

# Weight history of individuals with and without physical disability in the International Weight Control Registry

Julianne G. Clina<sup>1</sup>  | R. Drew Sayer<sup>2</sup>  | Anna M. Gorczyca<sup>3</sup> | Sai Krupa Das<sup>4</sup> | James E. Friedman<sup>1</sup> | Tsz Kiu Chui<sup>1</sup> | Susan B. Roberts<sup>5</sup>  | James O. Hill<sup>1</sup> 

<sup>1</sup>Department of Nutrition Sciences, University of Alabama at Birmingham, Birmingham, Alabama, USA

<sup>2</sup>Department of Family and Community Medicine, University of Alabama at Birmingham, Birmingham, Alabama, USA

<sup>3</sup>Division of Physical Activity and Weight Management, Department of Internal Medicine, University of Kansas Medical Center, Kansas City, Kansas, USA

<sup>4</sup>Jean Mayer USDA Human Nutrition Center on Aging, Tufts University, Boston, Massachusetts, USA

<sup>5</sup>Geisel School of Medicine, Dartmouth College, Hanover, New Hampshire, USA

## Correspondence

Julianne G. Clina, UAB Research Collaborative, 3810 Ridgeway Drive, WHARF, Homewood, AL 35209, USA.  
Email: [jclina@uab.edu](mailto:jclina@uab.edu)

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## Abstract

**Background:** People with physical disabilities (PWD) have an increased risk of obesity and related comorbidities compared with people without physical disabilities (PWoD). Previously identified contributors to weight loss maintenance pose challenges to PWD. However, it is not known if PWD experience less success in weight management.

**Methods:** Six hundred and nine participants in the International Weight Control Registry (IWCR) were eligible for this analysis (PWD,  $n = 174$ ; PWoD,  $n = 435$ ). Self-reported weight history metrics were compared using general linear models. Perceived weight history category was compared using Chi-squared tests. Importance of diet and physical activity strategies for weight management were compared using Wilcoxon rank-signed tests.

**Results:** PWD reported higher current body mass index (BMI) ( $36.1 \pm 0.7$  vs.  $31.0 \pm 0.5$ ;  $p < 0.0001$ ) and more weight loss attempts ( $9.1 \pm 0.7$  vs.  $7.1 \pm 0.4$ ;  $p = 0.01$ ) than PWoD. Current weight loss percentage (PWD  $13.0 \pm 1.0$ ; PWoD,  $13.0 \pm 0.6$ ;  $p = 0.97$ ) and weight loss category ( $\chi^2 [3, N = 609] = 2.9057, p = 0.41$ ) did not differ between the groups. There were no differences in any weight strategy between PWD who were successful and those who regained.

**Conclusions:** PWD and PWoD in the IWCR achieved similar levels of weight maintenance success. However, higher BMI and more weight loss attempts suggest that PWD may face challenges with weight management. More research is needed to identify strategies leading to success for PWD.

## KEYWORDS

obesity, physical disability, weight loss maintenance

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## 1 | INTRODUCTION

People with physical disabilities (PWD) have disproportionately higher rates of obesity.<sup>1,2</sup> The World Health Organization defines disability as an inability to perform activities in the manner or range considered normal for that individual.<sup>3</sup> Physical disabilities can include spinal cord injuries, multiple sclerosis, cerebral palsy, hearing and visual impairments, amputations, and many more.<sup>1</sup> These disabilities can impact physical functioning, movement, memory, communication, mental health, and social relationships among others.<sup>1,4</sup> Among PWD, obesity increases the risk of pressure injuries,<sup>5</sup> obesity-related diseases such as type 2 diabetes, hypertension, and dyslipidemia,<sup>5,6</sup> and can result in muscle wasting leading to declines in mobility.<sup>5</sup> While some studies have been able to successfully produce weight loss in PWD,<sup>7,8</sup> producing weight loss is only part of the battle. Several studies have attempted to understand weight loss maintenance in people without physical disability (PWoD)<sup>9–14</sup>; however, no studies have investigated weight loss maintenance in PWD.

