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Beyond the physical: The interplay of experienced weight stigma, internalised weight bias and depression in lipoedema

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Summary

This study explored experienced weight stigma, internalised weight bias and depressive symptom severity in lipoedema, a chronic health condition that primarily affects women and involves painful and disproportionate adipose tissue. This study utilised an international cross-sectional online survey involving $N = 1070$ women over 18 years old ($M_{age} = 48.9$ years old) with self-reported diagnosed or suspected lipoedema. Participants completed measures of demographic and health characteristics, experienced weight stigma, internalised weight bias and depressive symptoms (PHQ-9). Chi-square analysis showed experienced weight stigma differed between those with stage 1 ($n = 57$), stage 2 ($n = 311$), Stage 3 ($n = 664$) and stage unknown ($n = 38$) lipoedema. Hierarchical linear regression determined the effects of weight stigma on depression and the mediating role of internalised weight bias. Experienced weight stigma ($p < .001$) and internalised weight bias ($p < .001$) were related to depressive symptoms beyond age and symptoms of lipoedema (BMI, lipoedema symptom severity and mobility). Internalised weight bias partially mediated the effect of experienced weight stigma on depression. Psychological attributes of experienced weight stigma and internalised weight bias uniquely contribute to depressive symptoms in lipoedema. Increased awareness of the psychological effects of weight stigma and the role of internalised weight bias in women's experience of lipoedema on depression is needed.

KEYWORDS

depression, Lipoedema, mood, weight bias, weight stigma

What is already known about this subject

- Lipoedema is related to experiencing a lower quality of life.
- Women with lipoedema are often misdiagnosed as obese and report feeling misunderstood by healthcare providers.
- In obesity, experiences of weight stigma can negatively impact physical, psychological and social wellbeing.

What this study adds

- A detailed, novel and timely understanding of weight stigma prevalence across stages of lipoedema.
- Demonstrated links between lived experiences of experienced weight stigma and internalised weight bias in depression in lipoedema.
- An understanding of psychological factors impacting depression beyond the physical and clinical symptoms of lipoedema.

1 | INTRODUCTION

Depression affects approximately 5% of adults worldwide and is a leading cause of disability.[1] The aetiology of depression is multifaceted, involving complex interactions of biological, psychological and social factors that reduce an individual's capacity to function optimally in everyday activities, relationships and work. Similarly, various biopsychosocial factors contribute to lipoedema, a disorder of disproportionately distributed adipose tissue that is often misdiagnosed as obesity. For women with chronic health conditions and greater body mass index (BMI), depression is common.[2] For those diagnosed with lipoedema, current estimates indicate depression impacts up to 59% of individuals and can lead to increased medical costs, exacerbation of physical symptoms, additional functional impairment, poor self-care and reduced adherence to treatment.[3–5]

To effectively address depressive symptoms in the context of lipoedema, it is important to consider the interplay of biological, psychological and social factors that influence both depression and the broader spectrum of health-related symptoms characteristic of lipoedema. For example, in obesity, symptoms of depression are associated with health and physiological factors such as BMI and inflammation, as well as social and psychological factors of experienced weight stigma (social devaluation and discrimination towards overweight individuals) and internalised weight bias (believing that negative stereotypes about weight apply to the self and self-blame).[6] Importantly, weight-based discrimination mediates the effects of BMI on depression.[7] To date, however, little research has explored the impact of experienced weight stigma on depression for women with lipoedema, a disorder often mistaken as, and comorbid with, obesity.

Lipoedema affects approximately 10% of women and involves symmetrical growth of adipose tissue primarily in the hips, buttocks and thighs.[8] Lipoedema has been described as a disease of loose connective tissue, potentially triggered by increased fluid and connective tissue remodelling occurring during times of hormonal change, stressful life events or surgical trauma resulting in inflamed, fibrotic and painful adipose tissue.[9] There are broadly three morphological 'stages' to lipoedema (with a fourth stage sometimes considered which involves Stage 3 lipoedema with comorbid lymphoedema). In stage 1, the excess adipose tissue is visible, and however, the skin appears normal; in stage 2, indentations appear on the skin and masses of adipose tissue can grow; and in Stage 3, the skin and adipose tissue cause gross deformations, particularly around the thighs and knees.[10] Whilst the stage of lipoedema is not based on severity the severity of its symptoms, those with stage 3–4 lipoedema experience greater concerns physically, mentally and socially alongside a greater prevalence of some health conditions such as lymphoedema and obesity.[11] Approximately 3%–20% of those with lipoedema fall within the 'normal' BMI range (18.5-≤24.9 kg/m^2).[12] As lipoedema is a unique adipose disorder characterised by expanding adipose tissue, a high BMI may not be indicative of obesity. For example, Brenner et al. found that in 607 lipoedema patients, over 80% were considered overweight or obese according to their BMI; however, when categorised according to their waist-to-height-Ratio, this reduced to less than 40%.[13] The difficulty in distinguishing between adipose tissue related to obesity or lipoedema can lead to misdiagnosis, delays in lipoedema diagnosis and treatment and experiences of weight stigmatisation in healthcare. For example, from symptom onset to diagnosis of lipoedema, women report an average of 18 years, with median times of 26–40 years.[4,14] Furthermore, in a sample of 1362 participants, a diagnosis delay of 20–25 years was reported, with over 75% of those women in stages 3–4 reporting being treated badly by their doctor due to their weight.[11]

