Article:
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Supplemental table S1: Overview of studies

Article *(first author, year, country).*	**Study** *(design, duration, setting).*	**Participants** *(cancer site & stage, sample size).*	**Intervention focus***	**Mode of delivery**	**Intervention description**	**Summary of relevant findings**
Interactive Health Communication Applications (IHCAs)						
Børøsund et al 2014, Norway.[39]	RCT, 12 months, home setting.	Stages I-III, breast. Intervention N=64 Control N=45 IPPC alone N=58 *(Internet based Patient-Provider Communication Service).*	S PS	Self-management.	- 'Web Choice' web-based illness management system. - Assessment: self-monitoring of symptoms. - Self-management support: information & activities tailored in response to results of self-monitoring. - Information: signposting to other web sources related to e.g. lifestyle, treatment, legal rights. - Communication: area to share experiences plus nurse monitored forum & blogs. - Electronic diary: for patients to record notes.	Significantly lower symptom distress (p=0.001), anxiety (p=0.03) and depression (p=0.03) in intervention vs usual care group. Significantly lower depression scores for IPPC group (p=0.03) vs usual care. (Preliminary analysis undertaken at 6 months).
Gustafson et al 2008, USA.[40]	RCT, 5 months, home setting.	Stages 0-IV, breast. Intervention N=91 Internet only N=83 Control N=83	S PS	Supported self-management.	- 'Comprehensive Health Enhancement Support System' (CHESS). - Information: breast cancer resources, Q&A section, healthcare consumer advice, signposting & links. - Communication: facilitated discussion groups for patients and family, expert responses to patient questions, videos of patient experiences. - Decision support: physical & psychological symptom monitoring and tailored advice, decision aid & suggested action plans.	Four months post-intervention (T=9 months), CHESS group scored significantly higher than control group for QoL (p=0.018) and social support (p=0.021), but not higher than the internet only group. Social support was also higher for those in CHESS group during intervention period, compared to internet alone (p=0.003, T=2 months) and control (p=0.004, T=4 months).
Gustafson et al 2013, USA.[32]	RCT, 8 months, home setting.	Stage III-IV, non-small cell lung cancer. Intervention N=144	S PS	Supported self-management/ clinically integrated.	- CHESS *'Coping with lung cancer' website.* - Information: lung cancer, bereavement and caregiving, plus tools to support caregiving. - Communication: support from peers, clinicians, experts & channels for social networking.	Patient physical symptom distress (caregiver reported) lower in CHESS vs control (internet) arm (p=0.031 at 4 months & p=0.004 at 6 months). Marginal significance

		Control (internet) N=141 *(patient-care-giver dyads).*			- Decision support: algorithm-driven tailored information provided based on self-reported data. - Clinician involvement: summary of self-reported and caregiver reported patient health status sent to clinician, with patients' questions listed for next visit. - Email alerts to clinicians where reported symptoms ≥7 (on a scale of 0-10).	seen at 2 months (p=0.051) and 8 months (p=0.081).
Huang et al 2019, Taiwan.[33]	RCT, 3 months, home setting.	Stage III-IV, non-small cell lung cancer. Intervention N=27 Control N=28	S PS	Supported self-management.	- Web-based health education program. - Self-monitoring of symptoms & health indicators. - Educational information relating to lung cancer, staging, treatment, care & symptom management. - Social & emotional supportive resources & patient experiences. - Q&A facility for patients to contact research nurse, with timely reply (within 24 hours).	Significantly improved global QoL (p<0.05), emotional function (p<0.01) and symptom distress (p<0.01) for intervention vs control group from pre-test to post-test. Three months later, significantly larger group x time interactions for global QoL (p<0.05) and emotional function (p<0.05) in intervention users vs controls.
Kim et al 2018, Korea.[34]	RCT, 3 weeks, home setting.	Stage IV, breast. Intervention N=36 Control N=40	S H/L	Self-management.	- 'ILOVEBREAST' interactive mobile game. - Multi-player educational game with integrated social networking. Avatar created based on user information, with quest to carry out activities to minimise chemotherapy side-effects. - Self-monitoring feature using personal avatar. - Education & support for prevention of side-effects and to encourage activities promoting well-being.	Greater QoL in intervention group during chemotherapy compared to control group (p=0.01). Smaller decrease in QoL in intervention vs control group (p=0.01). No significant between group differences for depression or anxiety.
O'Carroll Bantum et al 2014, USA.[42]	RCT, 6 months, home setting.	Stages 0-IV, mixed sites. Intervention N=176 Control N=176	H/L PS	Supported self-management/ professionally delivered.	- 'Surviving and Thriving with Cancer' (STC): website delivering weekly sessions (by trained facilitators) with information & skills development relating to e.g. diet, exercise, relaxation for stress, fatigue etc. - Patients encouraged to develop weekly behaviour change action plans. - Feedback provided by facilitator. - Discussion board & 'post-office' for patients to interact with each other publicly & privately.	Greater improvement in insomnia for intervention group (effect size 0.20, p=0.03). No significant changes for depression or fatigue.