PWD may face unique barriers to achieving and sustaining the changes in diet and physical activity that have previously been identified to be integral for loss maintenance.<sup>15–18</sup> Factors such as high physical activity participation<sup>19,20</sup> or access to healthier food options<sup>21–24</sup> present challenges for PWD. In addition, PWD face barriers to accessing healthcare and often report unmet healthcare needs.<sup>25,26</sup> Many PWD rely on Medicaid, which does not cover most dental services as well as many other health-care needs.<sup>26</sup> Providers have also reported Medicaid as a barrier due to lower reimbursement rates.<sup>26</sup> So, while PWD may have access to health care, actual health care needs are often not met for this population. While these have been proven to impact overall health for PWD, it is not clear if weight loss or maintenance is actually more difficult for this population.

Since the 1990s, several registries collecting data relating to weight management efforts have been developed. In general, these registries have required participants to lose a substantial amount of weight (e.g., 30 pounds for the National Weight Control Registry<sup>27</sup>) and maintain that weight loss for a prolonged period of time to be included. Strategy registries have identified as important to weight loss maintenance include a high level of physical activity,<sup>28,29</sup> use of diet logs,<sup>29,30</sup> and reducing portion sizes.<sup>29,31</sup> More recently, the International Weight Control Registry (IWCR) was developed to capture longitudinal information regarding weight management strategies, including weight history data, as well as behavioral, environmental, psychological, and economic contributors to weight management.<sup>32</sup> The IWCR was to include those who have been successful at losing and maintaining weight, as well as those without maintenance success or without success with losing any amount of weight. However, enrollees were not assessed for disability status upon enrolling in the IWCR; thus, no investigations on weight management for PWD have been completed for this population within the IWCR.

The purpose of the present study was to better understand if and how weight loss maintenance success differs between PWD and

PWoD and to compare strategies for weight loss between PWD who were successful versus regained lost weight. It was hypothesized that PWD will lose less weight than PWoD and achieve successful weight loss maintenance less frequently than PWoD. Further, it is hypothesized that among PWD, those using an assistive device for ambulation will have less weight loss and achieve weight loss maintenance success less frequently than PWD who do not use an assistive device. Finally, it is hypothesized that PWD successful at weight loss maintenance will rate weight loss strategies consistent with those previously identified (i.e., reducing portion sizes, keeping food logs, high level of activity) to achieve success higher than PWD that regains.

## 2 | METHODS

### 2.1 | Participants

Figure 1 depicts participant recruitment and enrollment. For the present study, all participants who completed initial enrollment into the IWCR between December 2020 and October 2021 ( $n = 1373$ ) were assessed for presence of disability. Out of this sample, 452 responded with 91 reporting disability. In addition, a new sample of PWD was recruited using emails to past research participants and through health record systems.

### 2.2 | Measures

Disability status and use of assistive devices were assessed in a survey asking about presence of disability or any condition that limits mobility and about use of assistive devices for ambulation. This survey was designed by the research team. Individuals were allowed to select multiple disabilities and multiple assistive devices used for ambulation as appropriate. Listed disabilities to select from included amputation, paralysis, osteoarthritis, rheumatoid arthritis, myasthenia gravis, edema, Friedreich ataxia, cerebral palsy, multiple sclerosis, spinal cord injury, spina bifida, blindness, peripheral neuropathy, diabetic retinopathy, Parkinson's disease, traumatic brain injury, stroke, muscular dystrophy, macular degeneration, postural orthostatic tachycardia syndrome, joint pain, and other, and assistive devices included cane, walker, crutches, rollator, push wheelchair, power wheelchair, guide dog, white cane, rollator, upper or lower limb prosthetic, reacher tool, ankle-foot orthoses, or other. Self-reported weight history, including information on current weight, most amount of weight lost, and number of previous weight loss attempt as also collected during initial enrollment.