Experienced weight stigma is an important social determinant of health and can be explicit (i.e. deliberate, such as overt criticism of weight) or implicit (i.e. non-deliberate structural stigma, such as an unaccommodating environment).[15,16] Family members, doctors, coworkers, classmates and friends are common sources of experienced weight stigma in either their inadvertent or deliberate attempt to blame and shame the individual into losing weight.[17] Experiencing weight stigmatising situations can also lead to internalisation of weight biases, where negative weight-based stereotypes and statements are applied to the self, such as 'I don't feel that I deserve to have a really fulfilling social life, as long as I'm overweight'.[18] This not only deprives individuals of positive experiences (e.g. a fulfilling social life) but also intensifies self-criticism, illustrating the dual harm of internalised weight stigma. Women and those with a greater BMI report experiencing weight stigmatising situations to a greater degree than men and women with a lower BMI.[19] Experienced weight stigma and internalised weight bias can in turn inadvertently lead to increased weight, symptoms of depression, reduced physical, social and mental health and can lead to healthcare avoidance and reduced healthcare quality.[1,20–22] An extensive meta-analysis of 30 research studies ($N = 9345$) showed moderate associations between depression and both perceived experiences of weight stigma and internalised weight stigma.[23] Furthermore, a recent

systematic review of 17 studies ($N = 21\,172$) showed that internalisation of weight bias has a mediating role in the relationship between experienced weight stigma and biopsychosocial outcomes such as experiences of pain.[6] Furthermore, cross-sectional research in Taiwanese university students ($N = 968$) suggests a sequential mediation from perceived weight stigma to weight-related self-stigma to psychological distress (comprised of depression, anxiety and stress components).[24] However, only one study has identified a significant indirect effect of internalised weight stigma in 170 obese patients, on the relationship between experienced weight stigma and depression itself.[25]

To date, the relationship between experienced weight stigma and depression for those with lipoedema is not well understood. Emerging research highlights clear links between depression and the stages and severity of symptoms of lipoedema (e.g. pain), BMI, nutritional deficiency and mobility.[3,11,26–28] However, to date only one study has highlighted experiences of reported experiencing weight stigma and an increased likelihood of self-reporting depression compared to those who had not experienced weight stigma.[29] As such, research has yet to systematically examine weight stigma and the relationships between experienced weight stigma, internalised weight bias and depression in lipoedema.

It is uncertain whether experienced weight stigma indirectly affects depression through internalised weight bias in those with lipoedema. Whilst obesity can be comorbid, it is possible that women with lipoedema may reattribute their body weight and shape to genetic and hormonal factors of lipoedema rather than obesity. For example, those with lipoedema have reported feeling relief upon their diagnosis as this (at least partially) provided an explanation for their body weight beyond lifestyle behaviours.[30] This change in self-perception may potentially lead to shifting one's 'social identity' (self-concept derived from perceived membership in a social category or group).[31] For example, when diagnosed, those with lipoedema may shift from psychologically identifying as a stereotypically 'obese' person to identifying as a person with a separate health condition. It is possible then that biases and stereotypes that are often linked to those that are labelled as obese (e.g. those that are obese are lazy) are less likely to become internalised. However, one's social identity is also impacted by how others perceive and group the individual based on particular characteristics (e.g. BMI) and those with lipoedema still retain awareness that how others perceive and treat them had not changed after diagnosis.[30,31] In other words, lipoedema is 'hidden' to others. Furthermore, recent research has shown that with increasing weight, women whose weight is distributed in the gluteofemoral region (compared to the abdominal region) are somewhat protected from self-devaluation, potentially due to perceived higher reproductive fitness and attractiveness.[32] Therefore, it is uncertain as to the relationships between experienced weight stigma, internalised weight bias and depression for those with lipoedema. Understanding these links can assist in informing the development of effective strategies and tools to assist in the prevention and reduction of depression in this health population.

1.1 | The current study

This study examines the experienced weight stigma, internalised weight bias and depression in adult women with lipoedema. It aims to first describe experienced weight stigma across morphological 'stages' of lipoedema. In line with this, it is hypothesised that increased stages of lipoedema will be related to more frequent experiences of weight stigmatisation. Secondly, the study seeks to determine the effect of experienced weight stigma and internalised weight bias on depression after accounting for covarying factors of the condition (lipoedema symptom severity, mobility and BMI). Lastly, this study aims to assess whether the internalisation of weight bias explains the effect of experienced weight stigma on depression in this population.

