

**The Effect of Burn Characteristics and Demographic Factors on Sexuality and Body
Image**

Franziska Rhein

4405528

Department of Clinical Psychology, Utrecht University

201500819: Master Thesis

Supervisor: Dr. Nancy van Loey

Second evaluator: Femke van den Brink

April 20th, 2022

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Abstract

Past research has shown that burn injuries can compromise patient's body image, which may also affect their feelings of sexual attractiveness. Yet, the evidence for sexual problems in burn survivors is rather limited, and health care professionals often lack experience in treating such issues. Therefore, the aim of the present study was to investigate body image and sexuality in a population with burns to help improve health care services for patients. A cross-sectional design was used to examine the effect of body image on sexuality and whether gender, burn size (TBSA%) and age predict sexual and body image (dis)satisfactions. Additionally, moderation effects of gender on burn size and body image, or sexuality were also investigated. The sample included $N = 117$ burn survivors from multiple burn centers in Belgium and the Netherlands, who were questioned six months after their injury. Results showed significant effects for gender on body image and sexuality, with women experiencing more dissatisfactions than men. Increasing age at injury and body image dissatisfaction both predicted decreases in sexuality. Moreover, greater TBSA% was associated with declines in body image, but not in sexual satisfaction. Lastly, no moderation effect for gender on TBSA% and sexuality or body image was found. These results provide evidence for significant deteriorations in patient's satisfaction with body image and sexuality and thereby highlight the need for health care professionals to screen for and address sexuality and body image issues with their patients with burns.

Keywords: burns, sexual (dis)satisfaction, body image, TBSA%, gender differences

The Effect of Burn Characteristics and Demographic Factors on Sexuality and Body Image

On the 6th of March 2018, the World Health Organization (WHO) reported that about 180,000 deaths worldwide are caused by serious burns, mostly occurring at home or at the workplace (World Health Organization, 2018). Thanks to the continuing progress in burn care, research has shown that, in the last 50 years the survival rate of burn patients increased significantly (Blakeney et al., 2008; Druery et al., 2017; Ryan et al., 1998). Yet approximately 30% of the survivors report moderate to severe difficulties in social participation (Druery et al., 2017; Esselman, 2007; Ohrtman et al., 2020) including the individual's sexual activity and intimacy. The latter are often neglected in rehabilitation programs of patients with burns (Ahmad et al., 2013). On the one hand, this may be because healthcare professionals are uncomfortable addressing the patient's sexual activity and intimacy (Rimmer et al., 2010), on the other hand, research about the influence of burns on sexuality is still limited, leaving health professionals untrained in treating this issue in clinical settings (Piccolo et al., 2011).

Furthermore, burns do also affect victim's physical appearance, and consequently, body image dissatisfactions may occur. According to Cash's theoretical cognitive-behavioral model (2002, 2012), body image is seen as an attitude composed of body image evaluations and investments. Several inter-related factors can influence and shape this attitude, among them being physical characteristics and changes (Cash, 2002, 2012). Burn scars may result in dissatisfaction with physical appearance affecting feelings of (sexual) attractiveness. Indeed, research has shown that there is a correlation between *body image dissatisfaction* (BID) and sexual satisfaction (McDonagh et al., 2008; Tepper et al., 2001; Ussher et al., 2012). Evolutionarily, physical attractiveness is an indicator of successful reproduction for women (Buss & Schmitt, 2011), which possibly reinforces the negative evaluation of body image for

the female gender, as they are more aware of their appearance in the first place. This phenomenon may be particularly pronounced when it comes to potential sexual partners (Woertman & van den Brink, 2012). Furthermore, especially older adults may experience a decrease in sexual satisfaction when successful reproduction has not yet occurred, one possible explanation being that women's fertility declines with increasing age (Menken et al., 1986). However, in burn survivors, the relationship between body image and sexual (dis)satisfaction has not received much attention yet (Kazemzadeh et al., 2021).

Therefore, the current study investigates the impact of burn size, measured by *total body surface area* (TBSA%) affected on sexuality and body image aspects to improve the availability of rehabilitation interventions after burns. The effect of body image (dis)satisfaction on sexual (dis)satisfaction will also be examined and gender, as well as age differences will be discussed to investigate more the prosocial impact of burns.

Burns and Body Image

A first look into the literature suggests that women seem to have higher levels of BID compared to men, following increases in TBSA% (Connell et al., 2013; Connell et al., 2014). It even seems that patient's dissatisfaction with appearance becomes greater over time with women's BID scores being significantly more elevated than men's at 12 months postburn (Connell et al., 2013). However, Connell et al. (2014) found that women's BID scores improved after 12 months postburn, yet they were not statistically significant. A tendency for women being more affected by BID after a burn injury becomes apparent, supported by findings of the longitudinal study by Thombs et al. (2008). They proposed that the main predictors for body image dissatisfaction are TBSA% affected, female gender as well as placing a higher value on physical appearance (Thombs et al., 2008). Yet, in their qualitative study of $n = 5$ female patients with burns, Connell et al. (2015) found that all participants experienced negative changes in their self-perceptions, independent of burn size or depth.