Current weight loss status (kg) was calculated by subtracting lifetime maximum weight from current weight. To calculate the current weight loss percentage, current weight loss status (kg) was then divided by lifetime maximum weight and multiplied by 100 to get the percent value. Participants also self-identified as one of four weight loss categories upon study entry: (1) Successful, those who

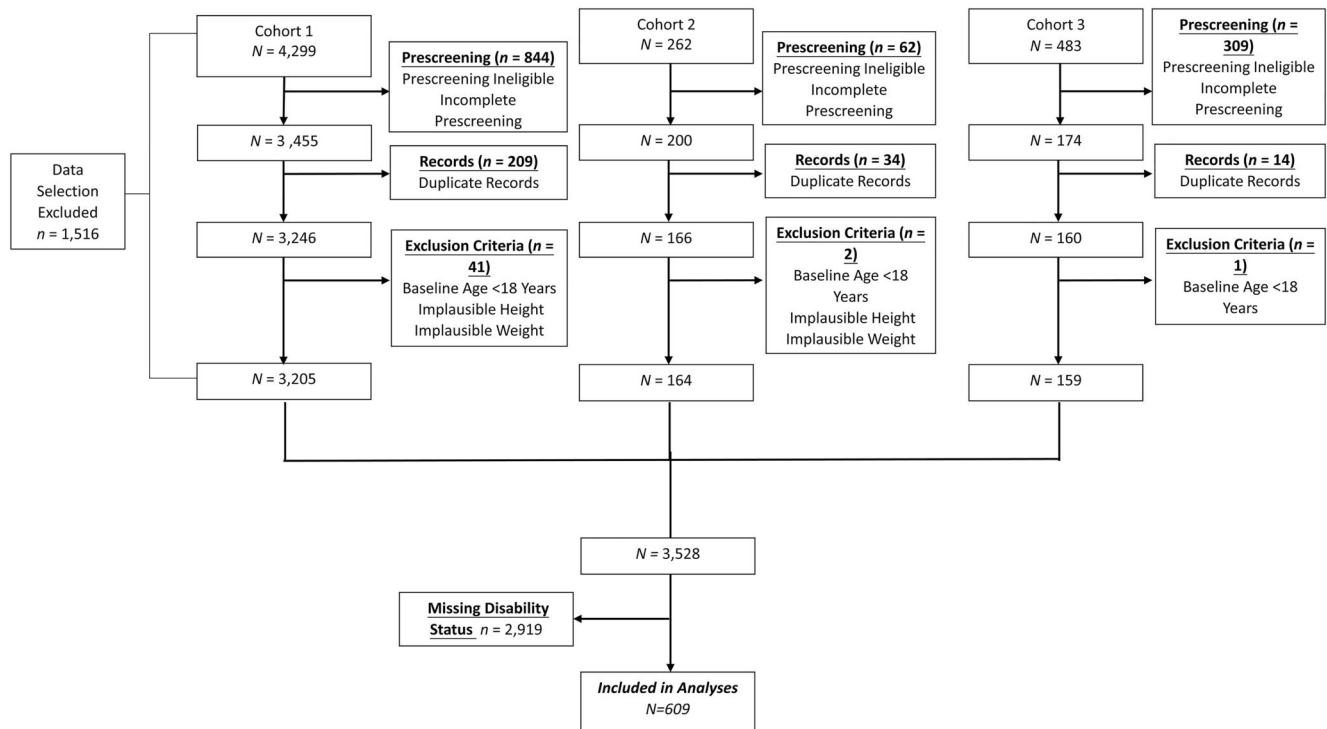


FIGURE 1 Depicts participant enrollment, retention, and inclusion in the statistical analysis.

are successful at losing weight and successful at maintaining lost weight for at least 1 year, (2) Regain, those who successfully lost weight but regained the weight they lost, (3) Unsuccessful, those who were not able to lose weight, or (4) Interested, those attempting weight loss for the first time. Finally, participants were asked to rank the importance of various diet and exercise strategies during the time they lost the most weight. Participants were asked to rank their importance using a 5-point Likert scale, with one representing not important at all, and five representing extremely important. The questions related to these strategies were based on questions used in the National Weight Control Registry to rank behaviours associated with weight loss maintenance success.<sup>33</sup>

## 2.3 | Statistical analysis

All study data were collected and managed using REDCap electronic data capture tools hosted at the University of Alabama at Birmingham.<sup>34,35</sup> REDCap is a secure, web-based software platform designed to support data capture for research studies, providing (1) an intuitive interface for validated data capture; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for data integration and interoperability with external sources.<sup>34,35</sup>

