lack of motivation to travel). Two studies delivered buddy (peer-to-peer) programs where an experienced peer provided one-to-one support (26, 27). Compared to group based peer support, a key feature of the 'buddy' programs, was training to develop volunteer communication skills, self-awareness and the provision of emotional, informational and social support. This training took an average of six hours (26).

Who (facilitators): Critical care clinical nurse specialists and/or a social worker mainly facilitated the group-based models. Two studies included other members of the interdisciplinary team (e.g. physical therapist, occupational therapist, dietician, speech therapist) as supplementary facilitators (21, 28).

How and Where: Most studies described in-person peer support groups delivered as a stand-alone intervention. Only one study combined a peer support group component with another intervention, in this case in-person physical rehabilitation (28). In-hospital peer support groups were generally delivered near to the ICU or in the waiting room. Damianakis used the Internet as a delivery mode to videoconference the peer support group (25). Buddy peer-to-peer support models were delivered via in-person hospital visits (26) and via phone (27), during and following hospitalisation.

When and how much: Peer support models were predominantly delivered during ICU admission. Two studies delivered peer support in the sub-acute and chronic phase of illness – one in the outpatient setting following myocardial infarction (28) and the second in caregivers of TBI-people who were on average 4.6 (range 2-12) years post-injury (25). Group-based peer support was generally delivered in weekly, one-hour sessions with a duration that ranged from five weeks to an unlimited period while buddy peer-to-peer support was limited to three visits (26) or nine phone contacts averaging a total of nine hours (27).

Tailoring: Two studies described tailoring of the intervention; firstly, diverse cross-cultural participation was encouraged, using interpreters (23) and secondly, the peer support group was unstructured, not topic-driven focusing on a client-centred approach.

Planning and Implementation of Intervention: No studies reported how intervention adherence or fidelity was assessed or any strategies used to maintain or improve fidelity. Less than half of the studies reported some description of intervention delivery. Two studies reported

approximately 5-6 participants attended the available peer support group (23, 27) and another described all 27 intervention group patients received the planned number of buddy peer-to-peer visits (26).

Risk of Bias within studies

The percentage agreement for risk of bias scores was 100% between reviewers. The overall methodological quality of the cohort studies was low as assessed using the Newcastle-Ottawa Scale (Supplemental Table 3). The RCT had a low risk of bias in most categories of the Cochrane Risk of Bias Tool.

DISCUSSION

Peer support has the potential to improve outcomes for patients and families who have experienced critical illness (8). This systematic review describes the literature on outcomes and models of peer support in critical care cohorts however only eight eligible studies were identified. Quantitative methods were the predominant study design with three studies utilizing qualitative inquiry; only one RCT was identified. There was a high risk of bias in most studies.

We believe that this systematic review has implications for the bedside clinician. The first is that there is growing scientific interest in peer support in the ICU, and that the idea passes the test of having a “physiologically plausible” rationale. The second is that it is possible to rigorously test the efficacy of peer support interventions. The third is that such rigorous tests have not yet been done for core populations. This provides critical context given the growing drumbeat in the critical care community at large—to do something, *anything*, to help survivors of critical illness. While the authors are deeply sympathetic to such a perspective, we believe this review demonstrates that evidence-based clinicians could (a) develop innovative new programs in peer support, as there is no single proven model they would be denying patients by engaging in such innovation; and (b) reasonably choose not yet to adopt peer support programs (despite their compelling physiologic

rationale). There is an urgent need for rigorous mixed methods evaluations of all new peer support programs, to contribute to this nascent scientific literature.

In its totality, the evidence for benefit of peer support is mixed with some studies showing that peer support reduced anxiety and/or depression, and improved social support and self-efficacy (26, 27), while other studies showed no difference in outcomes between intervention (peer support) and control (usual care) (22, 24). Key differences between these studies are the peer support model and timing of delivery. In the two studies where outcomes improved, peer support was delivered via an individual peer-to-peer model that started in hospital and extended beyond discharge (26, 27). Comparatively, in the two studies where no difference in outcomes was observed, peer support was delivered via a facilitated group model within the hospital, during the patients' admission to the ICU. Selection of the model and timing of delivery may require careful consideration that matches the patient and caregiver support needs as their needs change across care continuum from the ICU through to discharge from hospital and beyond (29).

Models of peer support and key design elements provide important information that may guide further research design. All studies used formal peer support models that were facilitated by a professional and nearly all were delivered in hospital during the acute crisis period (21-24, 26, 27). This meant most of the models were delivered to families only, while just two studies described peer support in patient cohorts (26, 28). Delivering formal peer support during an acute crisis not only limits participation to just families, but it may also restrict attendance if families are experiencing stress and cannot manage competing demands or can only attend the group sporadically preventing group cohesion (24). It is possible the acute crisis period may be better suited to a buddy peer-to-peer model where family members of former ICU patients provide support to those in the ICU waiting room as is done in cancer cohorts (30). This model operates by selecting peer mentors (a cancer survivor or caregiver) and matches them to provide one-on-one support to other cancer survivors or caregivers who are at the beginning of their experience and recovery.