Moreover, all participants described undergoing a phase of adjustment to their new self and indicated that their insecurities caused reductions in frequency of sex and in sexual pleasure during intercourse. This is in line with recent findings by Kazemzadeh et al. (2021) who found that sexual dissatisfaction correlated strongly with body image disturbances. Over two-thirds of the burn patients indicated being unhappy with their appearance and three-fourths reported that their new appearance adversely impacted their relationships (Kazemzadeh et al., 2021). Yet, most studies were either conducted with female patients or provided evidence that female patients tended to be more affected by BID after a burn than male patients (Pandya et al., 2015; Piccolo et al., 2013). This underscores the importance of further investigating gender differences in body image, as well as in sexual satisfaction, as it was found that, at least among women, satisfaction with appearance is associated with more sexual pleasure (Satinsky et al., 2012).

Burns and Sexuality

According to the World Health Organization (2006), sexual health is “a state of physical, emotional and social well-being in relation to sexuality and not merely the absence of disease, dysfunction or infirmity”. Being in a sexually satisfying relationship is a very important aspect for human relationships (Kazemzadeh et al., 2021) and a lack of sexuality can increase sexual problems and impact individual’s vitality (Claudat & Warren, 2014). The researchers Ahmad et al. (2013) conducted a study investigating sexuality in patients six months postburn and found that 52.94% of them reported being sexually dissatisfied, which was significantly higher compared to a control group where only 20.40% of the individuals scored low on sexual satisfaction. Furthermore, most of the sexually dissatisfied patients with burns suffered from a burn size of 30-40% TBSA affected and were hospitalized with second- or higher-degree burns. This is in line with previous findings by Noble et al. (2006), where the researchers also found a significant association between larger burns (>20% TBSA)

and decreased sexuality scores, indicating that there seems to be a strong link between burn severity and sexual satisfaction (Pandya et al., 2015). However, there is also contrary evidence given by Ohrtman et al., (2020) as they found that the probability of engaging in sexual activity or being in a romantic relationship was similar among burn survivors and general citizens from the United States. In fact, the frequency of engaging in sexual activity was even significantly greater for individuals with burn injuries (65%) than for the general population sample (57%).

Gender Differences

Another interesting finding that can be derived from the study by Ohrtman et al. (2020) was that male burn survivors appeared to be more sexually active compared to females. The researchers attributed this to the tendency of women to be more affected than men by body image disturbances after a burn injury (Pandya et al., 2015; Piccolo et al., 2013), which in turn may affect their sexuality (Ohrtman et al., 2020). Results of a longitudinal study by Öster and Sveen (2015) also showed that, each time of assessment, women scored lower than men on sexuality subscales. Although sexuality scores seemed to increase over time in both genders, the only statistically significant improvement was for men at the 24-months and two to seven years follow-up assessment. Furthermore, the researchers also found evidence for decreases in sexual satisfaction with increases in TBSA% for both genders, which is in line with previous findings by Connell et al. (2014). In their study, women's satisfaction with sexuality was also lower compared to men's with fewer improvements over time for individuals with minor burns (<15% TBSA) (Connell et al., 2014), which again suggests that women's sexuality is more affected by their burns than men's. When looking at female studies only it becomes even more evident that sexual dissatisfaction is a much-presented factor in women's postburn lives, as results by Kazemzadeh et al. (2021) showed that 82% of the participants indicated being unsatisfied

with their sexual activity. Yet, there is also contrary evidence found in the literature. Ahmad et al. (2013) for example discovered that declines in sexual satisfaction postburn were greater for men than for women as 75.69% of the sexually unsatisfied patients were male and only 24.30% were female. However, several studies showed that men generally score higher than women on domains of sexual activity and sexual satisfaction in both the burn survivor as well as the general population (Ohrtman et al., 2020; Pandya et al., 2015; Tudahl et al., 1978; Woertman & van den Brink, 2012). Consequently, a decline in sexual intercourse after a burn injury may be worse for men than for women. Yet, differences in postburn sexual satisfaction should not be considered solely a consequence of gender.

