BMC Nursing

RESEARCH

Open Access

A comprehensive nurse-led aftercare programme addressing post-burn sexual well-being of adult burn survivors: a randomised controlled trial

Jonathan Bayuo[1*], Frances Kam Yuet Wong[1], Arkers Kwan Ching Wong[1], Prince Kyei Baffour[2] and Loretta Yuet Foon Chung[3]

Abstract

Background Sexual well-being is a key part of being human yet often remains shrouded in secrecy and poorly addressed in the clinical setting. The impact of burns and its long-term sequelae often lead to concerns regarding body image disturbance, self-esteem issues, and interpersonal challenges which can impact on an individual's sexual well-being. However, existing post-burn rehabilitation programmes usually lack components addressing concerns regarding sexual well-being. As a part of a larger project, we developed a nurse-led aftercare programme, and this study sought to examine the effects of the programme in addressing the post-burn sexual well-being of adult burn survivors.

Methods A randomised controlled trial approach was used. Sixty burn survivors aged ≥ 18 years with burn size ≥ 10% total burn surface area were assigned to intervention and control groups. Participants in the intervention group underwent the nurse-led aftercare programme which involved pre-discharge support and proactive follow-up support over 8 weeks. The sexuality subscale of the Burn Specific Health Scale-Brief was used to evaluate the outcome of interest. Data were collected at three timepoints: baseline (T0), post-intervention (T1), and follow-up (T2).

Results Using a corrected p value of 0.017, the study observed only statistically significant time effect at both T1 and T2. Both group and interaction effects were statistically insignificant for this outcome.

Conclusion Issues regarding sexual well-being are often considered sacred and may be challenging to discuss. Thus, a longer duration of the intervention may be considered with ongoing training of practitioners to identify and resolve emerging challenges. Despite the non-significant interaction and group effects, including sexual well-being support in post-burns rehabilitation programmes will facilitate access to and utilisation of the service among burn survivors who may need it.

Trial registration Prospectively registered on 14th August 2020. ClinicalTrials.govNCT04517721.

Keywords Aftercare, Burn survivors, China, Omaha system, Sexual well-being

*Correspondence:
Jonathan Bayuo
jona.bayuo@presbyuniversity.edu.gh; jbayuo@polyu.edu.hk

[1]School of Nursing, The Hong Kong Polytechnic University, Hong Kong Special Administrative Region, Hong Kong, China
[2]School of Health, Leeds Beckett University, Leeds, UK
[3]Evidence-Based Center for Nursing, Lanzhou University, Lanzhou, China

Background

The clinical management of burns has improved over the years leading to high survival rates, yet with significant psychosocial concerns [1]. Post-burn issues such as pain, limited physical role functioning, and psychological distress often impact adversely on both physical and psychosocial functioning of burn survivors [2, 3]. Indeed, return to work, school, and other leisure activities can be extremely challenging for burn survivors and the notion of living with post-burn scars can impact on interpersonal relationships and intimacy which are key aspects interwoven in the social fibre of persons [4].

Concerns regarding intimacy, maintaining interpersonal relationships due to post-burn scars, sexual role performance fears and anxiety abound among adult burn survivors [5, 6]. Undoubtedly, post-burn rehabilitation programmes exist to support the burn survivor's return to work, school, and other leisure activities, albeit the aspects of improving intimacy, post-burn sexual health, and sexual role functioning often remain blurred or not talked about [7]. A recent comprehensive review that examined the structure of existing rehabilitation programmes for adult burn survivors underscored the lack of components targeting the post-burn sexual health of affected persons [8]. Thus, it is not surprising that a previous study has described the sexual health of burn patients and survivors as the "most neglected part of post-burn rehabilitation" p.e333 [9]. Additionally, Hurley and colleagues have noted post-burn sexual issues are commonly unaddressed in practice [10].

Often, sexual health and intimacy issues are considered private, sacred, and hardly talked about across various societies. Within the context of burn care, practitioners are often unprepared and may feel extremely uncomfortable talking to their patients about their post-burn sexual health [11]. Persons who survive burns and their partners, on the other hand, often feel embarrassed to ask questions pertaining to their post-burn sexual health and are very likely to shy away from those questions [11]. In one study, the authors observed that up to 55% ($n=39$) of burn care staff were only likely to discuss sexuality and intimacy if the burn survivor or their partner initiated the discussion although the majority (95%, $n=67$) agreed that the patient should not have the responsibility of asking questions relating to their post-burn sexual health [12].

Though the responsibility may be on the burn care practitioners to initiate discussions relating to post-burn sexual health, some studies have highlighted the general lack of preparedness and resources to enable them to navigate through this critical role [7, 10, 12]. For most burn survivors, these concerns may not be apparent prior to their discharge. Following discharge, however, most burn survivors may be lost, and some may not return to even utilise the available rehabilitative care on outpatient basis due to long travel distances and financial constraints [13]. This emphasises a great need for a transitional care support to ensure that the immediate pre-discharge and post-discharge periods are connected to identify emerging concerns and work proactively to support burn survivors and their families [14]. Particularly for post-burn sexual health concerns which are most likely to become apparent following discharge, the transitional care support will be helpful in identifying emerging concerns, offering ongoing education, and undertaking referrals to ensure timely resolution of these concerns [14]. Despite this, transitional care and aftercare support remains poorly articulated warranting more work to integrate it further. Sexual health is relevant throughout a person's life which makes it cogent to include the aspect of post-burn sexual health in burns rehabilitation programmes. These critical gaps informed our study to develop a comprehensive aftercare programme with an aspect targeting the post-burn sexual health of adult burn survivors. The aim of the current study is to examine the effects of the transitional aftercare programme on post-burn sexual health of adult burn survivors.