2 | MATERIALS AND METHODS

2.1 | Participants

A total of 1532 participants consented to participate in the international cross-sectional survey. Of those, 462 participants were excluded due to incomplete data of more than 25% leaving $N = 1070$ for analysis in the current study. As shown in Table 1, participants' mean age was 48.9 years old and predominantly resided in Australia (33.1%), the United States (28.9%) and the United Kingdom (20.07%). A diagnosis from a health professional was reported in 77.1% and was diagnosed an average of 25 years post disease/symptom onset. Over half (62.1%) indicated they had Stage 3 lipoedema and approximately 95% had a BMI above 25.

2.2 | Procedure

Purposive sampling and snowball techniques were used to recruit participants. Recruitment flyers were posted on lipoedema-related social media pages and groups. Lipoedema-related organisations were emailed the recruitment flyer for inclusion in newsletters and/or posts on their websites and social media pages at their discretion. The recruitment flyers contained an anonymous link to an online survey, hosted by Qualtrics, which provided access to the survey. Informed consent was considered once participants had read the information and agreed to participate. The survey contained 321 items written in English and was open to participants between May 2021 and March 2022. The study was approved by the Human Research Ethics Committee (HREC) of Central Queensland University, Australia, approval number HREC 22991.

2.3 | Measures

This study reports a subset of data from 139 items, including background demographic characteristics, lipoedema symptom

TABLE 1 Participant characteristics.

Age (*m*, *SD*)	48.90 (11.80)
Country (*n*, %)	
Australia	354 (33.1%)
United States	308 (28.8%)
United Kingdom	214 (20.0%)
Netherlands	64 (6.0%)
Other countries[a]	130 (12.1%)
Highest level of education attained	
No formal qualification	29 (2.7%)
High school graduate	96 (9.0%)
Certificate/Advanced Diploma	348 (32.5%)
Bachelor's Degree/Honours degree	324 (30.3%)
Masters/Professional Degree	200 (18.7%)
Doctorate	39 (3.6%)
Prefer not to answer	28 (2.6%)
Employment status	
On disability benefits	134 (12.5%)
Employed	708 (66.2%)
Unemployed, looking for work	35 (3.3%)
Retired/Unemployed, not looking for work	203 (19.0%)
Student	50 (4.6%)
Relationship status	
Single	268 (25.0%)
In a relationship	782 (73.1%)
Unknown	20 (1.9%)
Body Mass Index (BMI)	
Underweight, BMI <18.5	1 (0.1%)
Normal weight, BMI18.5 – <25	47 (4.7%)
Overweight, BMI 25 – <30	150 (15.9%)
Obese I, BMI 30 – <35	173 (17.2%)
Obese II, BMI 35 – <40	199 (19.8%)
Obese III, BMI ≥40	427 (42.4%)
Lipoedema stage	
Stage 1	57 (5.3%)
Stage 2	311 (29.1%)
Stage 3	664 (62.1%)
Stage unknown	38 (3.6%)
Diagnosed with lipoedema	
Diagnosed by a health professional	825 (77.1%)
Self-diagnosed (have not sought a diagnosis)	130 (12.1%)
Self-diagnosed (doctor dismisses lipoedema)	76 (7.1%)
Other	39 (3.6%)
Years to diagnosis	24.81 (14.41)
Has a health care plan for lipoedema	
Yes	494 (46.2%)
No, had not discussed lipoedema with their doctor	237 (22.1%)
No, their doctor says lipoedema does not exist	246 (23.0%)
Unknown	93 (8.7%)
Has a mental health care plan	
Yes	53 (5.0%)
No	546 (51.0%)
Unknown	471 (44.0%)
See a psychologist/mental health professional	100 (9.3%)
Depression (PHQ-9) score	
None to minimal (0–4)	207 (23.5%)
Minimal (5–9)	269 (30.6%)
Moderate (10–14)	178 (16.6%)
Moderately severe (15–19)	109 (12.4%)
Severe (20–27)	117 (13.3%)

[a]Other countries include Canada ($n = 31$), New Zealand ($n = 31$), Germany ($n = 10$), Sweden ($n = 8$) and Ireland ($n = 8$), and other countries with $n = \leq 4$ include Argentina, Belgium, Brazil, Czech Republic, Denmark, Finland, France, Greece, Hungary, India, Israel, Italy, Mexico, Nicaragua, Norway, Philippines, Portugal, Slovenia, Spain and Turkey.

severity, lower limb mobility, experienced weight stigma, internalised weight bias, depression, stress and anxiety. The psychometric properties for each of the scale measures used are reported in Table 2.

2.3.1 | Background demographic characteristics

There were 13 items that determined demographic and lipoedema characteristics, namely age, country of residence, education level, employment status, relationship status, BMI, current lipoedema stage, diagnosis status, years from lipoedema onset to diagnosis, health and mental health care plan status, and whether their lipoedema management includes seeing a psychologist or mental health professional.