					- 'My tools' where patients can log behaviour, access relaxation exercises & find links to other resources.	
Owen et al 2017, USA.[37]	RCT, 12 weeks, home setting.	Stages 0-IV, mixed sites. Intervention N=176 Control N=171	PS	Supported self-management/ professionally delivered.	- 'Health-Space': Social networking intervention targeting distress management. - Personal profiles for patients to describe themselves and their experience of cancer. - Live facilitated chat (weekly), discussion board & email to engage with each other & with facilitators. - Weekly guidance modules with educational information & interactive activities.	Greater reduction in fatigue in intervention versus control group (p=0.04). No significant improvements in psychological functioning, depressive symptoms, anxiety or vigour.
Petzel et al 2018, USA.[35]	RCT, 60 days, home setting.	Stage III/IV/recurrent ovarian, peritoneal or fallopian tube. Intervention N=20 Control N=15	PS S	Self-management.	- 'Together': Online tool to promote advance care planning, cancer knowledge & address emotional health. - Learning library & recommended readings. - Functions for monitoring distress & goal setting. - Area to record questions for care providers. - Social networking: shared journal & forum.	No significant difference between intervention and control groups for any measure of distress (DT, HADS, and IES).
Ruland et al 2013, Norway.[38]	RCT, 12 months, home setting.	Stages 0-IV, breast & prostate Intervention N=162 Control N=163	S PS H/L	Supported self-management.	- 'WebChoice' (same intervention evaluated in Borosund et al. 2014).[39] - Addition of Q&A area for patients to ask nurses questions.	HRQOL and self-efficacy scores worsened within control group (p= 0.006, p=0.005), but not within intervention group. Between-group differences in symptom distress significant for global distress index (GDI) only (p= 0.037).
Steel et al 2016, USA.[31]	RCT, 6 months, home setting.	Advanced stage, mixed sites. Intervention N=144 Control N=117	PS S H/L	Supported self-management/ clinically integrated.	- Psychoeducational website with library of audio-visual and other resources. - Self-management component enabling symptom recording and self-monitoring. - Patient journal and chat room to engage with others. - Use of IHCA integrated with telephone follow up every 2 weeks & visits with care co-ordinator every 2 months.	Participants presenting with clinical levels of symptoms showed statistically (p= 0.05) & clinically significant improvement in QoL (FACT-G) at 6m follow up (intervention n=15, control n=12), with a large effect size (0.99).