Conceptual framework

Theoretically, the broader intervention is underpinned by Meleis's Theory of Transitions to emphasise the critical nature of transitioning from inpatient stay to the community [15]. Based on this theoretical underpinning, it is hypothesised that issues regarding post-burn sexual well-being will emerge as the burn survivor transitions to the community with the burn care nurse positioned to deliver aftercare support as nursing therapeutics in collaboration with other members of the burn care team [15]. Specifically on the post-burn sexual well-being, the nursing therapeutics is conceptually underpinned by the EX-PLISSIT (Permission-giving Limited-information Specific-suggestion Intensive-therapy) model. This model is used primary care settings and considered appropriate for addressing the sexual well-being of persons with disability and persons with visible differences [16]. Considering that burn survivors are likely to be living with post-burn scars which can create visible differences makes the EX-PLISSIT an appropriate model to underpin the intervention. The EX-PLISSIT model proposes non-linear movement between the four levels with Permission-giving being central and permeating all interactions [16].

Permission-giving is the first phase of the model that seeks to undo the silence associated with discussing issues relating to sexual well-being. This permission-giving is an ongoing process which serves as the foundation for subsequent communications. Key to this phase is to ask questions that offer the patient permission to talk about sex and intimacy but not compelling them to do so

[17]. Annon [18] has argued patients wish to know that their experiences are not unusual and for this to be communicated by a knowledgeable professional. Taylor and Davis [17] have noted that sometimes the reassurance conveyed by the healthcare professional regarding the normality and permission to think and feel and behave is sufficient to meet the patient's needs. Limited information focuses on providing information that is directly relevant to the concerns raised by the patient. The strategies employed may include connecting the patient to relevant support groups and community resources that may be relevant to their state. The specific suggestion phase focuses on identifying the challenges that the patients face and exploring their aspirations and expectations. Within the context of intimacy this could include focussing on social skills and situation management to overcome specific difficulties that a patient may disclose. The need for onward referral therefore is likely to be apparent at this stage. Engagement at the intensive therapy stage focuses on more specialist services such as psychotherapy.

Materials and methods

Design

This study is a prospective, two-arm randomised controlled trial reported according to the Consolidated Standards of Reporting Trials (CONSORT) 2010 checklist [19].

Participants, inclusion, and exclusion criteria

Between December 2020 to August 2021, all adult burn survivors receiving.

treatment for burn injuries at the Burn Surgery Department of the Gansu Provincial Hospital, Lanzhou were screened for eligibility. The inclusion criteria were (1) persons aged≥18 years with burn size≥10% total burn surface area as assessed by the burn surgeon or burn care/ trauma nurse, (2) second degree to mixed thickness burns irrespective of the site, (3) absence of a confirmed renal failure or psychiatry condition (based on medical records), and (4) reachable on phone and WeChat. The exclusion criteria were (1) adult burn survivors participating in an existing rehabilitation intervention study, (2) adult burn survivors who sustained multiple injuries in addition to the burn such as fractures, and (3) adult burn survivors who planned to relocate during the study period and would be unreachable via WeChat.

Screening and recruitment

A clinical research nurse at the hospital identified and screened potential adult burn survivors eligible for enrolment in the study based on the eligibility criteria. All potential participants were enrolled by a research nurse who was not involved in randomisation, allocation, intervention delivery or outcome evaluation. If pending discharge was noted, the recruiting nurse checked if the adult burn survivor fulfilled the criteria for inclusion. Details of the study were made known to participants who expressed their willingness to participate. Thereafter, two consent forms were either signed or thumb printed by the adult burn survivor following which a referral was for baseline outcome assessment. The site manager, who was not involved in clinical services/ outcome evaluation and had no knowledge about the potential subjects completed the randomisation and allocation. Following recruitment, any possible identifying parameter that could indicate to the blinded assessors, which group a participant was allocated to, was deleted.

Intervention

Burn survivors assigned to the intervention group underwent the new programme focusing on addressing their aftercare needs, including improving their post-burn sexual well-being. The programme of care comprised of two phases: structured pre-discharge and active follow-up via the WeChat social medial platform with secured end-to-end encryption and telephone over an 8-week period. A 4-week period was set to ascertain the sustained effects of the aftercare programme. Put together, the study lasted for 12 weeks. The pre-discharge phase occurred prior to discharge and was completed on face-to-face basis. At the pre-discharge phase, a Burn Care Nurse supported by the multi-disciplinary burn care team performed a comprehensive assessment guided by the Omaha System. With the use of the Omaha System, it was possible to identify sexuality, role change, interpersonal relationship, and social contact as specific problems under the psychosocial domain of the system. Goals were then set in collaboration with the adult burn survivor prior to their discharge which served as the basis for subsequent actions and follow-up over the next 8 weeks. Additionally, the Omaha System permitted the inclusion of signs and symptoms in relation to the identified problem. For instance, the sexuality problem in the psychosocial domain of the Omaha System is associated with the following signs and symptoms: (1) difficulty recognising consequences of sexual behaviour; (2) difficulty expressing intimacy; (3) sexual identity confusion; (4) sexual value confusion; (5) dissatisfied with sexual relationships; (6) unsafe sexual practices; (7) sexual action out/ provocative behaviours/ harassment; (8) sexual perpetuation/ assault. Based on the signs and symptoms selected, the burn care nurse could ascertain what aspect of sexuality required attention. Following the identification of the problem, the interventions employed were categorised under four intervention schemes of the Omaha System congruent with the EX-PLISSIT model:

Permission-giving and limited information

- *Teaching, guidance, and counselling*: This aspect of the intervention targeted education and behaviour modification where the attending burn care nurse offered reassurance and guided the burn survivor and their partner to identify the impact of the burn injury on their social contact, role change, intimacy, and sexual well-being. Maintaining a non-judgemental attitude, the burn care staff encouraged the burn survivor and the partner to talk openly about the post-burn sexual concerns and begin to identify solutions unique to their situation. The intervention acknowledged the inherent difficulty in opening conversation regarding sexuality/ intimacy and particularly for the Chinese context wherein such issues are considered private. Potentially, this meant that not all persons in the study would be willing to talk openly about their post-burn sexual health concerns. Thus, the burn survivors were reminded to talk freely about what they felt comfortable with. Also, the attending burn care nurse employed the STEPS approach to teach the adult burn survivor on building social and communication skills. The STEPS approach was developed by Barbara Kammerer Quayle as a tool for redeveloping social and communication skills among burn survivors. The approach refers to positive **S**elf-talk, **T**one of voice, **E**ye contact, **P**osture and **S**mile. The approach helped to project an image of confidence, overcome anxiety/ phobia in social or intimate situations and to make the burn survivor socially comfortable. It was useful when burn survivors experience social challenges or difficulty with intimate or previously enjoyed social interactions. This approach was used together with the Rehearse Your Response **(RYR)** strategy to help the adult burn survivor to handle intrusive questions that may emerge during social and intimate encounters. Regarding behaviour modification, the burn care staff utilised positive reinforcement by offering encouraging words based on progress made by the burn survivor and their partner towards improving their interpersonal relationship, social contact, and sexual health.

Intensive therapy

- *Treatment and procedures*: The attending burn care staff employed the 3-2-1 GO strategy to help the burn survivor to structure their responses in social and intimate scenarios. With this approach, the burn survivor is equipped to plan for uncomfortable social or intimate situations by thinking of **3** things to do when someone or a potential partner stare at them; **2** things to say when someone asks them what happened to them; and **1** thing to think about if someone turned away from them or turned them down.
- *Case management*: This intervention scheme targeted counselling care. Thus, the attending burn care nurse undertook a referral to another member of the burn care team who could offer professional counselling. Due to the limited access to a psychologist at the study site, the social work was also engaged in instances where the psychologist was unavailable.

Limited information and specific suggestion

- *Surveillance*: Surveillance refers to activities such as detection and monitoring intended to identify the burn survivor's status in relation to a given condition or phenomenon. In this intervention scheme, the burn care staff monitored the availability of social support for the burn survivor as they navigated their post-burn sexual issues. Also, improvements in their post-burn sexual health were monitored on weekly basis to facilitate early referrals to an appropriate member of the burn care team.

Following the initial assessment at the pre-discharge phase, the assigned burn care nurse followed up on weekly basis following discharge using the WeChat social media platform. For each week, the burn care nurse reviewed the goals, undertook further assessment, delivered further teaching using a patient education booklet which had been given to the burn survivor following discharge. The burn survivor or their partner could initiate a telephone call if needed when the next scheduled WeChat meeting was not due. If the burn survivor required a referral, this was completed by the attending burn care nurse and disseminated to an assigned member of the burn care team to follow-up which was usually on face-to-face basis.

Control group

Due to the absence of a specific aftercare programme focusing on post-burn sexual well-being at the study site, participants in the control group continued to use the existing follow-up service which comprised of reminders to return for surgical revision if required and medical reviews. Additionally, participants in the control group received two social calls from trained nursing students.

Outcome and outcome measure

The outcome of interest was post-burn sexuality which was assessed using the sexuality sub-scale of the Chinese version of the Burn Specific Health Scale-Brief (BSHS-B) [20]. The Chinese version of the scale has 38 items with six domains rated that are answered on a 5-point Likert scale ranging from 0 (extremely) to 4 (not at all), with higher scores indicating a better outcome [20]. The scale has a Cronbach's α of 0.795–0.940, and the function of 6-factor analysis accounted for 76.5% of the total variance [20]. For the sexuality sub-scale, there are three questions with a total sub-score of 12: (1) I feel frustrated because I cannot be sexually aroused as well as I used to, (2) I am simply not interested in sex anymore, and (3) I no longer hug, hold, or kiss. The sexuality measure was considered appropriate for this study as a recent scoping review highlighted the subscale as the commonly used measure to ascertain post-burn sexual well-being [7].

Sampling, sample size, and randomisation

We employed a purposive sampling approach to recruit potential adult burn survivors meeting the criteria for inclusion. Considering that there is no previous study implementing a post-burn sexual aftercare intervention, the sample size was determined based on a previous rehabilitation programme that used the Burn Specific Health Scale-Brief as the primary outcome measure [21]. Based on this study, a sample size of 60 (that is, 30 participants per arm) was considered adequate [21]. Prior blocked randomisation list with 60 sets of numbers was generated using the Random Allocation software. These randomised lists were kept in sealed envelopes and were sequentially opened by the site manager. The allocation sequence was concealed to the recruiting nurse and the research assistants (data collectors).

