## Supplementary Table 1: Consolidated criteria for reporting qualitative research (COREQ)

No. Item	Guide questions/description	Answer					
Domain 1: Research team and reflexivity							
Personal Characteristics							
1. Interviewer/facilitator	Which author/s conducted the interview or focus group?	Survivor surveys: n/a (Qualtrics survey) Partner interviews: Erin Kennedy, MPH Provider interviews: Erin Kennedy, MPH					
2. Credentials	What were the researcher's credentials? E.g. PhD, MD	Kelly Shaffer: PhD, licensed clinical psychologist Erin Kennedy: MPH Jillian Glazer: BA Anita Clayton: MD, board certified in Psychiatry and Neurology Wendy Cohn: PhD, MEd Trish Millard: MD, board certified in Internal Medicine, Hematology, Medical Oncology Lee Ritterband7: PhD, licensed clinical psychologist Shayna Showalter: MD, board certified in Surgery- General					
3. Occupation	What was their occupation at the time of the study?	Kelly Shaffer: Assistant Professor; University of Virginia (Research) Erin Kennedy: Research Coordinator; University of Virginia Jillian Glazer: Research Coordinator; University of Virginia Anita Clayton: Professor, University of Virginia (Research, Clinical, Education, & Administration) Wendy Cohn: Associate Professor; University of Virginia (Research, Administration) Trish Millard: Assistant Professor; University of Virginia (Research, Clinical) Lee Ritterband: Professor, University of Virginia (Research)					

	Shayna Showalter: Assistant Professor; University of Virginia (Research, Clinical)
Was the researcher male or female?	The following researchers identify as female: Kelly Shaffer, Erin Kennedy, Jillian Glazer, Anita Clayton, Wendy Cohn, Trish Millard, Shayna Showalter The following researcher identifies as male: Lee Ritterband
What experience or training did the researcher have?	Kelly Shaffer: psycho-oncology, qualitative research methods Erin Kennedy: qualitative research methods; trained on the interview guides and had prior experience completing qualitative interviews Jillian Glazer: qualitative research methods Anita Clayton: women's mental health and sexual dysfunction Wendy Cohn: qualitative research methods Trish Millard: medical breast oncology Lee Ritterband: digital health, psycho-oncology Shayna Showalter: surgical breast oncology
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Was a relationship established prior to study commencement?	Survivor surveys: Survivors were recruited from University of Virginia Breast Care Center and includes women treated by Trish Millard & Shayna Showalter; however, participation was double-blind: survivors were not made aware that Trish Millard & Shayna Showalter were involved in the research, and the identities of survivors enrolling or refusing were not known to Trish Millard & Shayna Showalter.  Partner interviews: Partners were recruited among survivors receiving care at the University of Virginia Breast Care Center and includes partners of women
	What experience or training did the researcher have?  ts  Was a relationship established prior to study

		however, participation was double-blind: partners were not made aware that Trish Millard & Shayna Showalter were involved in the research, and the identities of partners enrolling or refusing were not known to Trish Millard & Shayna Showalter.  Provider interviews: Providers were recruited among the medical, surgical, and radiation oncologists and nurse practitioners of the University of Virginia Breast Care Center. They were aware that Shayna Showalter, a member of the Breast Care Center team who was not interviewed, was part of the study team. Trish Millard, a member of the Breast Care Center team who was interviewed, joined the study team following data collection. They were aware that their comments would remain anonymized to all researchers with the exception of Kelly Shaffer & Erin Kennedy, who had no formal relationships with the providers prior to the study.
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	Survivors: At recruitment and again at the start of their survey, survivors were informed that the study was assessing breast cancer survivors' experiences with sexual well-being following cancer, and that survivors did not need to be in a relationship to participate.  Partners: At recruitment, partners were informed that the study was assessing the experiences with sexual well-being of romantic partners of breast cancer survivors. At the beginning of the interviews, partners were reminded the study was to learn about their unique experiences as the partner of someone who has been treated for breast cancer and their perceptions of