The sub-acute or post-hospital phase may be a more appropriate setting to deliver formal group-based models during the adjustment and adaptation phase (29) and could include both patients and their families. This timing of intervention, in the post-hospital setting, is more typical across the peer support literature as described in comparable cohorts (where there is initial trauma then recovery) such as stroke (31) and TBI (12, 32). Significant opportunity exists to explore the implementation and effectiveness of formal group-based peer support in the sub-acute setting for critical care survivors and their families.

While it is not possible to determine the most effective model of peer support from data included in this review due to limited and heterogeneous models and interventions, the two studies that delivered a buddy peer-to-peer model showed favourable outcomes. Support for this model has been demonstrated in other peer support literature such as TBI (12, 32). In a small sample of 20 community-dwelling individuals with TBI and their family, participants reported positive impacts such as increased knowledge of their condition, enhanced quality of life, improved life outlook and ability to cope (12). To move the critical care peer support field forward, studies that assess the efficacy of peer support need to be rigorously designed and reported, like other cohorts such as diabetes (33) and mental health (15, 34). Despite the presence of some high-quality studies; systematic reviews in these areas remain unable to report firm recommendations for the implementation of peer support due to deficiencies in conduct and reporting of many existing trials. This highlights the challenges of evaluating complex interventions such as peer support, and the need for standardized and explicitly comparable reporting.

CONCLUSIONS

Few studies have investigated peer support interventions in critical care cohorts. While of generally low quality, the existing studies indicate that peer support has potential to reduce psychological morbidity and increase social support. Group-based peer support was the most common model of peer support although peer-to-peer mentor appeared to produce favourable

outcomes. The limited evidence does not support firm recommendations for implementation of peer support in critically ill populations at this time. Future studies warrant rigorous methodological design and reporting to advance the state of the science.

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Table 3 Characteristics of Included Studies

Author/ Year	Location	Design	Participants	Cohort n	Outcome/s of Interest	Peer Support Intervention	Control Conditions
Halm 1990 (22)	U.S.	Prospective comparative, quasi-experimental cohort study	Family members who visited patients in a surgical ICU	55	Anxiety	ICU Family Support Group - in-person facilitated group.	Conventional bedside support (informational and psychologic support)
Amico 1994 (21)	U.S.	Qualitative	Parents of critically ill paediatric patients	NR	Qualitative description of parents experience of group participation	ICU Parental Peer Support Group - in-person, facilitated group	N/A
Fridlund 1993 (28)	Sweden	Prospective comparative cohort study	Critically ill male patients following AMI	36	Social network and social support	Group-based Peer Support + Physical Rehab Cardiac caring program inclusive of patients, NOK and interdisciplinary team	Routine cardiac follow-up given to every AMI patient at 5 weeks and 3 months
Sabo 1989 (24)	U.S.	Prospective comparative cohort study	Family members of critically ill patients with ICU LOS >24hrs	67	Stress, social support and hope	ICU Family Support Group - in-person facilitated group	NR
Harvey 1995 (23)	U.S.	Qualitative	Family members of critical care trauma patients	NR	Qualitative description of family and staff perspectives of group participation	ICU Family Support Group - in-person facilitated group	N/A
Parent 2000 (26)	Canada	RCT	Patients undergoing CABG surgery	56	Anxiety, Self Efficacy, Self Reported Activity	Buddy former patient-to-patient program	Routine information on surgery and recovery
Preyde 2003 (27)	Canada	Prospective comparative cohort study	Mothers of very preterm infants in NICU	60	Stress, Anxiety, Depression, Levels of perceived social support, Proneness to Anxiety	Buddy parent-to-parent program	Standard medical and social work care
Damianakis 2016 (25)	Canada	Qualitative	Community-dwelling caregivers of TBI patients previously admitted to ICU	10	Analysis focused on the content of the group discussions and only minimal appraisal on the model of peer support	Web-based video conferenced, facilitated support group	N/A

U.S. = United States; NR = Not reported; N/A = Not applicable; AMI = Acute myocardial infarction; I = Intervention group; C = Control group; SD = Standard deviation; ICU = Intensive care unit; LOS = Length of stay; RCT = Randomised controlled trial; CABG = Coronary artery bypass graft; NICU = Neonatal intensive care unit; ICU = Intensive care unit; TBI = Traumatic brain injury