2.3.2 | Lipoedema symptom severity scale

This 15-item scale (LSS) assessed the severity of lipoedema symptoms.[3] Participants were asked to indicate the severity of 15 lipoedema-related symptoms on a scale ranging from '0 – not severe at all', to '4 – extremely severe'. Total scores represent the severity of lipoedema symptoms, with higher scores indicating increased lipoedema symptom severity.

2.3.3 | Lower extremity functional scale

The 20-item Lower Extremity Functional Scale (LEFS) assessed the ability to perform everyday tasks and evaluates the functional impairment of individuals with disorders relating to one or both lower

TABLE 2 Pearson's product-moment correlations between variables.

	n	*M* (SD)	α	1	2	3	4	5	6	7	8	9
1. Experienced weight stigma (SSI)	1070	1.67 (1.27)	.97									
2. Internal weight bias (WBIS)	1070	53.63 (15.56)	.81	.32***								
3. Depression (PHQ-9)	880	10.23 (6.83)	.91	.42***	.52***							
4. Depression (DASS-21)	896	14.98 (11.57)	.93	.42***	.55****	.83***						
5. Anxiety (DASS-21)	896	11.33 (8.99)	.82	.39***	.38***	.64***	.66***					
6. Stress (DASS-21)	896	16.25 (9.97)	.88	.37***	.42***	.70***	.69***	.73***				
7. Lipoedema symptom severity (LSS)	1070	23.36 (9.79)	.88	.47***	.33***	.57***	.46***	.54***	.45***			
8. Mobility (LEFS)	1070	43.66 (20.43)	.97	−.43***	−.22***	−.41***	−.35***	−.33***	−.19***	−.63***		
9. Body Mass Index (BMI)	1008	40.02 (11,78)		.49***	.17***	.22***	.23***	.21***	.08*	.36***	−.59***	
10. Age	1070	48.90 (11.80)		−.13***	−.16***	−.12***	−.10***	−.15***	−.27***	−.01	−.31***	.07*

Note: Pearson's product-moment correlations between variables and psychometric properties of instruments.*Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed). ***Correlation is significant at the ≤.001 level (2-tailed).
Abbreviations: α, Cronbach's alpha reliability coefficient; BMI, body mass index; DASS-21, depression anxiety stress scales; LEFS, lower extremity functional scale; LSS, Lipoedema symptom severity; *M*, mean; *n*, number of participants; PHQ-9, patient health questionnaire; *SD*, standard deviation; SSI, stigmatising situations inventory; WBIS, weight bias internalisation scale.

extremities.[33] Participants were asked 'Today, do you or would you have difficulty at all with': (e.g. walking 2 blocks). Responses range from 0, 'Extreme difficulty or unable to perform activity', to 4, 'No difficulty'. Scores are summed, with lower scores indicating greater disability.

2.3.4 | Stigmatising situations inventory

The 50-item Stigmatising Situations Inventory (SSI) assessed the frequency participants reportedly experienced weight stigma over the lifetime across 11 categories.[34] Participants were asked to indicate on a 10-point scale (ranging from 0 'Never' to 9 'Daily') whether and how often they experience a situation due to weight (e.g. 'Being stared at in public'). A total SSI score was obtained by averaging item scores. Higher scores indicate an increased frequency of experiencing weight stigmatising situations.

2.3.5 | Weight bias internalisation scale

The 11-item Weight Bias Internalisation Scale (WBIS) assessed the extent to which participants believe that the negative stereotypes and self-statements regarding those overweight and obese apply to the self.[18] Participants rated on a 7-point scale (ranging from 1 'Strongly disagree' to 7 'Strongly agree') how much they agreed with the statement, such as 'I hate myself for being overweight'. Reverse scoring for some items is applied and scores are then averaged. Higher scores indicate greater internalised weight bias.

2.3.6 | Depression anxiety stress scale (DASS-21)

The DASS-21 contains 21 items that assess three aspects of negative mood states: 'Depression', 'Anxiety' and 'Stress'.[35] Participants rated the extent each item statement (e.g. 'I felt I was close to panic') applied to them over the past week from 0 'Did not apply to me at all' to 4 'Applied to me very much, or most of the time'. Higher scores indicate increasing symptom severity.

2.3.7 | Patient health questionnaire (PHQ-9)

The PHQ-9 assessed severity of depressive symptoms. Participants rate how often they experienced nine depressive criterion (e.g. 'Feeling down, depressed or hopeless') over the past 2 weeks on a scale of 0 'Not at all' to 3 'Nearly every day'. Item scores were summed.[36] Increasing scores indicate increasing severity of depression.