Wise et al 2018, USA.[36]	RCT, 4 months home setting.	Stage III/IV, mixed sites. Intervention N=59 Control N=51	PS	Self-management.	- '*miLivingStory*': Patient's illness narrative (elicited via telephone) digitalised and incorporated into a multi-component website. - Signposting to information, resources and support. - Social networking to share story and other media.	Improvements in peace (direct positive effect p=0.029) and depressed mood ('trend effect' p=0.097) at 4 months for intervention vs control group.
Zhu et al 2018, China.[41]	RCT, 12 weeks, home setting.	Stages I-IV, breast Intervention N=57 Control N=57	S PS	Supported self-management.	- Breast Cancer e-Support ('BCS') mobile application. - Learning forum: breast cancer education and symptom management strategies. - Discussion & ask the expert forums: support and advice provided by peers & health professionals. - Personal stories forum: selection of patients' experiences shared via video.	Lower QoL and self-efficacy observed with initiation of chemotherapy. However, controlling for baseline scores, intervention group experienced less worsening in QoL (d=0.46, p=0.03) and self-efficacy (d=0.53, p=0.03) at 3 months than care as usual (though not maintained at 6 months).
Virtual programmes of support						
Boele et al 2018, Netherlands.[51]	RCT, 5 weeks, home setting.	Stages II-IV, neurological. Intervention N=45 Control (glioma) N=44 Non-CNS cancer control N=26	PS	Supported self-management.	- Online glioma specific guided self-help course for symptoms of depression. - Based on problem-solving therapy. - 5 modules with examples & exercises for patients to work through, plus support from a trained coach to facilitate completion.	No evidence of effectiveness on HRQOL of glioma patients. No statistically significant differences in depressive symptoms between groups, though borderline significant post-treatment reduction in fatigue was observed in glioma patients (p=0.054).
Carpenter et al 2014, USA.[45]	RCT, 10 weeks, home setting.	Stages 0-III, breast. Intervention N=71 Control N=61	PS	Professionally delivered.	- 'Coping with Cancer Workbook': Online stress management taught through didactic instruction. - CBT based coping strategies and guided interactive exercises. - Integrated videos of patient case studies plus guidance provided by social worker. - Integrated discussion board moderated by oncology health professionals.	No significant improvement for social/functional well-being (FACT-B). Significant for primary outcomes of self-efficacy for coping with cancer (p=0.019) and self-efficacy for coping with negative mood (p=0.007). Cancer related post-traumatic symptoms also lessened with intervention use (p= 0.002*).*

Compen et al 2018, Netherlands.[46]	RCT, 8 weeks, home setting.	Stages 0-IV, mixed sites. Intervention (eMBCT) N=90 MBCT (face to face) N=77 Control N=78	PS	Professionally delivered.	- Online Mindfulness Based Cognitive Therapy (eMBCT). - Materials for 8-week course provided on website plus weekly interactions with therapist. - Patients to complete practice diaries daily, with fictional patients' examples for guidance. - Asynchronous feedback and interaction with therapist via email.	Compared to usual care, both MBCT and eMBCT improved scores for mental health related QoL ($p< 0.001$) but not for physical QoL. Both interventions also reduced distress, fear of recurrence and rumination and improved scores for mindfulness skills and positive mental health (all $p<0.025$).
Galiano-Castillo et al 2016, Spain.[52]	RCT, 8 weeks, home setting.	Stages I-III, breast Intervention N=40 Control N=41	H/L	Professionally delivered/ supported self-management.	- 'e-CUIDATE': Online, individually tailored exercise programme plus information about breast cancer. - Area for patients to write questions, send instant messages & set up video conferences with research staff, who also monitor progress remotely.	Significantly improved scores across all domains (EORTC-QLQ-C30 and BC module) for intervention arm ($p<0.01$).
Greer et al 2019, USA.[43]	RCT, 12 weeks home setting.	Stage IV, mixed sites. Intervention N=72 Control N= 73	PS	Self-management.	- Multi-component mobile application delivering anxiety management skills & exercises over 6 sessions. - Patient-therapist interactions simulated within integrated videos. - Corresponding homework plus review session.	Both intervention and control participants experienced improved QoL, anxiety and mood (d=0.45 – 1.20). However, no significant between group differences. Sub-group analysis showed intervention users with severe baseline anxiety experienced significantly improved anxiety (p=0.010).
Knoerl et al 2018, USA.[47]	Pilot RCT, 8 weeks, home setting.	Stages I-IV, mixed sites. Intervention N=30 Control N=30	S PS	Self-management.	- 'Proactive Self-management Programme for Effects of Treatment' (PROSPECT). - Self-guided pain management course. - CBT & self-management strategies delivered as modules on password-protected website. - Integrated videos and worksheets. - Self assessment of symptoms to guide content.	No significant differences observed (in mean change scores) for EORTC QLQ CIPN20 sensory (p=0.41) or motor (p=0.95) subscales.