Age at Injury

For instance, looking back at the study of Ahmad et al. (2013), it is worth mentioning that most patients that were sexually unsatisfied were between 20-30 years old, which is usually the decade of life where both genders are the most sexually active. In contrast, in the study by Öster and Sveen (2015) where the researchers found that females were more unsatisfied with their sexual satisfaction than males, patient's mean age at injury was $M = 43.6$ years ($SD = 15.3$ years), representing a different generation and thus a different decade in patient's lives. Differences in age on sexuality become increasingly interesting when looking at the results of Kazemzadeh et al. (2021), as they found no significant correlation between the two variables. In their sample of 180 female patients with burns, most of them were between 20-41 years old and sexually active, highlighting the fact that women of every age can be sexually dissatisfied due to their burn scars. Further evidence suggests that the possibility of burn scars impacting individual's sexuality even increases with ascending age at the time of injury (Connell et al., 2013). The same may account for body image concerns, as a study by Jessee et al. (1992) found that in children suffering from burn injuries, body image dissatisfaction increased with age. A systematic review by Cleary et al. (2020) also

suggests that BID is especially apparent in teenagers and young adults. Yet, more research is needed to find reliable evidence for this effect.

The Present Study

Therefore, the present study aims to extend the existing body of research on the effect of burn characteristics and demographic factors on patient's sexual (dis)satisfaction and body image (dis)satisfaction. A cross-sectional design was applied to investigate the data of patients with burns in Belgium and the Netherlands at six months after their burn accident.

As seen in Figure 1, we hypothesized that female gender (H1) and TBSA% affected (H2) will be associated with more body image dissatisfaction, controlling for age of injury.

Additionally, we expected a moderation effect for gender on the association between TBSA% and body image (H3). As shown in Figure 2, dissatisfaction with body image was further assumed to decrease patient's sexual satisfaction (H4). We also expected that higher TBSA% (H5) and female gender (H6) will be associated with more dissatisfactions in patient's sexuality and anticipated a moderation effect for gender on the association between TBSA% and sexual satisfaction (H7). Lastly, with patient's increasing age at injury more dissatisfaction with sexuality was expected (H8).

Figure 1

Hypotheses and control variable predicting body image (dis)satisfaction.

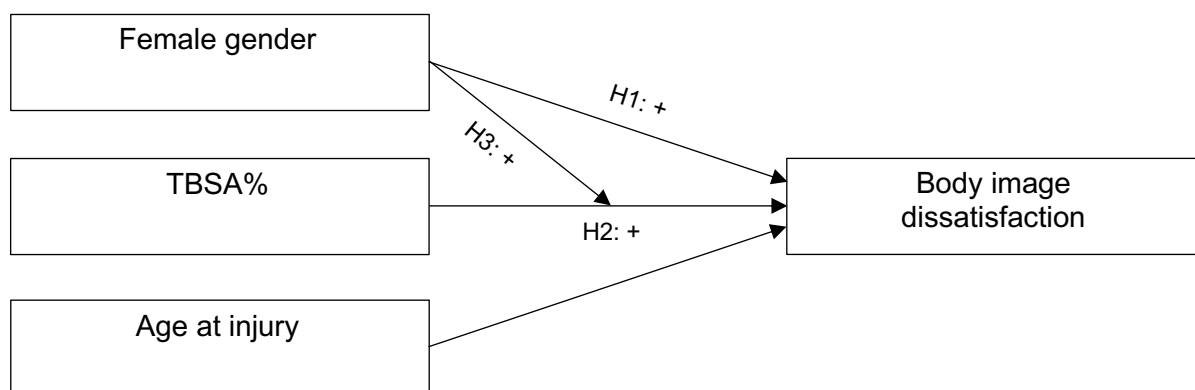
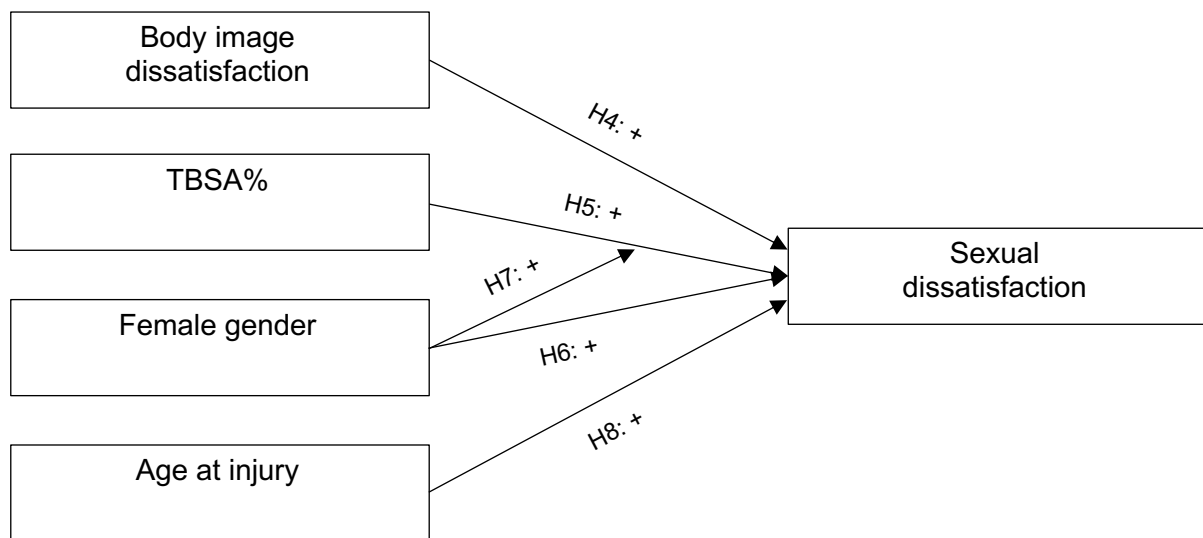