8. Interviewer	What characteristics were reported about the	your sexual relationship following your partner's cancer, and that this information would be used to design an online program that addresses sexual concerns for breast cancer survivors and their intimate partners.  Providers: The study was presented to the Breast Care Center clinical staff as a triadic study to assess survivors', partners', and providers' perceptions of women's sexual well-being following breast cancer, with the purpose of this information to develop technology-based assessment and intervention tools to improve how sexual concerns are assessed and addressed among breast cancer survivors.  The interviewer (Erin Kennedy) was selected based on
characteristics	interviewer/facilitator? e.g. Bias,	her experience in qualitative interviewing, expertise in
	assumptions, reasons and interests in the	cancer control and population health research, and
	research topic	comfort with addressing the topic of sexual health.
	Domain 2: study desi	gn
Theoretical framework	T	T
9. Methodological	What methodological orientation was stated	Thematic content analysis
orientation and Theory	to underpin the study? e.g. grounded theory,	
	discourse analysis, ethnography,	
	phenomenology, content analysis	
Participant selection		
10. Sampling	How were participants selected? e.g.	Survivors: Convenience sample of survivors who met
	purposive, convenience, consecutive,	eligibility criteria and attended an appointment at the
	snowball	Breast Care Center during the period of recruitment.
		Partners: Convenience sample of partners of survivors who attended an appointment at the Breast Care Center during the period of recruitment and indicated their partners may be willing to participate.

		Providers: Convenience sample of providers at the
		Breast Care Center.
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Survivors: Survivors who were identified as meeting eligibility criteria per prior medical record review by the study team were approached by a Breast Care Center LPN at rooming, informed about the study, and provided study information. Interested survivors completed a tear-off card with their own, and if applicable their partner's, contact information. Survivors were then emailed a Qualtrics link to complete the survey by the study team.
		Partners: Partners who attended appointments with a survivor at the Breast Care Center were approached by a Breast Care Center LPN and informed about the study and provided study information. Interested partners completed a tear-off card with their own information. Survivors also could provide their partner's information if they believed the partner would be interested. Partners were then contacted by phone and email by the study team to schedule a phone interview.
		Providers: The study team presented the study to the Breast Care Center providers at a clinical team meeting. Individual providers were contacted after the presentation to determine willingness to participate and to schedule an interview.
12. Sample size	How many participants were in the study?	Survivors: 20
12. Sample Size	Tion many participants were in the study.	Partners: 12
		Providers: 8
13. Non-participation	How many people refused to participate or	Survivors: 147 patients were identified as eligible per

Satting	dropped out? Reasons?	medical record review of women scheduled for a Breast Care Center surgical follow-up or survivorship appointment; 33 were not approached due to appointment cancellation/no-show (22%), 1 actively declined to participate (1%), 70 attended an appointment but did not complete a recruitment card for unknown reason (possibly including passive refusal, not approached, etc.; 48%), and 43 expressed interest by completing a recruitment card (29%). Of those expressing interest, 36 completed an online survey (84% of interested; 31% of total eligible survivors attending an appointment during the recruitment period). Of these, 20 were both married/in a relationship and endorsed interest in an Internet intervention for couples to address cancer-related sexual concerns, and therefore completed items analyzed in the present study.  Partners: Contact information was received for 16 partners; 1 declined upon contact (6%), 3 were unable to be reached (19%), and 12 completed an interview (75%).  Providers: All 8 providers emailed to determine willingness to participate completed an interview (100%).
Setting	XXI	
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Survivors: Online surveys completed at survivors' convenience.
CONCCUON	chine, workplace	Partners: Individual interviews conducted by phone.
		Providers: In-person individual interviews conducted
		in the providers' offices.
15. Presence of non-	Was anyone else present besides the	Survivors: It is unknown whether survivors completed