2.4 | Statistical methods

Of $N = 1070$ participants, 880 completed all measures in the current study and 190 provided partial data. Analyses treated missing data via pairwise deletion. The total scale score of the SSI was utilised in parametric analyses. However, for descriptive purposes, forms of experienced weight stigma in the SSI are first described in terms of whether the participant had experienced any of the items in each of the subscales. The item 'not being able to find clothes that fit' was found to

be high across all stages which is expected given the characteristic of the disproportionate body shape of lipoedema itself and was therefore assessed separate to the rest of the 'physical barriers' subcategory so as to not inflate the percentage of this category as a whole (see the Appendix S1 for a description of the prevalence of each of the 50 stigmatising situations that were experienced within each stage group). Chi-square analyses were used to assess group differences between lipoedema stage groups (stage 1, 2, 3 and stage unknown) on each form of experienced weight stigma. Post-hoc *z*-tests and adjusted *p*-values with the Bonferroni method were used to determine where stage group differences occurred.

For parametric analyses, Pearson's product-moment correlations assessed the relationships between scale variables (Table 2). Hierarchical linear regression analysis was used to assess the impact of experienced weight stigma and internalised weight bias on depression beyond identified covariates and determine whether internal weight bias mediated the effect of experienced weight stigma on depression (Table 3). In Step 1, age, BMI, lipoedema symptom severity, mobility and experienced weight stigma were entered into the model, followed by internalised weight bias in Step 2.

3 | RESULTS

3.1 | Experienced weight stigma

Across the sample, the majority of participants experienced weight stigma in terms of nasty and inappropriate comments from doctors (92.7%), family (91.3%), children (88.2%) and others (96.1%), others making negative assumptions (89.3%), loved ones being embarrassed by their size (81.2%), being stared at (80.9%), not finding clothing that fit (93.5%) and physical barriers (80.5%). Whilst still prevalent, the least likely to be experienced were being avoided, excluded or ignored (64.3%), job discrimination (49.3%) and being physically attacked (13.5%).

Significant differences between stage groups occurred across all forms of experienced weight stigma assessed (Figure 1). Overall, participants in stages 1, 2 and 3 differed significantly from one another in terms of (with Stage 3 most likely and stage 1 the least likely, to report these forms of experienced weight stigma): receiving inappropriate comments from doctors, comments from children, others making negative assumptions, being stared at, being avoided, excluded or ignored, loved ones being embarrassed by their size, physical barriers and being physically attacked. Stage 3 participants were also more likely to experience nasty comments from family, not being able to find clothes that fit and job discrimination compared to both stages 1 and 2. Stage 3 was significantly more likely to experience nasty comments from others compared to the stage 1 group alone.

As shown in the Appendix S1, in healthcare, most participants (>85%) reported having a doctor say their health is a problem despite being in good health and blame unrelated physical problems on their weight. Furthermore, approximately three-quarters (76.5%) reported that their doctor recommended a diet despite not seeking weight loss advice and over half (58.2%) reported not being able to find medical equipment in a size that fits them. Overall, nearly half (48.5%) reported that a doctor had made cruel remarks, ridiculed or called them names and the most often experienced (89.9%) were being told by others (including health and non-health professionals) that 'all you

TABLE 3 Hierarchical linear regression model assessing mediation of internal weight bias between experienced weight stigma and depressive symptom severity.

Variable	*B*	95% CI	*SE B*	β	R^2	ΔR^2
Step 1					.37***	.37***
Constant	11.03***	[6.86, 15.20]				
Age	−.08***	[−.11, −.04]	.02	−.14		
Body Mass Index	−.07**	[−.11, −.02]	.02	−.11		
Lipoedema symptom severity	.28***	[.23, .34]	.03	.41		
Mobility	−.06***	[−.09, −.03]	.02	−.18		
Experienced weight stigma	1.00***	[.63, 1.37]	.19	.19		
Step 2					.47***	.10***
Constant	2.60	[−1.46, 6.66]				
Age	−.05	[−.08, −.02]	.02	−.08		
Body Mass Index	−.06**	[−.10, −.02]	.02	−.10		
Lipoedema symptom severity	.23***	[.19, .28]	.03	.34		
Mobility	−.05***	[−.08, −.02]	.01	−.16		
Experienced weight stigma	.65***	[.31, 1.00]	.18	.12		
Internal weight bias	.15***	[.13, .18]	.01	.34		

Note: Hierarchical linear regression assessing the mediating effects of internal weight bias on the effects of experienced weight stigma on depression (DV). *Correlation is significant at the .05 level (2-tailed). **Correlation is significant at the .01 level (2-tailed). ***Correlation is significant at the ≤.001 level (2-tailed).
Abbreviation: CI, confidence interval.