All analyses were completed using SAS (version 9.4, 2002–2012 by SAS Institute Inc.). Participant characteristics were compared by disability status (PWD vs. PWoD) using Chi-squared tests for

categorical data or paired *t*-tests for continuous data. Participants were categorized into groups based on the presence of disability (yes/no) and weight history parameters (lifetime maximum weight and body mass index [BMI], current weight and BMI, most amount of weight lost, number of weight loss attempts, and current weight loss status and percentage) were compared between groups using general linear models. These models were adjusted for age and sex. Chi-squared tests were used to compare frequencies of weight loss and weight loss maintenance success between PWD and PWoD. Further, among PWD, participants were categorized based on use of assistive device for ambulation (yes/no) self-reported in the questionnaire using general linear models, adjusted for age and sex. Finally, the importance of weight loss strategies used was compared between PWD in the Successful versus Regain groups using the Wilcoxon rank-signed test due to a lack of normality in these data. Finally, when analyzing multiple outcome measures, *p*-values were not adjusted in order to minimize the risk of Type II error.<sup>36</sup> All methodologies were approved by the Tufts University Institutional Review Board (#13075).

## 3 | RESULTS

Figure 1 presents participant enrollment and eligibility for analyses. Six hundred and nine participants were eligible for the analyses and 174 were identified as having a physical disability or mobility limiting condition. Baseline characteristics of participants are presented in Table 1 by group (PWD vs. PWoD). In both groups, the majority of

TABLE 1 Participant characteristics.

Parameter	PWoD (n = 435)	PWD (n = 174)
Age, M (SE)	51.8 (0.7)*	57.1 (1.0)*
Race, n (%)		
American Indian or Alaska native	1 (0.2)	0 (0.0)
Asian	11 (2.5)	2 (1.1)
Native Hawaiian or other Pacific Islander	1 (0.2)	0 (0.0)
Black or African American	65 (14.9)	32 (18.4)
White or Caucasian	313 (72.0)	127 (73.0)
More than one race	5 (1.1)	6 (3.4)
Other	2 (0.5)	1 (0.6)
Unknown	4 (0.9)	1 (0.6)
Prefer not to specify	33 (7.6)	5 (2.9)
Ethnicity, n (%)		
Hispanic or Latino	16 (3.7)	6 (3.4)
Not Hispanic or Latino	377 (86.7)	155 (89.1)
Prefer not to specify	3 (0.7)	2 (1.1)
Unknown	0 (0.0)	3 (1.7)
Prefer not to specify	35 (8.0)	8 (4.6)
Female, n (%)	328 (75.4)	143 (82.2)
Income, n (%)		
Less than \$25,000	34 (7.8)*	39 (22.4)*
\$25,000–\$49,999	58 (13.3)	42 (24.1)
\$50,000–\$7999	98 (22.5)	35 (20.1)
\$80,000–\$130,000	114 (26.2)	30 (17.2)
Greater than \$130,000	94 (21.6)*	20 (11.5)*
Did not report	37 (8.5)	8 (4.6)
Employment status, n (%)		
Full-time employment (35 h a week or more year-round)	251 (57.7)*	44 (25.3)*
Part-time employment	41 (9.4)	18 (10.3)
Unemployed, actively seeking employment	10 (2.3)	10 (5.7)
Not employed, not seeking employment (student, retired, home-make, disabled, etc.)	100 (23.0)*	99 (56.9)*
Did not report	33 (7.6)	3 (1.7)

Note: Displays characteristics of participants with versus without disability. Continuous and categorical variables were compared between groups (people without vs. people with disability) using *t*-tests and chi-squared tests respectively.

Abbreviations: M, mean; PWD, people with physical disability; PWoD, people without physical disability; SE, standard error.

\* denotes group differences ( $p < 0.001$ ).

participants were female (PWD, 82.2%; PWoD, 75.4%) and non-Hispanic white. The average age for PWD was  $57.1 \pm 1.0$  years, which was higher than PWoD  $51.8 \pm 0.7$  ( $p < 0.001$ ). There were no differences between PWD versus PWoD by race, ethnicity, or sex; however, PWD had a higher frequency of lower income, not being employed, and a lower frequency of higher income and having full-time employment.

Information on types of disability present and use of assistive devices is reported in Table 2. The most common disability or mobility limitation reported was joint pain (70.1%) and osteoarthritis (48.9%). Among PWD, 56 reported using an assistive device for mobility (32.2% of PWD). Of those who used an assistive device, the devices reported most frequently were cane, reacher tool, and push wheelchair (Table 2).