participants	participants and researchers?	online surveys in the presence of others.
		Partners: Individual phone interviews were conducted with only the partner and interviewer (Erin Kennedy) on the call.
		Providers: In-person individual interviews were conducted with only the provider and interviewer (Erin Kennedy) present in a private office.
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Surveys and interviews were completed between October 2019 and April 2020.
	sample: e.g. demographic data, date	Survivors and partners: See Table 1 for demographic and medical characteristics of the sample.  Providers: The provider sample comprised 3 medical
		oncologists, 2 surgical oncologists, 1 radiation oncologist, and 2 nurse practitioners.
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Complete survivor survey, partner interview guide, and provider interview guide are available upon reasonable request to the corresponding author (Kelly Shaffer). Interview guides were collaboratively developed and reviewed by Kelly Shaffer, Erin Kennedy, Anita Clayton, Wendy Cohn, and Shayna Showalter, but guides were not pilot tested.
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	No repeat surveys or interviews were conducted.
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Survivor surveys were recorded in Qualtrics Highly Sensitive Data. Partner and provider interviews were audio recorded.
20. Field notes	Were field notes made during and/or after the interview or focus group?	The interviewer kept field notes while completing partner and provider interviews.
21. Duration	What was the duration of the interviews or focus group?	Survivor: Survivor survey duration ranged from 5 to 140 minutes, averaging 30 minutes.

22. Data saturation	Was data saturation discussed?	Partner: Duration of interviews ranged from 20 to 80 minutes, averaging 30 minutes.  Provider: Duration of interviews ranged from 10 to 25 minutes, averaging 15 minutes.  Survivor: N/A – survivors completed open-ended
		survey responses.  Partner: Partner sample was recruited to reach thematic saturation (see Table 4).  Provider: N/A – sample of providers from the target clinic was a convenience sample.
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	No
	Domain 3: analysis and fi	ndings
Data analysis	Domain D. unung 515 unu 1	arumgo
24. Number of data coders	How many data coders coded the data?	For survivor surveys, Kelly Shaffer & Erin Kennedy coded open-ended survey items and reviewed discrepancies together.  For partner and provider surveys, each interview was separately coded by 2 of the 3 coders of Kelly Shaffer, Erin Kennedy, and Jillian Glazer; all coded interviews were reviewed together by the 3 coders for consensus.
25. Description of the coding tree	Did authors provide a description of the coding tree?	Survivors: N/A – open-ended survey responses coded by question. Partners: See Supplementary Table 3 for themes, codes, and representative quotes Providers: See Supplementary Table 4 for themes and representative quotes.
26. Derivation of themes	Were themes identified in advance or derived from the data?	Themes were derived from the data.
27. Software	What software, if applicable, was used to manage the data?	Survivor survey data was exported from Qualtrics and coded by hand.

		Partner and provider surveys were transcribed using Trint, manually reviewed, then imported into and coded within Dedoose.
28. Participant checking	Did participants provide feedback on the findings?	No
Reporting	•	
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Survivor and partner quotes are identified with participant numbers. Provider quotes are not identified, given the relatively small number of participating physicians from a single clinic means anonymity would be compromised.
30. Data and findings consistent	Was there consistency between the data presented and the findings?	We aim to discuss data representatively in our Results and Discussion sections.
31. Clarity of major themes	Were major themes clearly presented in the findings?	We aim to discuss data comprehensively in our Results and Discussion sections.
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	We discuss discrepant findings in our Results and Discussion sections.

## Supplementary Table 2. Saturation Table for Partner Intervention Codes

	A	В	С	D	Е	F	G	Н	I	J	K	L	Total Partners	Total Quotes
Information about side effects/recovery f	nformation about side effects/recovery from treatments													
Impact of maintenance therapies							3*	1		1		2	4	7
Impact of surgical recovery		1*				3		1		1			4	6
Patient's low libido	1*		2		1								3	4
Concerns about causing patient pain		3*										1	2	4
Relationship and communication support	t													
Open, honest, and straightforward	1*	3	3			1	3		1	1		2	8	15
Protective buffering				5*	1	1	2						4	9
Addressing partner's self-confidence														
Survivor's appearance and self-confidence				2*	2		3	1					4	8
Perceived benefits from having topics add	dress	ed												
Importance of preparation				1*		1	1	1		3	1	1	7	9
Importance of being the supporter	4*	1		2		1				1			5	9
Importance of mutual satisfaction	1*	1	2		1								4	5
Affirmation vs. feeling alone		1*	1		•		2						3	4

<sup>\*</sup>Denotes that the code was generated during the coding of this interview.