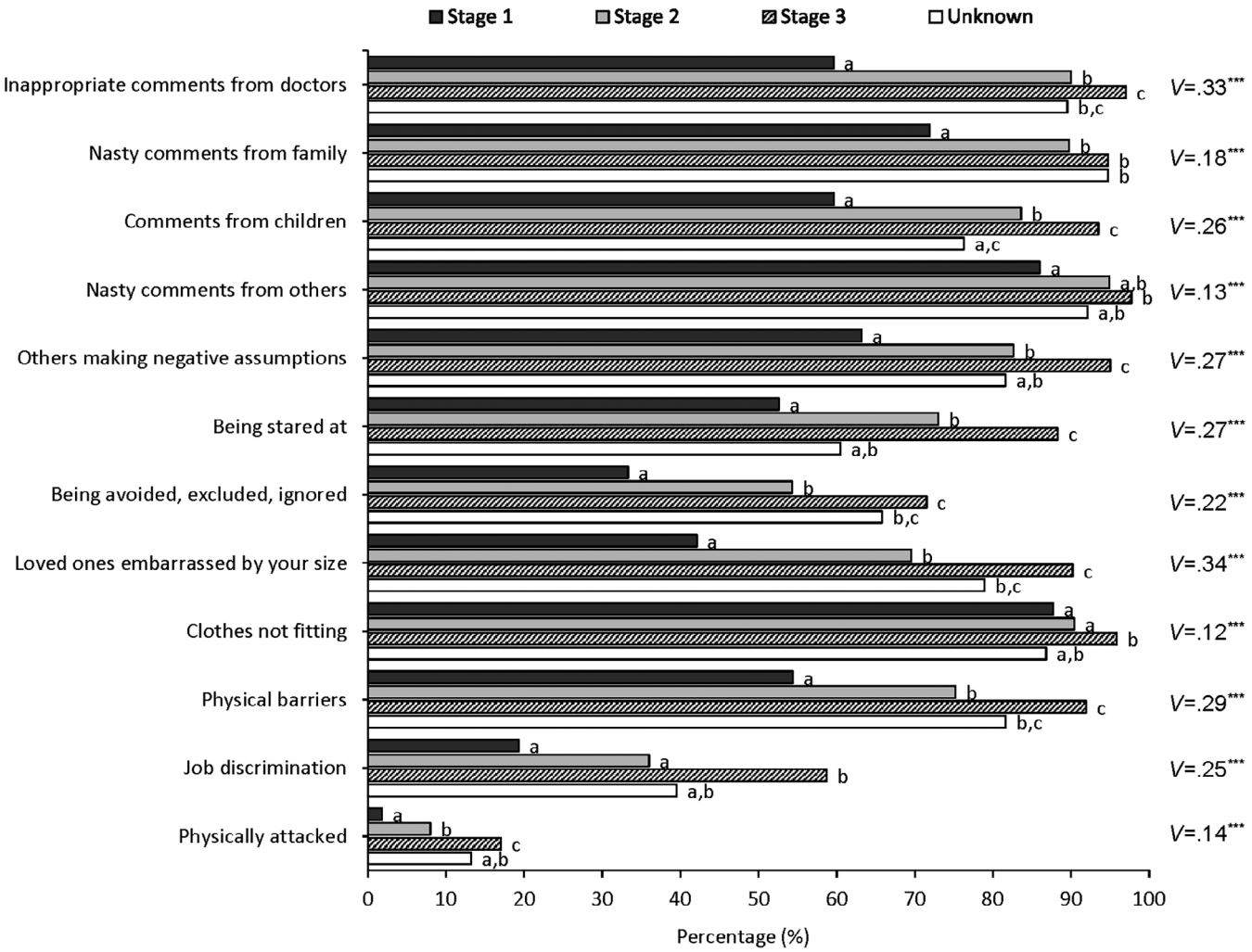

FIGURE 1 Differences in the prevalence of forms of experienced weight stigma between lipoedema stage groups. Chi-square analysis assessed differences between lipoedema stage groups (stage 1, 2, 3 and stage unknown) on whether they had experienced different forms of enacted weight stigma. Post-hoc z-test were used to compare differences between each group with *p*-values adjusted using the Bonferroni method. Different group letters indicate groups that differ significantly from one another. *V* = Cramer's *V* effect size. ***Chi-square is significant at the ≤.001 level (2-tailed).

need is willpower' (see the Appendix S1 for further details related to each stage group).

3.2 | Relationships between mental health, experienced weight stigma, internalised weight bias and symptoms of lipoedema

Significant relationships between all scale variables were identified, with experienced weight stigma, internal weight bias, depression, anxiety and stress scores all positively correlated with one another. Furthermore, increases in age, BMI and lipoedema symptom severity scores and decreases in mobility scores were related to greater experienced weight stigma, internal weight bias, depression, anxiety and stress scores and are therefore included as covariates in the hierarchical linear regression model.

3.3 | Mediation analysis: experienced weight stigma, internalised weight bias and depression

In Step 1 of the hierarchical linear regression model (Table 3), the adjusted R^2 value of experienced weight stigma, lipoedema symptom severity, mobility and BMI together explained 37.3% of depression severity with $F(5, 820) = 97.39$, $p < .001$. The findings revealed that experienced weight stigma positively predicted increased depression severity ($\beta = .19$, $p < .001$). In Step 2, the adjusted R^2 value showed that with the addition of internal weight bias, the model as a whole explained 47.1% of depression severity, $F(6, 819) = 121.60$, $p < .001$. Experienced weight stigma ($\beta = .12$, $p < .001$) and internal weight bias ($\beta = .34$, $p < .001$) positively predicted depression severity. The ΔR^2 value revealed a 10% change in the variance of model 1 and model 2, $\Delta F(1, 819) = 152.64$, $p < .001$. The regression weights for experienced weight stigma subsequently

reduced from model 1 to model 2 ($\beta = .19$ to $\beta = .12$) but remained significant, demonstrating a partial mediation. More specifically, experienced weight stigma has a direct as well as indirect effect on depressive symptoms beyond the effects of age and symptoms of lipoedema.