Data analysis

Both descriptive and inferential statistical analysis were undertaken using the Statistical Package for the Social Sciences (SPSS) version 28. Regarding the use of descriptive statistics, we employed means and standard deviation to ascertain the distribution of the dataset. Additionally, both Fisher and independent t tests were employed to undertake comparison of the data at baseline across both groups. Regarding inferential statistical analysis, we employed the generalised estimating equation (GEE) approach to uncover group, time, and interaction effects of the comprehensive nurse-led programme compared to usual care in improving post-burn sexual well-being. As a general rule of thumb, missing data were ignored in the instance they were less than 5%. Although the statistical tests were undertaken at the 95% confidence interval (p value=0.05), the repeated outcome assessment/ measurement increased the risk of a type-1 error. Thus, a corrected Bonferroni p value of 0.017 was applied.

Ethical considerations

Ethical approval for the study was obtained from the relevant facilities and the study protocol was registered with a trial registry. No adult burn survivor was coerced to participate in this study.

Results

Of the seventy-one (71) participants who were initially screened, 60 participants were randomised to either control (n=30) or intervention groups (n=30). We lost one adult burn survivor in the treatment group at the immediate post-intervention period and two participants were lost at the follow-up phase (see Fig. 1).

Socio-demographic characteristics of the participants

The socio-demographic features of the adult burn survivors who participated in this study are shown in Table 1. Of the 71 potential participants, 60 met the criteria for inclusion and were randomised using the 1:1 ratio to either control or intervention groups. In terms of gender, we observed that more males participated in the study (n=48). The mean age of the study participants were recorded as 37.88 years with a standard deviation of 10.98. Of all the socio-demographic characteristics, we did not observe any statistically significant difference which is suggestive that the participants in both groups were comparable on these characteristics.

Clinical characteristics

The clinical features of the adult burn survivors who participated in this study are presented in Table 2. From these features, flames emerged as the major cause of the burns across the study participants. Majority of the participants also experienced burns within the range of 10–19% TBSA with second degree type of burn injury. In terms of the body regions affected, the upper limbs emerged as the most affected part albeit without joint or digits involvement. Of all the clinical features, we did not observe any statistically significant difference which is suggestive that the participants in both groups were comparable on these characteristics. None of the participants had burns to the joints though both upper and lower limbs were affected.

Outcome assessment at baseline

Descriptively, the mean scores on the sexuality subscale were recorded as 10.51 (SD=3.40) and 10.07 (SD=3.12) for the intervention and control groups respectively. Despite the mean scores identified for both groups, no statistically significant difference was observed regarding the sexuality sub-scale of the BSHS-B (p=0.585),