Figure 2

Hypotheses predicting sexual (dis)satisfaction.



Note. The plus sign describes a predicted positive relationship.

Method

Participants

In total, 266 patients with burns from three Dutch and three Belgian burn centers were sampled during their hospitalization and followed for 18 months. Patients were included in the study if their hospital stay was longer than 24 hours following the burn injury, if they were age 18 years or older, Dutch-speaking and in a romantic relationship. The patient's partners also needed to be at least 18 years old and have sufficient Dutch proficiency. Patients with psychiatric problems (e.g., cognitive problems or a psychosis) were excluded from the study. Seventy-one out of the initial 266 patients dropped out because they were not in a romantic relationship and eight patients had missing data leaving 187 patients with a partner. Of the 187 patients with a partner, 117 completed the 6-month measurement (T3). The final sample of $n = 117$ consisted of 87 patients who identified with the male and 30 patients who identified with the female gender. Men's average age was $M = 43.0$ years ($SD =$

16.8, $Min = 18$, $Max = 82$) and women's $M = 41.0$ years ($SD = 15.8$, $Min = 19$, $Max = 82$). Mean TBSA% burned was $M = 9.8\%$ ($SD = 10.7\%$, $Mdn = 7.0\%$, $Min = 0.4\%$, $Max = 60.5\%$), and $M = 10.8\%$ in males and $M = 6.9\%$ in females. One hundred forty-nine patients from the initial sample dropped out. Ninety-five of them identified with the male gender and had an average age of $M = 42.3$ years ($SD = 15.2$, $Min = 18$, $Max = 74$), 54 identified with the female gender and had an average age of $M = 43.1$ ($SD = 15.2$, $Min = 18$, $Max = 73$). Their average TBSA% burned was $M = 12.2\%$ ($SD = 15.0\%$, $Mdn = 8.0\%$, $Min = 1.0\%$, $Max = 75.0\%$).

Materials

Sexuality Measures

Sexual (dis)satisfaction was measured by means of an adapted version of the Cooper-Fraps' (1985) Burn Sexuality Questionnaire (BSQ). The questionnaire consisted of 14 items (E.g., "How often do you hide the scars from your partner during the day with clothes and/or make-up?") and two supplementary items measuring for the patient's current experiences with sexuality and intimacy (E.g., "The burns have made my sexual life less enjoyable"). The patient's responses were recorded using a 5-point Likert scale (1 = *never*, 5 = *almost always* for item 1-14, and 1 = *strongly disagree*, 5 = *strongly agree* for item 15a-c and 16a-c), with higher scores indicating greater difficulties in patient's sexual life. A total score was calculated by reverse-coding negatively worded items and summing the 16 items into an overall mean score ($M = 1.8$, $SD = 0.6$, $Min = 1.1$, $Max = 4.0$). Results of a reliability test for internal consistency revealed a high internal consistency for items measuring sexual (dis)satisfaction (Chronbach's $\alpha = .89$).

Body Image Measures

To investigate patient's *body image (dis)satisfaction*, the Satisfaction with Appearance Scale (SWAP) by Lawrence et al. (1998) was used, containing 14 items that

measured the extent to which patients (dis-)agreed with statements reflecting their (dis)satisfaction with appearance post-burn regarding their facial features and body parts, and patient's (dis)comfort with appearance and its impact on social situations (E.g., "I am satisfied with my overall appearance"). Answers were given on a 7-point Likert scale (1 = *totally agree*, 7 = *totally disagree*), with higher scores suggesting greater BID. A sumscore of all 14 items was calculated by reverse-coding negatively worded items ($M = 34.0$, $SD = 17.5$, $Min = 14$, $Max = 80$). A reliability analysis showed high internal consistency for items measuring body image (dis)satisfaction (Cronbach's $\alpha = .91$).