Ritterband et al 2012, USA.[48]	RCT, 6 weeks, home setting.	Stages I-IV, mixed sites. Intervention N=14 Control N=14	PS H/L	Self-management.	- 'Sleep Healthy Using The internet' (SHUTi). - Web-based CBT with 6 interactive cores encompassing behaviour, education and problem prevention. - Sleep diaries guiding tailored sleep recommendations & feedback. - Automated emails to encourage adherence.	No significant effect on QoL, depression or anxiety with intervention use (though overall adjusted effect sizes were small-medium, ranging from *d*= 0.42 to *d*= 0.54). Intervention group did demonstrate improvement in fatigue (*p*= <0.01).
Rosen et al 2018, USA.[53]	RCT, 12 weeks, home setting.	Stages 0-IV, breast. Intervention N=57 Control N=55	PS	Self-management.	- 'Headspace'. - Audio-visual mindfulness meditation training delivered via mobile application. - 'Take10' 10-day introductory course, with additional training accessible on completion.	Significant improvement in QoL (*p*= <0.01) and mindfulness (*p*=0.04) in intervention vs control group from baseline to follow up.
Urech et al 2018, Switzerland.[49]	RCT, 8 weeks, home setting.	Localized and metastatic, mixed sites. Intervention N=65 Control N=64	PS	Supported self-management.	- 'Stress Aktiv Mindern' (STREAM). - Website hosting 8 stress management modules, each incorporating mindfulness exercises, psychoeducation, reflection & strategies, plus additional audio exercises. - Secure chat function with psychologist.	Significantly higher QoL (*p*= 0.007) and lower distress (*p*= 0.03) in intervention vs control group.
Yanez et al 2015, USA.[44]	Feasibility RCT, 10 weeks, home setting.	Stage III/IV, prostate. Intervention N=37 Attention control N=37	PS	Professionally delivered.	- 'Cognitive Behavioural Stress Management' (CBSM). - Online group intervention, delivered via tablet, tailored to advanced prostate cancer (APC). - Each group session (delivered by a facilitator) introduces a new stress reduction technique before focusing on stress management in relation to APC.	No significant effect on FACT-G, though mean difference between groups exceeded clinically significant (4 points). Symptoms of depression significantly improved for intervention group (*p*=0.03, completers only).
Zernicke et al 2014, Canada.[50]	Feasibility RCT, 8 weeks, home setting.	Stages I-IV, mixed sites. Intervention N=30 Control N=32	PS	Professionally delivered.	- eTherapy for Cancer Applying Mindfulness (eCALM) - Online group mindfulness sessions ('Mindfulness Based Cancer Recovery') delivered online by behavioural medicine clinicians via headsets, webcams & manuals. - Sessions covering a range of topics relating to stress & mindfulness. Participants encouraged to apply learning during sessions and in own time.	Significant improvements in intervention group vs control group for mood disturbance (*p*=0.049), stress (*p*=0.021), spirituality (*p*=0.040) and mindfully acting with awareness (*p*=0.026).