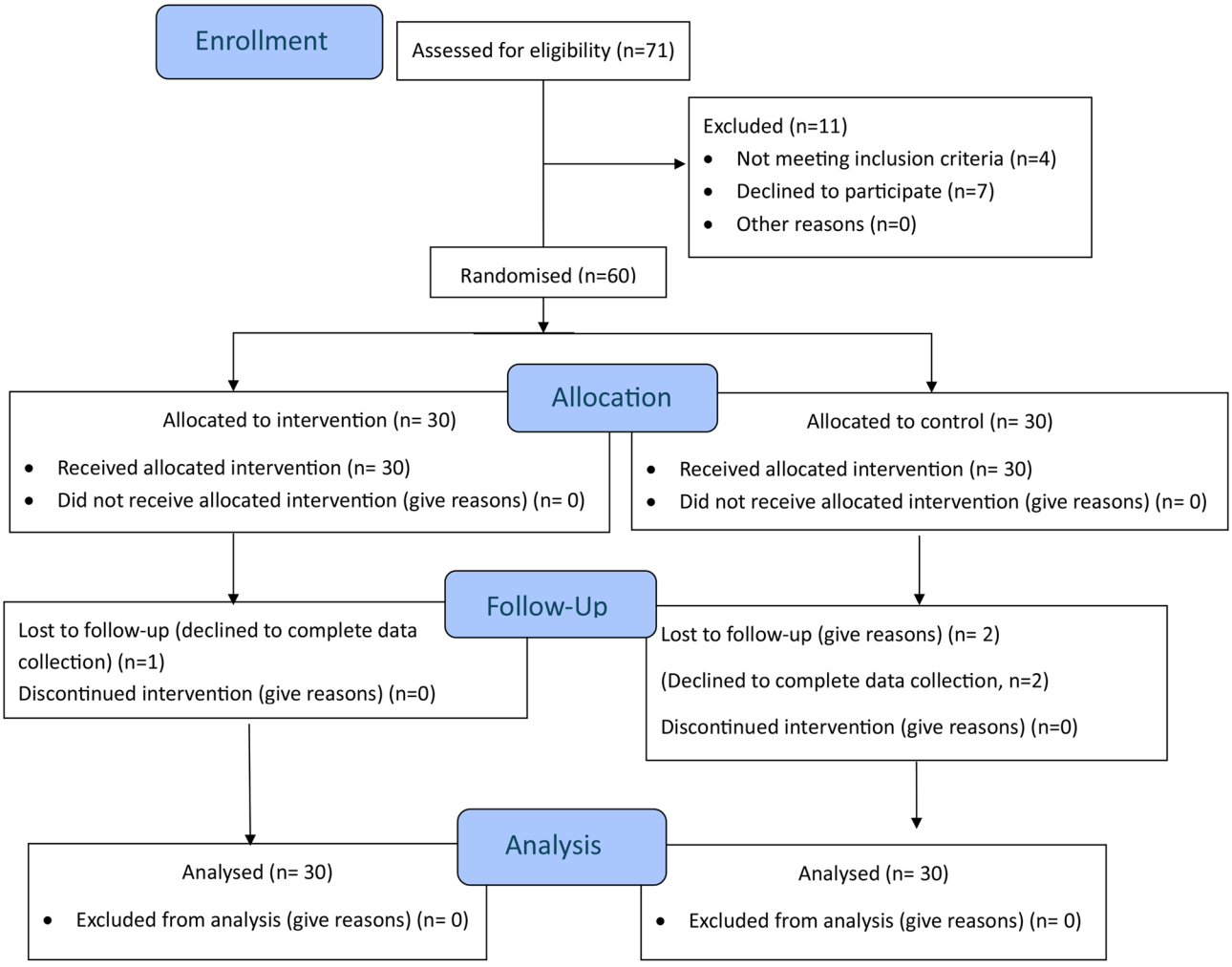

Fig. 1 CONSORT flow diagram for enrolment, allocation, and follow-up

suggesting that both intervention and control groups were comparable at baseline.

Effect of the intervention on post-burn sexual well-being

At the immediate post-intervention period, the mean score diminished marginally for participants in the intervention group (9.79, SD-3.17) whereas participants in the control group recorded a score of 8.01 (SD-2.48). Based on the GEE model presented in Table 3 using a Bonferroni corrected p value of 0.017, only statistically significant time effect was observed at T1 (B = -0.050, $p=0.005$) implying that a significant difference existed between the two groups at T1 with the mean score of the intervention group higher than the control group. Despite the significant time effect from baseline to T0, the interaction effect was not statistically significant. Also, at T2 (follow-up), the mean scores were recorded as 10.22 (SD-3.30) and 9.99 (SD-3.10) for participants in the intervention and control groups respectively. Using the Bonferroni corrected p value of 0.017, only statistically significant time effect was observed at T2 (B = -0.290, $p=0.002$). Both group and interaction effects were statistically insignificant on the sexuality subscale at follow-up (T2). Put together, the results at T1 and T2 imply that although participants in the intervention group demonstrated better improvements based on the mean scores when compared to the participants in the control group, the difference was not statistically significant creating a need for more work to refine the intervention.

Discussion

Sexual well-being is an integral aspect of humans albeit this has received limited attention among the burn patient population. Despite the existence of burns rehabilitation programmes across the globe, the aspect of sexual well-being is often excluded in these programmes which raises an interest regarding how this service can be developed and implemented [8]. Thus, as a part of a comprehensive transitional rehabilitation programme for adult survivors, a significant aspect focusing on the

Table 1 Socio-demographic characteristics of participants

Variable	Total (n = 60)	Control (n = 30)	Intervention (n = 30)	p value
Age (Years; M, SD)	37.88 (10.98)	38.07 (10.8)	37.70 (11.3)	0.162
Gender				0.333
Male	48 (80%)	22 (73.3%)	26 (86.7%)	
Female	12 (20%)	8 (26.7%)	4 (13.3%)	
Marital status				0.556
Married	48 (80%)	25 (83.3%)	23 (76.7%)	
Unmarried	11 (18.3%)	5 (16.7%)	6 (20%)	
Divorced	1 (1.7%)		1 (3.3%)	
Educational level				0.646
Primary	15 (25%)	8 (26.7%)	7 (23.3%)	
Secondary	22 (36.7%)	11 (36.7%)	11 (36.7%)	
Tertiary	21 (35%)	9 (30%)	12 (40%)	
No formal education	2 (3.3%)	2 (6.6%)		
Employment status				0.699
Full-time	49 (81.7%)	26 (86.7%)	23 (76.7%)	
Part-time	8 (13.3%)	3(10%)	5 (16.7%)	
Unemployed	2 (3.3%)	1 (3.3%)	1 (3.3%)	
Student	1 (1.7%)		1 (3.3%)	
Living condition				0.640
Living with family	55 (91.7%)	27 (90%)	28 (93.3%)	
Living alone	5 (8.3%)	3 (3%)	2 (6.7%)	
Perceived economic status				0.245
Can meet daily expenses	42 (70%)	20 (66.7%)	22 (73.3%)	
Cannot meet daily expenses	9 (15%)	7 (23.3%)	2 (6.7%)	
Inadequate	7 (11.7%)	2 (6.7%)	5 (16.7%)	
More than enough	2 (3.3%)	1 (3.3%)	1 (3.3%)	
Economic sources				
Family support	8 (13.3%)	5 (16.7%)	3 (10%)	0.475
Own salary	50 (83.3%)	25 (83.3%)	25 (83.3%)	
Own salary and family support	2 (3.4%)		2 (6.7%)	

post-burn sexual needs of the survivors was included. Despite the comprehensive nature of the transitional aftercare programme targeting post-burn sexual needs, the intervention led to only improved mean scores and statistically significant time effects which creates room for more work to refine the intervention and work towards improving the post-burn sexual well-being of adult burn survivors.