Demographic Data and Burn Characteristics

Patient's demographic data were recorded from their medical file. Their gender (male, female) was Dummy coded as 0 = *male* and 1 = *female* and age at injury measured in years. TBSA% burned was also taken from their medical files and indicated in percentage.

Procedure

After the study received approval by the ethics committee in the Netherlands (NL44682.094.13) and in Belgium (B670201420373), patients and their partners were recruited by a local researcher during their hospitalization between October 2013 – October 2015. The study was part of a prospective longitudinal study that examined the social consequences of burns. The invitation to participate included oral and written study information and patients as well as their partners were asked to give their informed consent. Subsequently, patients were asked to fill out the test batteries of the SWAP Scale and the adapted version of the BSQ.

In the original study, patients and their partners were requested to fill out this questionnaire at five different measurement points. For data protection reasons, the present study uses a simulation of this collected data. A cross-sectional design will be applied to investigate the data available at six months after the burn accident (T3).

Statistical Analysis

The analysis was conducted in IBM SPSS v28. An independent samples t-test was applied to compare the data of valid cases and dropouts. A Pearson correlation matrix was calculated to test for multicollinearity among the predictor variables. Next, two multiple regression analyses were used to investigate the effect of the potential predictors TBSA%, gender, age at injury and body image (dis)satisfaction on sexual (dis)satisfaction and on body image (dis)satisfaction respectively. Lastly, possible moderations were tested via interaction effects.

Results

Valid Cases vs. Dropouts

Comparing valid cases ($n = 117$) to dropouts ($n = 149$) via independent samples t-tests, no statistically significant differences were found for age at injury ($t(264) = 0.05, p = .961$), TBSA% burned ($t(264) = 1.47, p = .142$) and gender ($t(258) = 1.87, p = .062$). TBSA% percentages were slightly higher for dropouts ($M = 12.2\%$, $SD = 15.0\%$) than for valid cases ($M = 9.8\%$, $SD = 10.7\%$), and the mean of patient's age at injury almost the same comparing dropouts ($M = 42.6$, $SD = 15.2$) and valid cases ($M = 42.5$, $SD = 16.5$). Yet, for both variables, the variances between the subgroups were assumed to be equal ($p > .05$) across all variables, indicating that the group that dropped out would possibly not have led to more extreme BSQ or SWAP scores in our analyses. Moreover, the variance in gender was assumed to be different across the two subgroups ($p < .05$).

Correlations

As shown in Table 1, results of the Pearson correlation analysis revealed that most of the predictors correlated weakly with each other. However, BSQ and SWAP showed a strong positive association ($r = .626$). Hence, for most of the predictor variables multicollinearity must not be a problem here.

Table 1*Means, Standard Deviations, and Pearson Correlation Coefficients.*

	1	2	3	4
1 BSQ				
2 SWAP	.626**			
3 Age	-.007	-.147		
4 TBSA%	.013	.005	.186*	
<i>N</i>	117	112	117	117
<i>M</i>	1.8	34.0	42.5	9.8
<i>SD</i>	0.6	17.5	16.5	10.7

Note. *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Multiple Regression Analyses

Body Image (Dis)satisfaction

To investigate body image (dis)satisfaction in the burn population sample, a multiple regression analysis was performed with gender, age at injury and TBSA% predicting patient's SWAP score. A significant regression equation was found ($F(3, 191) = 10.96, p < .001$), with an $R_{adj}^2 = .133$. As shown in the upper part of Table 2, patient's SWAP score was equal to $16.89 + 10.29$ (gender) $- 0.09$ (Age) $+ 0.47$ (TBSA%). The results imply that SWAP significantly increased by 0.47 with one percentage increase in patient's TBSA% burned and women's SWAP, compared to men's was 10.29 higher. Both TBSA% ($b = 0.47, t(191) = 4.23, p = <.001$) and gender ($b = 10.29, t(191) = 3.84, p = <.001$) were significant predictors

of SWAP, but patient's age of injury was not ($b = -0.09$, $t(191) = -1.22$, $p = .225$). Including the interaction between TBSA% and gender into the model resulted in an increase of 0.3% of the explained variance in SWAP ($R_{adj}^2 = .136$) and in a significant equation of $F(4, 190) = 8.63$, $p < .001$. However, looking at the lower part of Table 2, it can be observed that the moderation effect of gender on TBSA% and SWAP was not significant ($b = 0.49$, $t(190) = 1.24$, $p = .215$). Also, the variable gender is not significant anymore ($b = 6.42$, $t(190) = 1.56$, $p = .120$).

Table 2

Multiple regression analyses with outcome variable SWAP.