Supplementary Table 3. Partners' preferences for topics to be covered by an Internet-delivered program on sexual health for couples following breast cancer and perceived benefits (N=12)

Topic Area /	Example quotations					
Related Theme						
	effects/recovery from treatments					
Impact of	Partner 5: "Tamoxifen just about ruined our marriage and there was no sex for a long time. She					
maintenance	was very dry. It was very uncomfortable."					
therapies						
	Partner 8: "The main difference is that I guess, the medication has made her very dry. And so it's					
	a little hurtful for her. And so. Yeah. So just that I have toI have to be a little more inhibited					
	and careful, and so that would be the only difference. But, you know, it's not, it's just					
	something that I have to learn, and that's fine with me Then the second is probably just the					
	energy level that she has not so much for sex, but just for, you know, the tiredness. And this					
	is not just, I don't just mean sex. I mean, like even simple things like dealing with the kids,					
	bathroom or something like that."					
Impact of surgical	Partner 10: "The cancer surgery, I mean, you know, she - there was a period of time that she					
recovery	couldn't engage in sexual intercourse. You know, so I mean, it affected it in that respect. But					
	it was a short time. It was, I'm thinking 30, 45 days. Because she was just too sore and she					
	had stitches and all that. And then the other thing is, since she had a reconstruction on that one breast and it was extremely painful. It was more painful than the surgery itself. I mean,					
	in the breast cancer removal and the double implant and, and you know, she had some pain in sexual experiences for several months after that, it was very, very delicate because she					
	couldn't move her arms. She couldn't, it was just very difficult because of the pain and the stitches. So, you know, we probably didn't we didn't have it is often because, you know, I					
	didn't want to do anything that would cause her pain."					
	Partner 11: "So for us, it was really just getting through recovery because of the reconstruction					
	surgeries she had with the, they did the transplant, were they, so, I mean, it was not just					
	breast reconstruction. It was abdominal and all that stuff, too. So it was a longer recovery. It					
	had more impact across the whole body For us, it was just a, as I said, it was just a					
	transitional phase. You know, surgery and recovery and then back to life."					
Patient's low	Partner 3: "Yeah, sometimes like, when I want to have sex, she was likeI'm not even sure that					

libido	she really wants to. Is she doing that just for me? Maybe. I remember her oncologist saying that some of the medication might affect, you know, the sexual appetite. I don't know how you put it. Like, libido? Something like that. So yeah, sometimes I will see, like, she's not into it, but, you know, she is just, you know, just doing it because I wanted to, like she doesn't want to let me down or anything like that. Sometimes I have that feeling."
	Partner 7: "Our physical, sexual connection as she was going through chemotherapy and all of that for a year. We virtually had no intercourse or physical sexual stuff We both understood that her sexual desire would, I guess we didn't think about it beforehand, but it sort of disappeared She has been very sexual since the first day we met. I think we probably figured something like that would happen. But like I said, intimacy is much more than physical, sexual contact."
Concerns about	Partner 10: "I think the main thing here with us was just working through the pain and, you know,
causing patient	being able to maintain a normal sex life and, and you know, one of the things that was
pain	always the forefront of my mind was I didn't want to do anything that would cause her pain.
	So, you know, I guess she was, she definitely did, she was the one that approached me about
	the subject because, I just didn't know what kind of pain she was feeling. She has a high, a very high tolerance for pain. And, you know, I was always a little concerned that it might
	cause her pain. And yeah, I think discussing that with her and, you know, she told me, you
	know, you just need to be careful, but there's no reason why we can't."
Relationship and c	ommunication support
Open, honest, and	Partner 5: "The problem with that is you're both struggling apart and you're disconnected, so
straightforward	you're not really facing what's really hurtful. So, you know, as Jesus said, the truth will set you free, and that is so true Not until I was truthful one on one, with the communication, that anything, that things started changing."
	Partner 8: "You know, in our case, I think we worked it out by just communicating. And that's where, you know, I'm not saying I couldn't use it [an intervention], but it wasn't something
	that I had obviously available. So I figured out a way to make things work with just my, with just communicating with my wife."
Protective	Partner 2: "Yeah, there's been a few comments about the scar that she's made. And then I'd blow
buffering	it off. I say I negate her thoughts of, uh, 'The scar's ugly' It was very important to me to be very supportive and say nothing negative. Like, 'No, the scar is minimal.' 'No, I don't pay