Undoubtedly, issues relating to sexuality and intimacy remain sensitive issues across the globe. Thus, both healthcare staff and patients may feel extremely uncomfortable discussing these issues. Uniquely, the Chinese socio-cultural context continues to be significantly influenced by Confucian and Taoist philosophies which describes openly talking about sex as a taboo [22]. Confucianism, for instance, views sexuality as a taboo and forbids open discussion about sex even in the clinical setting [23]. Openly talking about sex in the Chinese context is considered a source of embarrassment [22] and tantamount to 'airing one's private laundry' generating great discomfort among individuals [24]. Considering the nature of the conservative Chinese context, it becomes rather challenging to implement an aftercare programme that captures sexual needs of adult burn survivors. With the inherent contextual difficulties, a training programme was implemented prior to the trial which focused on undertaking comprehensive assessment using the Omaha System, organising the intervention schemes, and evaluating the care delivered. Despite the training programme implemented, it may have been difficult for the burn patients to open-up fully about their post-burn sexual needs [5, 7]. Arguably, the unique contextual challenges may have potentially led to the adult burn survivors withholding some information which could have enabled the burn care team to resolve their post-burn needs. Undoubtedly, it would take more time for the burn survivors to feel comfortable and talk freely about their sexual needs and seek support in resolving these.

Another potential explanation regarding the non-significant interaction effects observed regarding sexuality may be related to the fact that majority of participants in the current study had burns to the upper limbs and were within the 10–19% TBSA range. Previous studies have established increasing TBSA to be associated with

Table 2 Clinical characteristics of participants

Variable	Total (n = 60)	Control (n = 30)	Intervention (n = 30)	p value
Cause of burns				0.249
Chemical	3 (5%)		3 (10%)	
Electricity	6 (10%)	4 (13.3%)	2 (6.7%)	
Flames	38 (63.3%)	18 (60%)	20 (66.7%)	
Frostbite	1 (1.7%)		1 (3.3%)	
Scalds	12 (20%)	8 (26.7%)	4 (13.3%)	
TBSA (%)				0.291
10-19	40 (66.7%)	22 (73.3%)	18 (60%)	
20–29	6 (10%)	2 (6.7%)	4 (13.3%)	
30–39	4 (6.7%)	3 (10%)	1 (3.3%)	
40–49	3 (5%)	1 (3.3%)	2 (6.7%)	
50–59	2 (3.3%)		2 (6.7%)	
80–89	1 (1.7%)		1 (3.3%)	
90–99	2 (3.3%)	2 (6.7%)		
Missing	2 (3.3%)		2 (6.7%)	
Burn depth				
Partial thickness	45 (75%)	22 (73.3%)	23 (76.7%)	0.303
Full thickness	10 (16.7%)	6 (20%)	4 (13.3%)	
Mixed thickness	5 (8.3%)	2 (6.7%)	3 (10%)	
Body parts affected				
Upper limbs only	18 (30%)	9 (30%)	9 (30%)	0.355
Lower limbs only	12 (20%)	5 (16.7%)	7 (23.3%)	
Upper and lower limbs	6 (10%)	5 (16.7%)	1 (3.3%)	
Trunk only	6 (10%)	3 (10%)	3 (10%)	
Trunk and limbs	6 (10%)	3 (10%)	3 (10%)	
Limbs and face	5 (8.3%)	3 (10%)	2 (6.7%)	
Trunk and face	7 (11.7%)	2 (6.7%)	5 (16.7%)	
Presence of inhalational injury				
Yes	4 (6.7%)	1 (3.3%)	3 (10%)	0.517
No	55 (91.7%)	29 (96.7%)	26 (86.7%)	
Missing	1 (1.7%)		1 (3.3%)	

poor sexual well-being and dissatisfaction [9, 25, 26]. For instance, burn survivors who had sexual concerns (n=288) in the study by Ahmad et al., [9] had a TBSA ranging from 30 to 40% and of second-degree category. The relatively lower TBSA recorded in this study may suggest that their post-burn sexual needs may have been fewer compared to those with more extensive burns. Besides, with most of the participants experiencing burns to the upper limbs suggest that these can easily be covered with one's clothing and not evoke as much distress compared to burn survivors with scars to visible areas such as the face and neck. Thus, it may be helpful to extend this intensive, comprehensive programme to persons who have survived burns to visible areas of the body.

Previous studies have reported gender variations regarding post-burn sexual well-being [9, 27, 28]. These studies highlight that female experienced worse post-burn sexual well-being compared to males. Based on the LIBRE profile, Levi et al. [29] observed that men scored significantly better than women on sexual relationships, social interactions, work & employment, and intimacy. The current study did not ascertain gender variations on the outcome albeit the socio-demographic data indicate our sample included more males (n=48) than females. Although epidemiological studies have highlighted burns affecting more males than females [30, 31], the preponderance of males who have been observed to do better on post-burn sexual well-being may have potentially impacted the non-significant findings noted in the current study.

Though the current study did not observe a statistically significant interaction effect, the use of the WeChat platform is particularly noteworthy as it demonstrates the feasibility of employing a secured, encrypted social media platform to deliver ongoing support following discharge. Potentially, this approach may be helpful in overcoming the challenges associated with long travel distances and particularly helpful during the pandemic when burn survivors in China could not return to available outpatient services. The absence of adverse events reported by participants and the extremely low drop rate may suggest that the mode of delivering the intervention may have been considered appropriate by the study participants. Previous studies have reported the feasibility of using locally available social media platforms in delivering health education to burn patients [32, 33]. Considering the increasing costs associated with burns management, such low-cost locally available platforms need to be considered further to improve outcomes.