Multiple regression analysis				
Effect	Estimate	SE	<i>t</i>	<i>p</i>
Fixed effects				
Intercept	16.89	4.12	4.09	<.001
Gender	10.29	2.68	3.84	<.001
Age	-.09	.08	-1.22	.225
TBSA%	.47	.11	4.23	<.001
Multiple regression analysis with interaction effects added				
Fixed effects				
Intercept	17.16	4.12	4.16	<.001
Gender	6.42	4.11	1.56	.120
Age	-.09	.08	-1.17	.244

TBSA%	.42	.11	3.71	<.001
Interaction effects				
Gender*TBSA%	.49	.40	1.24	.215

Note: Total $N = 194$, Gender: 0 = male, 1 = female.

Sexual (Dis)satisfaction

Results of the multiple regression analysis with gender, age at injury, TBSA% burned and SWAP predicting patient's sexual (dis)satisfaction revealed a significant regression equation ($F(4, 107) = 20.88, p < .001$) with the predictors explaining $R_{adj}^2 = .417$ of the variance in patient's BSQ score. As shown in the upper part of Table 3, patient's BSQ score was equal to $11.42 + 4.31$ (gender) $+ 0.11$ (age) $+ 0.06$ (TBSA%) $+ 0.33$ (SWAP). According to the model, female's BSQ score was 4.31 higher than male's and a one-year increase in age at injury would result in 0.11 more sexual dissatisfaction in both genders. Moreover, increases in TBSA% burned predicted 0.06, and increases in SWAP 0.33 more sexual dissatisfaction in patients with burn injuries. Gender ($b = 4.31, t(107) = 2.51, p = .013$), SWAP ($b = 0.33, t(107) = 8.24, p < .001$) and age at injury ($b = 0.11, t(107) = 2.09, p = .039$) were significant predictors of BSQ, but patient's TBSA% affected was not ($b = 0.06, t(107) = 0.79, p = .433$). A second regression was performed and a predicted moderation effect of gender on TBSA% and BSQ added to the equation. The inclusion of the interaction effect resulted in a reduction of -0.5% in the explained variance in BSQ $R_{adj}^2 = .412$, but the overall model was still significant ($F(5, 106) = 16.57, p < .001$). Results of the second multiple regression analysis displayed in the lower part of Table 3 revealed no moderation effect of gender on TBSA% and BSQ ($b = -0.09, t(106) = -0.29, p = .771$).

Table 3*Multiple regression analyses with outcome variable BSQ.*

Multiple regression analysis				
Effect	Estimate	SE	<i>t</i>	<i>p</i>
Fixed effects				
Intercept	11.42	2.66	4.29	<.001
Gender	4.31	1.71	2.51	.013
Age	.11	.05	2.09	.039
TBSA%	.06	.08	.79	.433
SWAP	.33	.04	8.24	<.001
Multiple regression analysis with interaction effects added				
Fixed effects				
Intercept	11.37	2.68	4.25	<.001
Gender	4.91	2.71	1.81	.072
Age	.11	.05	2.08	.040
TBSA%	.07	.08	.83	.407
SWAP	.33	.04	8.19	<.001
Interaction effects				
Gender*TBSA%	-.09	.32	-.29	.771

Note: Total *N* = 111, Gender: 0 = male, 1 = female.

Discussion

The purpose of this study was to gain a better understanding about the effect of burn characteristics and demographic variables on patient's body image (dis)satisfaction and sexual (dis)satisfaction. The current study demonstrated that gender and TBSA% burned both predict body image (dis)satisfaction. This is in line with predictions of the first and second hypotheses were we also expected that female gender, as well as increases in TBSA% affected will be associated with higher body image dissatisfactions, controlling for age at injury. Yet, opposed to the study's third prediction, gender did not moderate the effect of TBSA% on body image (dis)satisfaction. Nevertheless, confirming hypothesis four, higher levels of body image dissatisfaction were associated with more sexual dissatisfaction. In contrast to hypothesis five and seven, neither patient's TBSA% burned nor the moderation effect of gender on TBSA% and sexuality predicted more sexual dissatisfactions. However, female gender as well as age at injury were significant predictors of sexual (dis)satisfaction, which is in line with predictions of hypotheses six and eight.

Our results confirm previous research that also found an effect for females being more affected by BID than males (Connell et al., 2013; Connell et al., 2014; Pandya et al., 2015; Piccolo et al., 2013). Moreover, increases in TBSA% burned did also significantly increase body image dissatisfactions, which confirms earlier results by Connell et al. (2013).

However, in contrast to our predictions, gender did not have a moderating effect on TBSA% and body image. We assumed to find gender differences as previous literature suggested that women display higher levels of BID with increasing TBSA% burned (Connell et al., 2013; Connell et al., 2014). Thombs et al. (2008) also named female gender and TBSA% affected as central determinants for body image (dis)satisfaction. Despite the non-significance of the joint effect of TBSA% and gender on body image, the significance of the variable's single effects still imply that being male or female does make a difference on body

image evaluations, but not when judging the impact of burn size for their physical appearance.