Symptom monitoring tools						
Basch et al 2016, USA.[56]	RCT, continuous[†], home setting, (clinic setting for computer inexperienced subgroup).	Advanced solid tumours, mixed sites. Intervention N= 441 Control N= 325	S	Clinically integrated.	- 'Symptom Tracking and Reporting' (STAR). - Web-based interface with questions relating to 12 common symptoms for patients to self-report. - Email alerts to nurses triggered where symptoms worsen by ≥2 points or reach ≥3. - Summary report printed for clinical team to review.	More improvement and less worsening in HRQOL scores seen in STAR arm vs usual care (*p*=<0.001). No significance for computer inexperienced subgroup (*p*=0.06).
Berry et al 2014, USA.[60]	RCT, 6-8 weeks, home and clinic setting.	Stages 0-IV, mixed sites. Intervention N= 374 Control N= 378	S	Supported self-management/ clinically integrated.	- 'Electronic Self-Report Assessment for Cancer' (ESRA-C): online computer program for self-reporting symptoms & tracking QoL. - Alerts to patients when help-seeking advised. - Self-care strategies & coaching for managing & communicating symptoms. - Graphical summary & option to annotate results.	Small statistically significant difference in symptom distress between groups (*p*=0.02).
Denis et al 2017, France.[55]	RCT, trial halted,[‡] home setting.	Stages III-IV, lung. Intervention N=67 Control N=66	S	Clinically integrated.	- 'e-Follow up Application' (eFAP). - Web-mediated weekly reporting of 12 items (weight plus 11 symptoms), sent immediately to medical team. Alerts to clinicians triggered where reported symptoms meet pre-defined criteria. - Graphical summary of scores sent to medical team.	Comparing change in QoL score from baseline to 6m: stable/improved scores in 80.6% participants in intervention arm vs 58.6% control arm (*p*=0.04).
Nipp et al 2018, USA.[57]	Pilot RCT**,** intervention period not defined (average admission 6.45 days), hospital setting.	Advanced cancer, mixed sites. Intervention N=75 Control N=75	S	Clinically integrated.	- 'Improving Management of Patient Reported Outcomes via Electronic Data' (IMPROVED). - Daily symptom self-monitoring via tablet computer during hospital admission. - Summary reports generated for clinicians. Alerts to clinicians generated where symptoms worsen by ≥2 or reach ≥4.	Intervention group reported higher proportion of days with lower psychological distress than control group (*p*=0.008).
Post et al 2013, USA.[58]	Pilot RCT, 160 days, home setting.	Stages I-III, breast Intervention N=27 Control N=23	S	Clinically integrated.	- 'Communicating Health Assisted by Technology' (CHAT). - Symptom monitoring using personal digital assistant (PDA) during chemotherapy. - Videos relating to symptom communication for patients to view ahead of clinical appointment. - Summary graph for clinicians to view.	All participants' HRQOL scores decreased over course of chemotherapy (lower = worse QoL) but mean pre-post decrease generally greater for intervention group (study not powered for this outcome). No significant changes for depression or fatigue.