Table 4 Outcomes of Peer Support for Quantitative Studies

Author	Outcome	Instrument	Score Range	Time Point/s	Scores Mean (SD)	Other outcomes and Comments:
Halm 1990 (22)	Anxiety	STAI	20-80*	Enrolment (in ICU) & 12-18 hours post	I: Trait 34.6 (6.6) Pre-State: 51.7 (13.9) Post-State: 41.9 (11.7) C: Trait 5.4 (9.2) Pre-State: 48.4 (13.5) Post-State: 42.3 (15.9)	No difference in state anxiety between intervention & control
Fridlund 1993 (28)	Social support & social network	Investigator-developed 10-item questionnaire	Score range & direction of scoring NR	Enrolment (before hospital discharge) & 3 months post AMI	NR	<i>Social Support:</i> Nine AMI-patients in both groups expressed a need for complementary social support. <i>Social Network:</i> Both groups expressed sufficient social network built on family at time of AMI and at 3 months. The intervention group increased their social network while the control group showed a decrease during the same period. Complementary social support after an AMI from professionals confirms AMI-patients' recovery & whole family has to be supported.
Sabo 1989 (24)	Stress, social support & hope	Investigator-developed questionnaire	Stress 10-50# Social support 10-50# Hope 7-35#	Data collected over 3wks prior to initiation of support group	I: <i>Stress:</i> 28.45, <i>Social support:</i> 38.03 <i>Hope:</i> 22.16 C: <i>Stress:</i> 28.11, <i>Social support:</i> 39.17 <i>Hope:</i> 22.58	52% (n = 16) felt the group "somewhat decreased" their <i>stress</i> . 71% (n = 22) treatment group felt "some increased feelings of <i>support</i> ". 45% (n = 14) felt an "increased sense of <i>hope</i> ". Attending an ICU family support session did not significantly change stress levels, feelings of hope, and social support.
Parent 2000 (26)	Anxiety, self-efficacy expectation, self-reported activity	STAI Jenkins Self Efficacy Expectation Scales Jenkins Activity Checklists	STAI 20-80* Self-efficacy 0-10 ⁵ Activity 0-14 for walking & 0-7 for climbing stairs but expressed as percentages ⁵	48 & 24 hours before surgery, 5 days & 4 weeks post-op: anxiety 5 days & 4 weeks post-op: Self efficacy & activity	I: Anxiety 48 hours: 46.6 (14), 24hrs: 29.2 (8.7), 5 days: 25.2 (5.2), 4 weeks: 25.3 (5.4); Self-efficacy & Activities 5 days: 7.5 (2.1) & 50.6 (18.6) 4 weeks: 9.6 (0.7) & 84.3 (12.8) C: Anxiety 48 hours: 39.8 (10.6), 24hrs: 38.8 (10), 5 days: 36.1 (9), 4 weeks: 31.4 (8.6); Self-efficacy & Activities 5 days: 5.4 (1.7) & 29.5 (18.4), 4 weeks: 9.1 (1.1) & 76.1 (14.9)	<i>Usefulness of intervention:</i> 97.3% responded with 4 (very much) on a 4-point Likert scale & 3.7% responded with 3 (moderately). Extent to which they would recommend such an intervention, all subjects (100%) responded with a maximal score of 4 on the scale. Intervention group showed a statistically significant decrease in anxiety during hospitalisation & lower anxiety at all measurement times after first intervention, compared with control. Intervention group reported statistically significant higher levels of self-efficacy & self-reported activity for general activities
Preyde 2003 (27)	Parental stress, anxiety, depression, perceived social support	Parental Stress Scale NICU STAI BDI MSPS	Stress 0-5^ Likert STAI 20-80^ BDI 0-63^ MSPS	Enrolment & 4 weeks: Parental Stress Scale Enrolment & 16 weeks post: STAI, BDI, MSPS	I: <i>Enrolment:</i> Stress: 3.18 (0.86), STAI: 44.9 (15.6), BDI: 4.53 (3.81), 4 weeks: Stress: 1.54 (1.3-1.7), 16 weeks: STAI: 31.4 (27.2-35.4) BDI: 2.20 (0.89-3.60) MSPS: 6.49 (6.02-6.88) C: <i>Enrolment:</i> Stress: 3.28 (0.68), STAI: 49.2 (11.9), BDI: 5.57 (3.28), 4 weeks: Stress: 2.93 (2.7-3.1). 16 weeks: STAI: 38.6 (34.6-42.7) BDI: 4.88 (3.51-6.17) MSPS: 5.48 (5.09-5.94)	At baseline, no statistical difference between groups. At 4 weeks post enrolment, the intervention group reported less stress than control that was statistically significant. At 16 weeks post enrolment, the intervention group reported less state anxiety and depression and greater perceived social support than the control that was statistically significant

STAI = State trait anxiety inventory; *Higher score indicates higher level of anxiety; AMI = Acute myocardial infarction; N/A = Not applicable; # higher scores = greater stress/social support/hope; NICU = Neonatal intensive care unit; BDI = Beck depression inventory; MSPS = Multidimensional scale of perceived support; ^Higher scores = higher stress/anxiety/depression; ⁵Higher scores indicate more positive outcomes.