TABLE 2 Disability and assistive device use.

Condition	N (% of PWD) (n = 174)
Joint pain	122 (70.1)
Osteoarthritis	85 (48.9)
Edema	27 (15.5)
Peripheral neuropathy	26 (14.9)
Spinal cord injury	22 (12.6)
Paralysis	18 (10.3)
Multiple sclerosis	17 (9.7)
Stroke	12 (6.9)
Rheumatoid arthritis	11 (6.3)
Traumatic brain injury	10 (5.7)
Macular degeneration	7 (4.0)
Cerebral palsy	7 (4.0)
Blind	3 (1.7)
Diabetic retinopathy	3 (1.7)
Parkinson's	3 (1.7)
Amputation	3 (1.7)
Muscular dystrophy	2 (1.1)
Spina bifida	2 (1.1)
Postural orthostatic tachycardia syndrome	1 (0.6)
Other	70 (40.2)
Assistive device use	N (% of users) (n = 56)
Cane	44 (78.6)
Reacher tool	18 (32.1)
Walker	15 (26.8)
Push wheelchair	15 (26.8)
Power wheelchair	12 (21.4)
Rollator	11 (19.6)
Ankle-foot orthoses	10 (17.8)
Crutch	3 (5.4)
Other	3 (5.4)

Note: Presents reported physical disabilities or conditions limiting mobility in the study sample and use of assistive devices.

Abbreviation: PWD, people with physical disability.

### 3.1 | Weight history

Frequency of PWD and PWoD in each weight category is presented in Figure 2. Chi-squared test revealed no differences in the frequency of weight category between PWD and PWoD ( $\chi^2$  (3,  $N = 609$ ) = 3.8380,  $p = 0.2795$ ). When comparing the Successful versus Regain groups using the Chi-squared test, there was a trend for PWD to be in the Regain group at a higher frequency than PWoD ( $\chi^2$  (1,  $N = 519$ ) = 3.7294,  $p = 0.0535$ ); however, this did not reach statistical significance.

Weight history of PWD and PWoD is presented in Table 3. In the whole sample, PWD reported a higher current and lifetime maximum weights and BMIs and more weight loss attempts compared to PWoD. When comparing the maximum amount of weight lost, there were no differences between PWD and PWoD. In both groups, the average current weight loss percentage was 13.0%, with no differences between the groups. Additionally, Table 3 presents comparisons between PWD and PWoD who self-identified in the "Successful" or "Regain" weight loss group.

Among Successful, PWD and PWoD had similar lifetime maximum weight and BMI, maximum weight lost (kg), lifetime weight loss status, and number of attempts, with the only difference in these groups being that current weight and BMI were higher among PWD. In the Regain group, PWD and PWoD had similar maximum kg lost, and while there was a trend for PWD to have higher current percent weight loss, this did not reach statistical significance (PWD,  $9.3\% \pm 0.8$ ; PWoD  $7.5\% \pm 0.5$ ,  $p = 0.0641$ ). PWD in the Regain group had higher lifetime and current weight and BMI, and more weight loss attempts than PWoD in the Regain group.

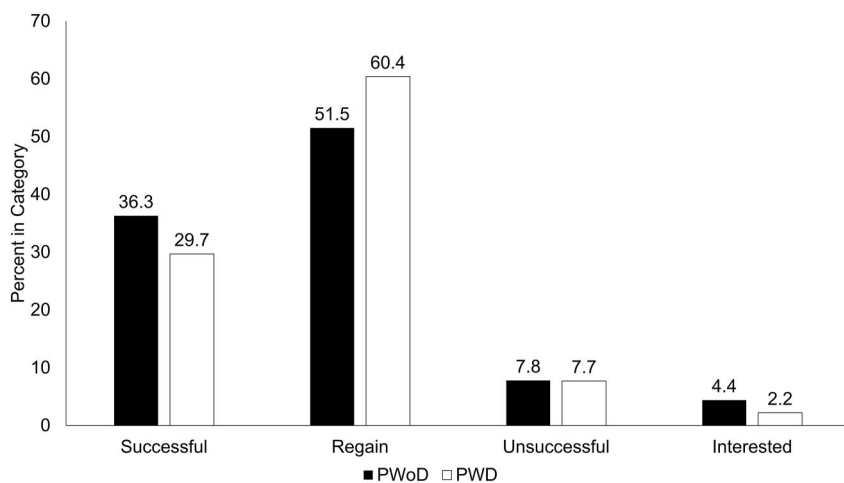
Data related to weight history of PWD who use versus do not use an assistive device are presented in Table 4. No results reached statistical significance; however, there was a trend for those who used assistive devices to have higher lifetime maximum BMI, current BMI, and have less weight loss.