4 | DISCUSSION

In this study, the prevalence of experienced weight stigma was observed among women with lipoedema alongside internalised weight bias, painting a vivid tapestry of the social and self-devaluation endured based on body weight. Results support the hypothesis that increased stages of lipoedema were related to more frequent experiences of weight stigmatisation. Similarly, according to the stage of lipoedema, significant differences in the forms of experienced weight stigma in both community and healthcare contexts were highlighted. The Stage 3 group was most likely to experience weight stigma compared to the lower stages of lipoedema. This contextual background of experienced weight stigma further dovetails with the mental health outcomes of the participants. Moderate to severe levels of depression were identified in 40% of the women with lipoedema, underscoring the detrimental impact of such stigma. Importantly, this study shows that experienced weight stigma and internalised weight bias uniquely contributed to the severity of depression beyond age and symptoms of lipoedema (BMI, lipoedema symptom severity and mobility). Moreover, the relationship between experienced weight stigma and depression was partly mediated by internalised weight bias. This nuanced interplay suggests that both social devaluation and self-devaluation based on body weight are important considerations when understanding the severity of depression in lipoedema above the impact of symptoms and identifies opportunities for targeted intervention.

4.1 | Experienced weight stigma and stages of lipoedema

There is an apparent assumption by others that those with lipoedema can control their body weight. Most participants had been told by others that 'all you need is willpower', suggesting that common beliefs and weight biases applied to those with obesity (e.g. that body weight is a result of personal choices and a lack of willpower) are also being applied to those with lipoedema. Whilst those with stage 1 lipoedema were least likely to report that others made negative assumptions, over 60% of those with stage 1 still reported experiencing the assumption that weight is a personal responsibility that is controllable through willpower. This assumption is often used to justify weight stigmatisation and attempts to socially shame overweight individuals into losing weight.[37] This may explain why receiving nasty comments from family and others were also commonly experienced. Many experience hearing hurtful comments, are stared at, have feelings of disgust from others and are believed to be a person lacking in character by the general public, friends and family.[30,38] Whilst those with stage 1 lipoedema were found to be the group least likely to experience weight stigma, likely a result of the lower BMI typically found within stage 1 compared to other stages, a high proportion of this group still reported experiencing most forms of experienced weight stigmatisation, such as difficulty finding clothing. Previous research similarly reported that 95%–100% of women with lipoedema experience difficulty finding clothing, likely a result of the disproportionate body shape of lipoedema across stages.[14,39]

Those with Stage 3 lipoedema appeared disproportionately affected by experienced weight stigma across most forms; being stared at, loved ones being embarrassed by their size, being avoided, excluded and ignored and experiencing physical barriers and job discrimination. Previous research with Stage 3 lipoedema similarly identified physical barriers that reduce engagement in activities such as finding accessible toilets, utilising transportation and feelings of low self-confidence and self-esteem, with women reporting that discrimination and public judgement are just as crippling as the physical constraints, impacting their social and working lives and leading to social avoidance.[11,38,40] Increasing social connectedness, particularly those with Stage 3, is therefore important. Awareness of experienced weight stigma in the healthcare context is also important to consider in this chronic health population.

The current study identified weight stigmatisation and a lack of knowledge and acceptance of lipoedema in healthcare, with an average of 25 years from lipoedema onset to diagnosis. Nearly a quarter reported they were not on a health care plan as their doctor did not believe lipoedema exists. Furthermore, many with lipoedema reported experiences of doctors who said their health was a problem despite being healthy, blamed unrelated problems on their body weight and provided unsolicited diet advice. Diet and exercise are important strategies for health in avoiding additional weight gain and inflammation.[41] However, these results show that those with lipoedema are likely to be given obesity-related treatments such as generic dietary and exercise advice for weight loss without consideration for the unique characteristics of lipoedema. Experienced weight stigma in healthcare was found to be both implicit, such as the finding that nearly 60% had experienced not being able to find medical equipment that fits their size, and explicit. For example, the results showed that nearly half of the participants reported that a doctor had made cruel remarks, ridiculed or called them names due to their weight. These findings mirror research that found a median of 20–25 years to diagnosis and that 30% reported that a General Practitioner (GP) had actively dismissed lipoedema as a valid health condition, approximately 25% reported that their GP was not willing to learn or help and over half reported experiencing being treated badly by their doctor due to their weight.[11] The lack of acknowledgement and resistance to acceptance and treatment of lipoedema by doctors could potentially be hindered by weight biases. For example, doctors can perceive those who are overweight as non-compliant, annoying, lazy and lacking willpower, and spend less time in appointments and educating patients who are overweight compared to their thinner counterparts.[16,37,42] Similarly, healthcare providers perceive those with lipoedema as lazy and attribute health problems to obesity.[30,43] A lack

of appropriate treatment and management of lipoedema-related symptoms could potentially impact mental health concerns. For patients, the fear of being stigmatised can lead to healthcare avoidance, potentially extending the delay in diagnosis and treatment.[44] This may partly explain the current finding that despite 40% experiencing moderate to severe levels of depression, less than 10% of participants had sought mental health support.