Furthermore, as predicted, increases in BID were associated with more sexual dissatisfactions and results of a Pearson correlation confirmed that there is a strong association between body image and sexuality ($r = .626$). These findings are congruent with results of female studies that also found evidence for deteriorations in body image followed by declines in sexual satisfaction (Connell et al., 2015; Kazemzadeh et al., 2021), and add new insights to the body of evidence, showing that BID in men can also adversely affect their sexuality.

However, in contrast to previous studies demonstrating that increases in TBSA% burned lead to more sexual dissatisfaction (Ahmad et al., 2013; Noble et al., 2006; Öster & Sveen, 2015), the present study did not find evidence for such an effect. One explanation for this could be that, in the current study, the average TBSA% burned was lower ($M = 9.8$) compared to previous studies that found significant effects for larger burns ($TBSA > 20\%$ (Ahmad et al., 2013; Noble et al., 2006)). Also, the mean for TBSA% burned was higher in patients that were excluded from the analysis ($M = 12.2$). That could have led to different outcomes, although results of an independent samples t-test revealed equal variances between dropouts and valid cases. Lastly, the current study only looked at patient's experiences with sexual (dis)satisfaction at six months after the burn accident, whereas other researchers gathered data at up to five years after the burn (Noble et al., 2006). Perhaps time passed since the accident is a crucial variable to consider in this investigation, as severe wounds may need longer to heal.

The current results provide evidence for differences in sexuality across gender, which is in line with previous research that also found higher scores of sexual dissatisfactions in females compared to males after a burn injury (Connell et al., 2014; Öster & Sveen, 2015;

Tudahl et al., 1987). However, contrary to our expectations there was no moderation effect found for gender on TBSA% affected and sexuality. Although past research gathered evidence for significant associations between gender, TBSA% burned and sexual (dis)satisfaction (Connell et al., 2014; Öster & Sveen, 2015), the current study found no support for this relationship. This may partly be explained by the fact that the body of evidence about gender difference on burn size and sexuality still holds mixed results. In female studies, insecurities and deteriorations in sexual pleasure are central elements described by patients (Connell et al., 2015; Kazemzadeh et al., 2021). However, men are generally more sexually active in burn survivor and general populations (Ohrtman et al., 2020; Pandya et al., 2015; Tudahl et al., 1987; Woertman & van den Brink, 2012) which may further make the experience of a burn injury and subsequent decreases in sexual activity worse for them. This notion finds support by Ahmad et al. (2013) who also showed that declines in sexual satisfactions were greater for men than for women.

Furthermore, results of the present study also suggest that age at injury matters too, as increases in age were associated with more sexual dissatisfactions. This finding is in line with prior research showing negative associations between age and sexuality (Connell et al., 2013). Yet, in contrast to results by Ahmad et al. (2013) where most of the patients experienced a deterioration in sexuality between ages 20-30 years, the mean age in the current study was higher ($M = 42.5$). Interestingly, in another study in which the average age was similar to that of the present study, no significant effect for age at injury on sexuality scores was found (Öster & Sveen, 2015). The same accounts for satisfactions with appearance. Age in the multiple regression analysis predicting body image (dis)satisfactions was not significant, confirming previous results by Kazemzadeh et al. (2021) that concluded (dis)satisfactions with appearance may be a matter at every age.

Interestingly, whereas burn size did significantly influence body image evaluations, it did not significantly affect satisfactions with sexuality and intimacy. Yet, declines in body image, in turn, did predict more sexual dissatisfactions. These findings are of great relevance, as they suggest that there may not be a direct, but an indirect relationship between TBSA% and sexuality through body image. This implies that it is not the extent of the change in appearance itself (TBSA%) but the attitude towards this change and one's own revaluation of appearance (body image) that influences sexual (dis)satisfaction. Yet, future research needs to verify this relationship by means of mediation analyses.

Together, the current study's findings support the hypothesized research model. We did find evidence for female gender predicting higher BID in patients with burn injuries. Moreover, dissatisfactions with appearance were further associated with deteriorations in sexuality. Lastly, increasing age and female gender also predicted more sexual dissatisfactions.

Theoretical and Practical Implications

The present results have great practical importance, both for health care practitioners and patients. As sexuality and intimacy are still not being addressed enough in clinical settings (Ahmad et al., 2013), rehabilitation professionals should also touch upon emotional consequences of burns. Specifically, the consequences of TBSA% burned on patient's changes in body image should be assessed as the current results demonstrated that increasing TBSA% affected body image satisfactions which in turn influenced sexuality. Because patient's burn size did not directly but may indirectly predict sexual (dis)satisfaction through body image (dis)satisfaction, more attention should be paid to body image in clinical practice. One's satisfaction with appearance seems to be a central determinant for the effect of burn severity on sexual aspects, and by addressing BID in patients with burns, health care professionals may help patients to deal with such issues better, which may contribute to an

increase in their well-being. Moreover, patients, but especially women should receive more psychoeducation about the emergence of problems with sexual satisfaction after a burn injury to increase awareness and the probability of patients seeking help themselves. Lastly, the trend of higher sexual dissatisfactions with increasing age should be considered in rehabilitation programs.