	attention to it.' 'No, I don't see it.' 'No, I don't look at it.' You know, I'm trying to be very positive supporting."
	Partner 3: "I think most of the time I'm pretty comfortable talking about, you know, our sex life. But sometimes, you knowsometimes you don't want to make her upset if I'm saying something, something about it, so I don't. Sometimes I'm not really straightforward with her. But you have to be diplomatic if you want to talk about something, you know, an issue or anything like that. Sometimes I'll be really straightforward. You know, you are not vilifying anything. Then even, you know, husband and wife, sometimes you have to be diplomatic because you don't know what the other person is thinking. She might not know my true intention. You know, it could be the way I am putting it."
	Partner 5: "When one [person in the] couple feels like you're going to hurt their feelings by telling them the truth and the other is feeling, you know, that they're not, you know, beautiful and, you know, and they're closed up, I mean, you know, that's a bad combination for a marriage."
Addressing partner	
Survivor's appearance and self-confidence	Partner 3: "Sometimes, honestly, sometimes she'll have like a low self-confidence, saying, 'Oh, you can divorce me,' and 'You can marry somebody else,' or something like that. You know, I think sometimes she has some kind of bad, you know, self-confidence issues. But I willI also encourage her. You know, 'I don't see you as, you know, 'you have cancer.' So, I don't see her as having a defect, you know, if you were to put it bluntly."
	Partner 5: "Well, I think what happens is the scarring and, you know, if she didn't feel like she was beautiful anymore and didn't feel like I was attracted to her, and we grew apart She didn't feel beautiful with all the scarring and reconstruction, and so she was embarrassed and she pulled away. And of course, I pulled away. And so it was We discussed it and then we tried."
Perceived benefits	from having topics addressed
Importance of preparation	Partner 8: "It would be good to get some sort of, you know, understand what are the sensitivity issues, how to deal with them and, you know, preempt some of these problems rather than deal with them afterwards, in terms of, you know, like the pain or dryness."

	Partner 9: "You know, I think both of us are aware of these side effects. These things associated with that. So, you know, it's not like it's been a complete 180 and we're both just, you know, really angry over it or, you knowI don't know how to express that exactly I mean, even before, you know, we'd even gotten throughfinished the whole process, I mean, they were pretty upfront and telling us a lot of the side effects and preparing us for that, so, you know, nothing really has been a big surprise."
Importance of	Partner 1: "I didn't let her fight this alone. I was there for her. I was there with her. And I will
being the	always be there for her with everything Several of her friends have been diagnosed with
supporter	breast cancer also, and, you know, some of the spouses have contacted me. You know, how to deal with it. You know, it's justyou've got to be there for your spouse and just be supportive."
	Partner 10: "Well, the only thing I would say is, it's very important for the husband to be supportive, and to be an active part of the meetings with the doctors and, you know, it's important. I was there at the hospital every chance, opportunity I had. I was there when she had her surgery. I was there when she went in. I was there when she came out in the recovery room. You know, I think it helped. I think it helped her. It made me feel a little more at ease that I was there with her and I wasn't working somewhere and just worrying about, you know, how the operation was going."
Importance of	Partner 7: "We really care about each other. She enjoys it [our sex life], I enjoy it I see the
mutual satisfaction	benefits in orgasm as giving to the other, not taking."
	Partner 10: "Her interest was still there and is very sad when we weren't able to have relations, she would say, I wish we could. And I always say, me too, but I don't want to hurt you. I mean it. You know, it's got to be something that's mutually enjoyable or else it's no fun."
Affirmation vs.	Affirmation:  Restrict 7: "You know, as I remember now. I think I nicked up a namehlat probably from
feeling alone	Partner 7: "You know, as I remember now, I think I picked up a pamphlet probably from American Cancer Society that talked a little about sex for the man and for the woman during treatment. So I think there's some of that out there. It just reaffirmed what we were going through."
	Partner 10: "Well, I think [the oncologists] both mentioned it a little bit as far as the side effects, potential side effects Mostly it's not anything we didn't already know, but, but it was good

to get it out in the open.