### 3.2 | Weight loss strategies

The importance of various dietary and physical activity strategies of PWD in the successful group versus PWD in the regain group weight is presented in Table 5. There were no differences in any strategy between successful PWD and PWD based on weight history group.

## 4 | DISCUSSION

The present study was aimed to learn more about differences in weight management between PWD and PWoD enrolled in the IWCR. Across the four weight history categories, there were no differences between PWD and PWoD in category frequency. So, while current literature suggests that PWD face potential barriers to weight loss maintenance,<sup>19,21,22,24,37</sup> results from this study indicate that PWD and PWoD have similar weight management success. Across the whole sample, PWD and PWoD are maintaining 13% weight loss on average, indicating that PWD can be successful in achieving and maintaining a significant weight loss. These results are contrary to the prevailing view that PWD have a more difficult time with weight loss and maintenance than PWoD due to barriers to health commonly identified in this population.<sup>37,38</sup> However, it is important to note that this study found that PWD had more weight loss attempts than PWoD, which could indicate that it may take longer for PWD to find what leads to success. Elucidating factors related to success for PWD is critical for tailoring future programs to be more



**FIGURE 2** Weight loss category of individuals with and without physical disability. Compared using the Chi-squared test. There were no differences in the frequency of weight category by group (people with physical disabilities vs. people without physical disability). PWD, people with physical disability; PWoD, people without physical disability.

**TABLE 3** Weight history of individuals with and without disability.

Parameter	Without disability	With disability	P value
Whole sample	(n = 372)	(n = 147)	
Lifetime maximum, kg	102.2 (2.7)	117.0 (4.5)	0.0055
Lifetime maximum BMI, kg/m <sup>2</sup>	36.8 (1.0)	42.3 (1.7)	0.0074
Max loss, kg	20.8 (0.8)	22.4 (1.3)	0.3060
Current weight, kg	86.2 (1.3)	100.6 (2.1)	<0.0001
Current BMI, kg/m <sup>2</sup>	31.0 (0.5)	36.1 (0.7)	<0.0001
Current weight loss status, kg	16.2 (2.4)	15.5 (4.0)	0.8786
Current weight loss percent, %	13.0 (0.6)	13.0 (1.0)	0.9702
Number of previous weight loss attempts	7.1 (0.4)	9.1 (0.7)	0.0141
Successful	(n = 153)	(n = 47)	
Lifetime maximum, kg	102.7 (6.1)	108.0 (11.5)	0.6853
Lifetime maximum BMI, kg/m <sup>2</sup>	36.5 (2.4)	40.1 (4.5)	0.4758
Max loss, kg	22.5 (1.4)	24.6 (2.7)	0.4985
Current weight, kg	75.2 (1.4)	84.7 (2.5)	0.0010
Current BMI, kg/m <sup>2</sup>	26.5 (0.5)	30.9 (0.9)	<0.0001
Current weight loss status, kg	27.3 (5.8)	24.6 (11.1)	0.8277
Current weight loss percent, %	20.3 (1.1)	21.7 (2.0)	0.5577
Number of previous weight loss attempts	6.8 (0.6)	8.2 (1.2)	0.3168
Regain	(n = 219)	(n = 100)	
Lifetime maximum, kg	101.9 (2.0)	121.2 (3.1)	<0.0001
Lifetime maximum BMI, kg/m <sup>2</sup>	37.1 (0.7)	43.4 (1.1)	<0.0001
Max loss, kg	20.6 (0.8)	19.2 (1.2)	0.3223
Current weight, kg	94.1 (1.8)	108.1 (2.6)	<0.0001
Current BMI, kg/m <sup>2</sup>	34.3 (0.6)	38.6 (0.9)	<0.0001
Current weight loss status, kg	7.9 (0.7)	11.7 (1.1)	0.0053
Current weight loss percent, %	7.5 (0.5)	9.3 (0.8)	0.0641
Number of previous weight loss attempts	7.2 (0.5)	9.5 (0.8)	0.0283

Note: Presents weight history of people with and without disability in the International Weight Control Registry. Compared using general linear models and presented as mean (standard error). All models adjusted for age and sex. Max loss variable also adjusted for lifetime maximum weight.