In turn, learning about the occurrence of sexual and body image dissatisfactions following a burn injury could help patients to open up more about their insecurities and thus reduce their suffering. The publication of such statistics could contribute to a general normalization of sexuality-related topics to gain more awareness and understanding also on the part of unaffected people.

Strengths

The study's cross-sectional design allowed in-depth analysis of patient's data available at six months after the burn injury. Furthermore, as the examined data in this study was part of a prospective longitudinal study, patient's progress on sexuality and body image variables may be investigated further and compared to the present results. Also, a priori power analyses suggested a sample size of least 92 participants to achieve a power of .80 in the multiple regression analysis predicting sexual (dis)satisfaction ($f = 0.15$, $\alpha = 0.05$, predictors = 5). As the present study incorporated a sample of $n = 117$ participants, it can be expected that a power of at least .80 was reached. The same accounts for the multiple regression analysis predicting body image (dis)satisfaction, where a sample size of at least 85 participants was suggested ($f = 0.15$, $\alpha = 0.05$, predictors = 4) to reach a power of .80.

Limitations and Future Directions

Yet, this study also has its limitations. First, the theoretical model used in the present study was rather explorative and a unification of body image (Cash, 2002, 2012) and evolution theory (Buss & Schmitt, 2011), underlined by results concerning females' sexuality

(Woertman & van den Brink, 2012). It therefore needs repetition to strengthen the findings. Second, the recruitment and assessment by different professionals at different burn centers may have led to differences in patient support and therefore in the reported symptoms. Third, gender representations were quite uneven as the sample incorporated almost three times more men than women. Fourth, the current study applied multiple regression analyses to investigate two outcome variables. Future research could use structural equation modelling (SEM) which may be more suitable for such situations. Fifth, due to the cross-sectional design, no conclusions can be drawn regarding the course of body image or sexual (dis)satisfaction over time. As the literature suggests fluctuations in sexual (Connell et al., 2013; Öster & Sveen, 2015) and body image (dis)satisfactions (Connell et al., 2013; Connell et al., 2014), future research should use a prospective longitudinal design to gain more insights into the progression of patient's sexuality and body image over time. As the present study is part of a prospective longitudinal study already, the current results may be compared to the data of later measurement points. Seventh, possible limitations may also be found in the operationalization of burn size. The current study took patient's TBSA% as an indicator of burn severity, yet, neglecting information about burn location. In fact, other studies showed that especially burns at areas of the scrotum, the breast, or thighs increased sexual and body image dissatisfaction (Ahmad et al., 2013; Connell et al., 2013; Connell et al., 2014; Piccolo et al., 2013). However, in this study no relationship between TBSA% affected and sexuality could be found, raising the question of whether more precise information on burned body parts would have been important to find significant results. Lastly, the current study assumes a binary gender distribution. However, future research should also collect information about different gender identities.

Together, these findings stress the importance of talking about body image and sexual (dis)satisfaction already during hospitalization or later during rehabilitation. The reluctance

of both parties to address problems of sexuality and intimacy (Rimmer et al., 2010) could be bridged with a general protocol in which such issues are part of the overall screening process. Protocols that assess patient's sexual problems, such as the PLISSIT model by Annon (1976) do already exist, however its application requires clinicians who are skilled at addressing such topics. Therefore, health care professionals should receive in-service training to become more proficient in discussing sexuality aspects. Patients should be provided with contact information and self-help groups to gain awareness of the emergence of sexuality issues post-burn, and to enable patients to seek help themselves.

The present study offers further contributions to the literature of burns, sexuality, and body image. Firstly, it yields more evidence for the negative impact of burns on patient's body image satisfactions, but additionally presents new insights of a presumed indirect effect of burns on sexual satisfaction via body image. Furthermore, the study also showed that dissatisfactions in body image and sexuality were measurable in both genders but found to be larger for women. Evidence for a moderating role of patient's gender on burn size and sexuality or body image could not be found. Lastly, with increasing age at injury, more problems with sexuality post-burn were expected. Insights into longitudinal studies would help us gain a better understanding about the progression of sexuality and body image scores over time, and future research is needed to verify the mediation effect of body image on burn severity and sexuality and to differentiate the influence of burned body parts on patient's sexual (dis)satisfactions.

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