Table 3 GEE model comparing sexuality outcomes between groups

			95% CI			
Outcome	B	SE	Lower	Upper	Wald χ2	Sig.
Sexuality						
Group	0.454	0.89	-1.29	2.197	0.26	0.61
Time1	-0.05	0.717	-1.455	1.354	0.005	0.005*
Time2	-0.29	0.645	-0.855	1.673	0.403	0.002*
Group*Time1	-0.311	0.922	-2.118	1.497	0.114	0.736
Group*Time2	-0.314	1.15	-2.567	1.939	0.075	0.785

**Statistically significant based on Bonferroni corrected p value = 0.017

The key strength of the current study is the use of the Omaha System in problem identification and organising the intervention within the EX-PLISSIT framework. Although statistically non-significant interaction effects were observed regarding sexuality, the current study represents a major step towards opening discussion around an often-forbidden topic. For a sensitive area such as sexuality, it can be challenging to find a simple and straightforward tool to guide assessment, intervention, and evaluation of care. The Omaha System offered a straightforward and practical approach to ascertain the existence of concerns associated with post-burn sexual well-being, organise the intervention, and evaluate the care provided in a continuous and comprehensive way. Besides, the language used in the Omaha System is appropriate for multidisciplinary work facilitating communication in the burn care team [5]. Despite the notable strengths, some limitations are worth highlighting. Firstly, the limited availability of a psychologist at the study site made it challenging to deliver the intensive therapy aspects of the intervention. Though a limitation, it may potentially highlight another strength of the study, that is, burn care nurses taking on lead roles in delivering aftercare support following discharge from the burn unit. This may particularly be relevant to developing settings wherein access to a psychologist may be a significant challenge. A second limitation is the fact that the current study demonstrated a preponderance of males compared to females. Although this is congruent with existing global epidemiological studies, it is likely to impact the outcome. Future studies may therefore consider including more females and persons with burns to visible body parts such as the face, neck and hands to ascertain its effects.

Conclusion

Sexuality is a key part of being human but often remains shrouded in secrecy. For burn survivors, the long-term sequelae of the injury can impact their self-esteem, intimacy, and sexual well-being. Yet, these issues are often not addressed in existing rehabilitation programmes. The aftercare programme implemented in this study was comprehensive to identify and resolve these issues in a proactive manner. The findings potentially indicate a need for a longer duration of the programme considering that it may take a while for the burn survivors to feel comfortable and open up about their sexual well-being issues and obtain support in resolving these. Moving forward, post-burn rehabilitation programmes should include components targeting sexual well-being issues to facilitate access to such services for survivors and their partners who may need them.

Acknowledgements

A note of acknowledgement to the nurses who served as case managers for the project and the burn survivors who participated in the study. Also, we wish to acknowledge that data reported in this study emerged from a PhD thesis undertaken by the first author (JB) at the School of Nursing, The Hong Kong Polytechnic University.

Author contributions

JB and FKYW conceptualised the study; JB, FKYW, and LYFC designed the study and obtained the study data; JB, FKYW, AKCW, and PKB analysed and interpreted the results; JB and PKB drafted the manuscript; JB, FKYW, AKCW, PKB, and LYFC reviewed and substantially revised the manuscript; JB, FKYW, AKCW, PKB, and LYFC approved the draft for submission.

Funding

No funding received for this study.

Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

he study was ethically approved by the Institutional Review Board of the Hong Kong Polytechnic University, Hong Kong Special Administrative Region (Approval number: HSEARS20200730001) and the Gansu Provincial Hospital (Approval number: 2020-027). The study was prospectively registered with a trial registry (NCT04517721). Consent to participate was obtained using an informed consent form and all participants consented to participate.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Received: 2 September 2024 / Accepted: 23 October 2024
Published online: 11 November 2024

References

1. Bryarly J, Kowalske K. Long-term outcomes in burn patients. Surg Clin. 2023;103(3):505–13.
2. Bayuo J, Wong FKY, Lin R, Su JJ, Abu-Odah H. A meta-ethnography of developing and living with post-burn scars. J Nurs Scholarsh. 2023;55(1):319–28.
3. Siddiqui SS, Shah IH, Riaz M, Khan QJ. Living with visible scars: the social stigmatization of burn survivors. Prof Med J. 2023;30(12):1514–9.
4. Mc Kittrick A, Gustafsson L, Hodson T, Di Tommaso A. Exploration of individuals perspectives of recovery following severe hand burn injuries. Burns. 2023;49(2):467–75.
5. Bayuo J, Wong FKY, Agyei FB. On the Recovery Journey: an integrative review of the needs of burn patients from immediate pre-discharge to post-discharge period using the Omaha System. J Nurs Scholarsh. 2020;52(4):360–8.
6. Connell K, Phillips M, Coates R, Doherty-Poirier M, Wood F. Sexuality, body image and relationships following burns: analysis of BSHS-B outcome measures. Burns. 2014;40(7):1329–37.
7. Bayuo J, Wong AKC, Wong FKY, Baffour PK, Kuug AK. (2024). Sexual role functioning, sexual satisfaction, and intimacy after surviving burn injuries: a scoping review of associated factors, screening tools, and burn care staff preparedness. J Burn Care Res, irae004.
8. Bayuo J, Wong FKY. Intervention content and outcomes of postdischarge rehabilitation programs for adults surviving major burns: a systematic scoping review. J Burn Care Res. 2021;42(4):651–710.
9. Ahmad I, Masoodi Z, Akhter S, Khurram F. Aspects of sexual life in patients after burn: the most neglected part of postburn rehabilitation in the developing world. J Burn Care Res. 2013;34(6):e333–41.
10. Hurley A, King IC, Perry FM, Dheansa BS. Addressing sexual function in adult burns victims: a multidisciplinary survey of current practice in UK burn units. Burns. 2022;48(4):926–31.
11. Ohrtman EA, Shapiro GD, Simko LC, Dore E, Slavin MD, Saret C, Amaya F, Lomelin-Gascon J, Ni P, Acton A. Social interactions and social activities after