## Feeling alone:

Partner 5: "I would say to be very open on the effects of Tamoxifen. And I mean, the effects of the surgery, the effects of chemo on sex. I mean, we felt like we were alone in all that. And then you feel like, well you know, we might be the only ones because nobody else is talking about it. So we must be the only one... I think there's a there's a whole gamut of issues that come along with that struggle being alone. So, I mean, I think we you know, in my case, you know, went to numbing, you know, avoiding, running, you know, anti-social, probably, depression, which she went through the same thing. So you're doing it alone."

Supplementary Table 4. Providers' perceived benefits of an Internet-delivered program on sexual health for couples following breast cancer (N=8)

Theme	Tp	Tq	Example quotations
Facilitate patient- provider communication	8	10	"Yeah, communication probably, because that's probably where it all falls down. So teaching them it's OK to talk to providers and talk to your partners about it maybe just a better way to inform us, as I've already said, the providers."
			"I have some patients that track their symptoms, and I don't know that I have a lot of them do it via technology So I think in a way, in general, if you used an app where you could just mark down what your symptom was, and then, before you go into your doctor, it could compile or you could look at it and see, 'Oh, these are the things,' that might trigger them to bring it up."
			"So, if you have a short time slot, and perhaps you don't have as extensive a conversation as you like, it will flag issues that are important to the patients. So, yeah, I think that could be helpful."
Provide informational foundation for effective communication	4	6	"I think that's where people are going to searchthey're going to use technology first to search for answers, before they even approach a providermany of them are. So if they can understand what the different types of products or medications that are available that can help them, I think they'll have a more informed discussion with their provider."
			"As an education piece, because sometimes I feel like what another issue is that patients don't necessarily realize that that's a side effect or that's related at all to their breast cancer treatment. So when I say 'Any side effects to your endocrine therapy?' People may say no. And then if I ask, 'Well what about joint pain?' They say, 'Oh, yeah, well, that does seem worse."
			"I don't think the patients always know how to describe what their issue is in a way that, as a provider, I can effectively help it. So if they had sort of like dropdown options and, you know, something like that where it goes from like vaginal irritation, vaginal itching, dryness, discharge changes, to like more specific questions about sexual activity and like maybe interpersonal desire-type questions, then you could kind of pinpoint where the issue is more."

Technology increases access to care	3	3	"For technologies, since the patients essentially are eliciting this help on their own, it can really be instantaneously. So, you know, that could be something that we could provide for our patients outside of this formal time."  "It gives you the option that I might be able to just message them back with some basic, 'Here are some things you could try.' Versus, calling and talking to them, or having them come in."
Increase patient engagement in treatment	2	2	"So you can imagine it's just like patients taking their HIV meds. You know, a little daily reminder, or you can imagine technology having a role therejust like a lot of these. And there's a bunch of programs out there for apps on computer or apps on phones to have reminders, but also interact hopefullyget patients to interact. They get a little bit of education out of it. They put in a little bit of how it's helping them. They can track, you know, have their scores on their satisfaction gotten better or worse. They can sort of see how they're doing for themselves and see how a drug invention has actually made things better or maybe hasn't made a difference."
			"I could see it assessing interventions, because a lot of times I tell patients to start by using some type of vaginal moisturizer twice a week, and then trying to gauge whether that's helped can be a little bit challenging. So if, you know, they tracked that they're actually doing it, remembering to do it, and what they're using, and then also tracking their symptoms, you could see, 'OK. Does this seem like it's actually making a difference?' Versus, 'It's maybe the same or worsening?'"

 $T_p$  = Total number of provider interviews with code;  $T_q$ = Total number of coded quotes