4.2 | Depression, experienced weight stigma and internalised weight bias

The impetus of the finding that higher experienced weight stigma and internalised weight bias were related to greater severity of depression, anxiety and stress in this sample is to provide greater insight into the social and psychological context of depression for women with lipoedema. As a social stressor, experiences of weight stigma negatively impact biochemistry and physiological processes that can increase inflammation and pain, reduce physical activity and self-regulation and increase weight status, potentially further reducing mobility, adding to the burden of disease and reducing quality of life.[6,45] Whilst not causative, this insight may assist in understanding the potential mechanisms of effect in those with lipoedema who experience greater difficulty in regulating emotions and reduced quality of life compared to others without lipoedema.[4,46,47]

The moderate relationships found between depression and both experienced weight stigma and internalised weight bias in our current sample hold significant importance for understanding the social and psychological context of depression in women with lipoedema. This study sheds light on the dual impact of weight stigma experienced from external sources and internalised negative self-perceptions and self-devaluation on the co-morbidity of depression in lipoedema. Previous reviews in other clinical and community samples highlight the impact of experienced weight stigma on mental health.[23,48] The current study identified this relationship distinctly in women with lipoedema, a condition characterised by painful fat accumulation and body shape changes. Importantly, experienced weight stigma and internalised weight bias were both significantly related to depression, beyond symptoms such as BMI, lipoedema symptom severity and mobility.

Interestingly, internalised weight bias partially mediated the effect of experienced weight stigma on depression. This finding highlights that the experience of stigmatisation and social devaluation can profoundly impact one's social identity, leading to self-stigmatisation and self-devaluation in those with lipoedema. For instance, in lipoedema, stigmatisation by doctors can evoke feelings of shame and devaluation.[30] Additionally, some individuals may internalise weight biases, attributing self-critical blame to themselves regarding their body or experiencing feelings of inferiority.[11,39] It is important to note that whilst there was a weak relationship between experienced weight stigma and internalised weight bias in our current sample, experienced weight stigma remained a unique predictor of depression. Even after accounting for internalised weight bias, experienced weight stigma and internalised weight bias independently contribute to depressive symptoms. Consequently, not all women with lipoedema who face weight stigmatising experiences will internalise such biases or incorporate them into their identity and self-concept. Attempts to reduce self-critical internalised weight bias may be possible through targeted compassionate focused interventions as a recent study showed reduced clinical depression when applied to feelings of body weight shame.[49] Further investigation and intervention are needed to understand how experienced weight stigma and internalised weight bias influence mental health outcomes in lipoedema.

4.3 | Limitations

This study is the first to examine weight stigmatising experiences, internalised weight biases and depression in women with lipoedema in a large international sample. Understandably the self-report, cross-sectional nature of the data means that directionality cannot be confirmed. For example, those with greater severity of depression perhaps are more likely to perceive experienced weight stigma (believe that others are making negative assumptions about them) and internalise weighst bias or vice versa. Additionally, whilst the majority self-reported diagnosis by a health practitioner, lipoedema diagnosis was not confirmed in the current study. Furthermore, as self-report measures were used for variables, single-rater response bias may have contributed to the observed associations between variables. Therefore, results should be interpreted within the context of these limitations.

5 | CONCLUSIONS

Women with lipoedema identified experiences of weight stigma across stages of lipoedema in both the health care and the general community. Importantly, experienced weight stigma was identified as a significant predictor of depressive symptoms, uniquely contributing to mental health symptoms over and above the impact of lipoedema symptoms and psychologically relevant internalised weight bias. Internalised weight bias is a cognitive script that partially mediated the relationship between experienced weight stigma and depression and highlights that for women with lipoedema, social devaluation by others based on their body weight contributes to negative self-perception and evaluation. Taken together, experienced weight stigma and internalised weight bias contribute to the severity of depression beyond the effects of lipoedema symptoms. Educative strategies to increase community and healthcare practitioner knowledge of lipoedema, the prevalence of depression and the impact of experienced weight stigma may benefit those with lipoedema. Greater clarity and awareness of the experiences of lipoedema, and comorbid depressive symptoms provide scope to implement targeted psychotherapeutic interventions for self-devaluation and depression.

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CONFLICT OF INTEREST STATEMENT

The authors state that there are no conflict of interests to be reported.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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