burn injury: a life impact burn recovery evaluation (LIBRE) study. J Burn Care Res. 2018;39(6):1022–8.
12. Rimmer RB, Rutter CE, Lessard CR, Pressman MS, Jost JC, Bosch J, Foster KN, Caruso DM. Burn care professionals' attitudes and practices regarding discussions of sexuality and intimacy with adult burn survivors. J Burn Care Res. 2010;31(4):579–89.
13. Litchfield I, Jones LL, Moiemen N, Andrews N, Greenfield S, Mathers J. The role of self-management in burns aftercare: a qualitative research study. Burns. 2019;45(4):825–34.
14. Bayuo J, Wong FKY, Yi W, Chung LYF. Adult burn survivors and burn care staff perceptions regarding transitioning from the burn unit: a Cross-country qualitative study in Ghana and China. Qual Health Res. 2024;34(7):607–20.
15. Meleis AI. Transitions theory. Nurs Theor Nurs Pract. 2015;4:361–80.
16. Daneshfar F, Behboodi-Moghadam Z, Khakbazan Z, Nabavi SM, Nayeri ND, Ghasemzadeh S, Montazeri A. The influence of Ex-PLISSIT (extended permission, limited information, specific suggestions, intensive therapy) model on intimacy and sexuality of married women with multiple sclerosis. Sex Disabil. 2017;35:399–414.
17. Davis S, Taylor B. (2006). From PLISSIT to ex-PLISSIT. *Rehabilitation: The use of theories and models in practice. Edinburgh: Elsevier*, 101–129.
18. Annon JS. The PLISSIT model: a proposed conceptual scheme for the behavioral treatment of sexual problems. J sex Educ Therapy. 1976;2(1):1–15.
19. Schulz KF, Moher D, Altman DG. (2014). Consort. *Guidelines for Reporting Health Research: A User's Manual*, 80–92.
20. Ling-Juan Z, Jie C, Jian L, Xiao-Ying L, Ping F, Zhao-Fan X, Tao L. Development of quality of life scale in Chinese burn patients: cross-cultural adaptation process of burn-specific health scale–brief. Burns. 2012;38(8):1216–23.
21. Elsherbiny OE, Fahar E, Weheida MH, Shebl SM, A. M., Shrief WI. Effect of burn rehabilitation program on improving quality of life (QoL) for hand burns patients: a randomized controlled study. Eur J Plast Surg. 2018;41:451–8.
22. Lieber E, Li L, Wu Z, Rotheram-Borus MJ, Guan J, Group. N. I. o. M. H. C. H. P. T. (2006). HIV/STD stigmatization fears as health-seeking barriers in China. AIDS Behav, *10*, 463–71.
23. Gao E, Zuo X, Wang L, Lou C, Cheng Y, Zabin LS. How does traditional confucian culture influence adolescents' sexual behavior in three Asian cities? J Adolesc Health. 2012;50(3):S12–7.
24. Chin D. HIV-related sexual risk assessment among Asian/Pacific Islander American women: an inductive model. Soc Sci Med. 1999;49(2):241–51.
25. Goncalves N, Ciol MA, Dantas RAS, Junior F, J. A., Rossi LA. A randomized controlled trial of an educational programme with telephone reinforcement to improve perceived health status of Brazilian burn victims at 6-month post discharge. J Adv Nurs. 2016;72(10):2508–23.
26. Öster C, Sveen J. Is sexuality a problem? A follow-up of patients with severe burns 6 months to 7 years after injury. Burns. 2015;41(7):1572–8.
27. Connell KM, Coates R, Wood FM. Burn injuries lead to behavioral changes that impact engagement in sexual and social activities in females. Sex Disabil. 2015;33:75–91.
28. Pandya AA, Corkill HA, Goutos I. Sexual function following burn injuries: literature review. J Burn Care Res. 2015;36(6):e283–93.
29. Levi B, Kraft CT, Shapiro GD, Trinh NHT, Dore EC, Jeng J, Ryan CM. The associations of gender with social participation of burn survivors: a life impact burn recovery evaluation profile study. J Burn Care Res. 2018;39(6):915–22.
30. Lam N, Hung N, Duc N. Influence of gender difference on outcomes of adult burn patients in a developing country. Annals Burns fire Disasters. 2019;32(3):175.
31. Mehta K, Arega H, Smith NL, Li K, Gause E, Lee J, Stewart B. Gender-based disparities in burn injuries, care and outcomes: a World Health Organization (WHO) global burn Registry cohort study. Am J Surg. 2022;223(1):157–63.
32. Batra N, Colson CD, Alberto EC, Burd RS. (2021). Using social media for the prevention of pediatric burn injuries: pilot design and usability study. JMIR Formative Res, 5(7), e23242.
33. Rouzfarakh M, Deldar K, Froutan R, Ahmadabadi A, Mazlom SR. The effect of rehabilitation education through social media on the quality of life in burn patients: a randomized, controlled, clinical trial. BMC Med Inf Decis Mak. 2021;21:1–11.

Publisher's note