Abbreviations: BMI, body mass index; kg, kilograms; m, meters.

TABLE 4 Weight history of people with disability with and without assistive devices.

Parameter	No assistive device (n = 91)	Assistive device (n = 56)	P value
Lifetime maximum weight, kg	113.4 (3.7)	122.4 (5.1)	0.1582
Lifetime maximum BMI, kg/m <sup>2</sup>	40.7 (1.4)	44.8 (1.9)	0.0831
Max weight loss, kg	25.3 (1.4)	20.7 (2.1)	0.0813
Current weight, kg	97.0 (3.2)	104.5 (4.2)	0.1612
Current BMI, kg/m <sup>2</sup>	34.6 (1.1)	38.1 (1.5)	0.0624
Current weight loss status, kg	15.0 (1.7)	17.9 (2.3)	0.3008
Current weight loss percent, %	13.2 (1.2)	13.8 (1.7)	0.7611
Number of previous weight loss attempts	9.2 (1.0)	9.6 (1.3)	0.7915

Note: Presents weight history of people with physical disabilities who do versus do not use assistive devices for ambulation in the International Weight Control Registry. Presented as mean (standard error).

Abbreviations: BMI, body mass index; kg, kilograms; m, meters.

TABLE 5 Strategies for weight loss.

Strategy	Success (n = 47)	Regain (n = 100)	Z	P value
Dietary				
Reducing portion sizes	68.2	76.0	-1.1	0.2779
Decreasing fat	81.9	76.8	0.7	0.5124
Decreasing carbohydrates	70.7	74.8	-0.6	0.5800
Decreasing sugar	77.4	71.7	0.8	0.4269
Increasing low-calorie foods	75.3	72.7	0.4	0.7195
Increasing protein	72.0	74.2	-0.3	0.7634
Eating low glycemic diet	78.5	70.3	1.1	0.2602
Skipping meals	66.7	75.9	-1.3	0.1982
Cutting out snacks	73.5	72.0	0.2	0.8424
Logging food	69.2	75.5	-0.9	0.3877
Counting calories	68.6	75.8	-1.0	0.3160
Not eating out	73.8	73.4	0.1	0.9559
Using meal replacements	68.9	75.7	-1.0	0.3403
Physical activity				
Aerobics	72.8	73.1	0.0	0.9669
Walking	75.3	71.2	0.5	0.5835
Yoga	73.8	70.4	0.5	0.6046
Resistance training	73.4	73.5	0.0	0.9931

Note: Compares reported importance of strategies used weight loss between people with physical disabilities who were successful at weight loss maintenance versus those who regained lost weight. Comparing using Wilcoxon Rank-Signed test, with scores presented as mean rank.

successful for this population and reducing the number of attempts before finding success. This was especially true in the Regain group across PWD and PwOD, with PWD having two more weight loss attempts on average, despite still experiencing regain. This finding also supports the goal of inclusion science, which is to include PWD in existing health promotion research to allow for direct comparison of PWD and PwOD, instead of operating on opposite tracks, in order to learn more.<sup>39</sup>

Within each weight history category analyzed, PWD had a higher current BMI and lifetime maximum BMI, which could suggest that PWD are more susceptible to weight gain. When comparing PWD and PwOD in the Successful group, the only difference between the groups regarding weight history was a higher current weight and BMI for PWD. These results align with current literature, which suggests that PWD are at higher risk for obesity PwOD,<sup>6,40,41</sup> as the data reflected significantly higher current weight in PWD compared to

those without. Even among those successful in the present study, the current BMI for PWoD was in the overweight range (26.5 kg/m<sup>2</sup>), while PWD current BMI is in the obesity range (30.9 kg/m<sup>2</sup>). Similarly, when comparing those in the Regain group, PWoD would be categorized as class 1 obesity (34.3 kg/m<sup>2</sup>), while PWD would be categorized as class 2 obesity (38.6 kg/m<sup>2</sup>).<sup>42</sup> This could mean that PWD are still at risk for conditions associated with obesity, despite weight loss efforts. At a higher BMI, PWD could still be experiencing comorbid conditions related to obesity and disability, such as pain, risk for chronic diseases, and limitations related to mobility. It is important to continue follow up with this sample to determine long-term consequences of the higher BMI.