Ruland et al 2010, Norway.[59]	RCT, intervention period varied[§], home & hospital settings.	Various stages including advanced, haematological. Intervention N=75 Control N=70	S	Clinically integrated.	- 'Interactive Tailored Patient's Assessment tool' (Choice ITPA). - Tablet computer application allowing patients to rank symptoms (including distress) according to their priorities & need for support, encouraging communication with clinicians. - Summary report of symptoms in rank order of need for support made available for clinician review.	Significant group differences in symptom distress favouring intervention arm for discomfort (p=0.04) and sleep/rest (p=0.05). Significance also reported for sexuality (p=0.07) and eating/drinking (p=0.09). (Two-sided significance level set to 0.10)
Strasser et al 2016, Switzerland.[54]	Multi-cluster RCT, 6 weeks hospital setting.	Advanced, incurable, mixed sites. Intervention N=145 Control N=119	S	Clinically integrated.	- 'Electronic Monitoring Of Symptoms and syndromes Associated with Cancer' (e-MOSAIC). - Patients complete symptom reporting on palm-based digital device prior to weekly oncologist visit. - Patient reported outcome measures integrated with other clinical data, filled in by study personnel. - Data immediately transferred to local computer, printed & placed in patient's file for clinician review.	No statistical or clinical significance between groups in global QoL. Symptom distress significantly improved for intervention users from first to last visit (p=0.003).
Velikova et al 2004, UK.[61]	RCT, 6 months, clinic setting.	Stages 0-IV, mixed sites. Intervention N=144 Attention-control N=70 Control N=72	S PS	Clinically integrated.	- Patient self-completion of HRQOL questionnaires (EORTC-QLQ-C30 & HADS) in clinic, prior to appointment. - Graphical summary of results printed. - Physicians asked to review results during clinical encounter with patient.	HRQOL significantly improved in intervention (p=0.006) and attention control (p=0.01) groups compared to control. No significant difference in HRQOL between intervention & attention control (p=0.80).
Communication conduits						
David et al 2011, Germany.[62]	RCT, 8 weeks, home setting.	Stages I-IV, breast. Intervention N=69 Control N=64	PS	Professionally delivered.	- Individually tailored psychosocial counselling delivered via email by clinical psychologist (24 hr response time). - Welcome email introducing counsellor and suggesting topics for discussion.	No significant difference in HRQOL or psychological distress between intervention & control groups.
Donovan et al 2014, USA.[64]	Pilot RCT, 3 weeks, home setting.	Stages I-IV, recurrent ovarian. Intervention N=33 Control N=32	S PS	Supported self-management/ professionally delivered.	- 'Written Representational Intervention to Ease Symptoms' (WRITE Symptoms): online message board interactions between patient & nurses, to support symptom self-management. - Patients identify 3 target symptoms by completing symptom representation questionnaire (SRQ).	Lower symptom distress (p=0.012) and a trend for lower symptom severity (p=0.058) in intervention vs control arm at 2 weeks post intervention.

					- Individualised symptom management information. - Co-creation of care plan & self-management goals. - Self-care guides (provided via email or mail) to consolidate message board-based learning.	Repeated measures analysis supported group effect; intervention group reported lower symptom distress than controls (p=0.037).
Vilhauer et al 2010, USA.[63]	Pilot RCT, 6 months, home setting.	Stage IV, breast. Intervention N=16 Control N=14	PS	Self-management.	- Peer-peer online support group (unmoderated). - Emails sent to all group participants via automatic mailing list server. - Participants encouraged to share experiences.	No significant effect on psychosocial well-being.
Information websites						
Giesler et al 2017, Germany.[67]	RCT, 2 weeks home setting.	Mixed stages, inclusive of stage IV, colorectal. Intervention N=103 Control N= 109	S PS	Self-management.	- German language website collating experiences of health & illness. - Patients' experiential information relating to colorectal cancer organised into modules thematically and by individual cases.	No intervention effects on self-efficacy at 2 weeks or 6 weeks post baseline.
Ryhänen et al 2013, Finland.[66]	RCT, 12 months, home setting.	Stages I-III, breast Intervention N=50 Control N=48	S	Self-management.	- 'Breast Cancer Patient Pathway' (BCPP) - Flow chart of patients' breast cancer treatment pathway, with integrated links to information.	No statistically significant between group changes in QoL or anxiety.
Stanton et al 2013, USA.[65]	RCT, 6 months, home setting.	Invasive/metastatic breast. Intervention N=46 Control N=42	PS	Self-management.	- 'Project Connect Online', information website with associated self-design workshop. - Workshop to guide participants in designing their own personal websites (for themselves & others). - Template included: blog, signposting area, and 'How you can help' page for visitors to read and post messages.	Improvement in depressive symptoms (p=0.009), positive mood (p=0.03) and life appreciation (p=0.03) at 6 months follow up for intervention group (effect moderated by treatment status).

*Intervention focus: S= symptom management focus, PS= psychosocial focus, H/L= health & lifestyle focus.

† Participants remained on study until discontinuation of cancer treatment, voluntary withdrawal or death.

‡ Interim analysis demonstrated large survival benefit for intervention group leading to trial being stopped early.

§ 50 patients from each group (intervention and control) were followed for a minimum of 100 days; 25 intervention participants and 26 controls were followed up for 1 year.