Data comparing PWD using or not using assistive devices found no differences in weight history between the two groups. While there was a trend for PWD that use assistive devices to have higher lifetime maximum BMI, current BMI, and less weight loss (kg), none of this reached statistical significance. This could be because the most commonly used devices were canes, reacher tools, and walkers, which are typically associated with a higher degree of mobility and fewer limitations than other devices, such as wheelchairs. In addition to exploring disability-specific considerations for weight loss maintenance, more research is needed regarding the use of assistive devices during weight loss. This could include an investigation of strategies leading to weight management success especially for individuals using wheelchairs.

This study was unable to identify strategies that were different for PWD who were successful versus PWD in the Regain group. Several factors could have impacted this outcome, namely that the IWCR included successful participants, consistent with previous registries, but also those who regained lost weight, which was missed by previous registries. Additionally, the questions used during this assessment might not be sensitive enough to capture true differences between behavior. PWD often face higher rates of poverty and unemployment than PWoD,<sup>43</sup> which could directly impact physical activity routines, access to healthy foods, and other factors which were not appropriately assessed in this work. A more in-depth analysis of various physical activities and dietary behavior may be needed to identify contributing factors allowing successful participants to achieve their success with weight loss maintenance.

Several limitations exist in the present study. All the data collected for this study were self-reported, including weight loss category and current weight information. This is a notable limitation of this work, and future investigations should consider using objective data in similar investigations. Additionally, the lifetime weight loss status percentage was approximately 13% in both PWD and those without disability. The high weight loss percentage indicates that this sample is more successful compared to other data regarding weight loss maintenance.<sup>9,14,44</sup> For enrollment into the IWCR, much of initial recruitment was conducted through previous research participants from clinical trials related to obesity treatment. It is possible that this led to a biased sample, with more successful people completing the IWCR. In addition, people who have had more success with weight loss may be more likely to

enroll in the study, leading to a self-selection bias in the sample. Furthermore, within the sample of PWD, the most common types of disability included joint pain and osteoarthritis, with few people having disabilities that may lead to more limitations such as multiple sclerosis, stroke, spinal cord injury, etc. It is important that these groups are targeted for recruitment in the future to learn more about weight loss maintenance in these populations. In addition, future research could examine how environmental, psychosocial, and behavioral factors are associated with weight loss maintenance success among PWD for the development of more effective clinical programs tailored to this population. Finally, it is important to consider the cyclical nature of physical disability and obesity. While disability can result in obesity, often obesity also results in a physical disability or limited mobility.<sup>45</sup>

To our knowledge, this is the first study of its kind attempting to compare weight management among PWD and PWoD. Future researchers should work to include PWD in weight management research as disability is common among obesity and vice-versa. Future work should emphasize early prevention of obesity in this population as well as stronger treatment programs and options created specifically to decrease the known barriers for PWD.

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#### CONFLICT OF INTEREST STATEMENT

Dr. Roberts founded the iDiet, a web-based behavioral weight loss program ([www.theidiet.com](http://www.theidiet.com)), and is a Board member of Danone. Dr. Hill has ownership interests in Shakabuku LLC. He has received research grants from the National Cattleman's Beef Association and owns a patent for the Energy Gap. He has received consulting fees from Gelesis and has stock options in the company. The remaining authors have no relevant conflicts of interest to disclose.



## ORCID

Julianne G. Clina  <https://orcid.org/0000-0002-3655-5644>

R. Drew Sayer  <https://orcid.org/0000-0002-9488-7030>

Susan B. Roberts  <https://orcid.org/0000-0003-1320-8460>

James O. Hill  <https://orcid.org/0000-0003-4690-2264>

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