Validation of Self-Reported Anthropometric Measures and Body Mass Index in a Subcohort of the DianaWeb Population Study

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Abstract

We evaluated the validity of self-reported anthropometric measures in 200 women of approximately 1000 participating the DianaWeb study, a community-based participatory research offered to Italian breast cancer patients. Self-reported height, weight, and body mass index resulted to be satisfactorily accurate, and self-reported weight, height, and waist circumference were appropriate to estimate overweight/obese and central obesity in participants of the DianaWeb study.

Introduction: DianaWeb is a community-based participatory project open to Italian breast cancer patients. The aim of the study was to assess the effectiveness of a lifestyle intervention in improving the prognosis after patients received diagnosis and surgery/chemotherapy. The DianaWeb study uses an interactive Web site (www.dianaweb.org) to monitor patients' lifestyles, and to obtain clinical and anthropometric data. Although detailed instructions for measuring height, body weight, waist circumference, and blood pressure (BP) are provided, individuals might tend to overestimate or underestimate those parameters. The aims of the present study were: (1) to compare self-recorded data with those from standardized ambulatory measurements; (2) to determine the trueness of a subject classification in the overweight/obesity or hypertensive subgroup on the basis of the patients' own measurements and estimates; and (3) to identify confounding variables. **Patients and Methods:** We compared self-reported with ambulatory measurements in a subgroup of 200 randomly selected women of approximately 1000 enrolled in the DianaWeb study (from September 2016 to March 2018). **Results:** Bland–Altman analysis showed a close agreement for self-reported and ambulatory-measured height, weight, and body mass index (BMI). On the contrary, women overestimated waist circumference and underestimated BP. Cohen κ statistics showed fair agreement only for hypertension. Binary logistic regression analysis showed that BMI and diastolic BP self-measurements were biased according to age. **Conclusion:** The results suggest that self-reported height, weight, and BMI are satisfactorily accurate for patients in the DianaWeb study, such as accuracies of overweight/obese and central obesity classification, and that these data can be useful for our research.

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Introduction

Breast cancer (BC) is the second most common cancer worldwide and the most commonly diagnosed cancer and the leading cause of cancer death among women.[1] In 2018 an estimated 2.1 million new cases were diagnosed worldwide, with 627,000 deaths.[1] Across European Union countries, BC shows

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growing incidence rates with a decreased mortality, which have led to an increased number of long-term BC survivors. In European Union countries, the age-standardized net BC survival at 5 years is approximately 81%.[2]

It is well known that survivors have an increased risk of early mortality, comorbid conditions, and second primary cancers. There are multiple risk factors that might increase the risk of recurrences, such as pharmacological treatments, genetic factors, and the presence of behavioral and dietary risk factors.[3,4] It is known that a sedentary lifestyle accounts for up to 25% of deaths of BC.[5] Compared with normal-weight women,[6,7] women with a high body mass index (BMI) have a twofold increased risk of 5-year recurrence and a 60% increased risk of death over 10 years. Several studies showed that a Western dietary pattern is associated with an increase of recurrences and with a lower cancer-specific survival. On the contrary, epidemiology suggests that the Mediterranean dietary pattern and specific vegetables, such as soy food and cruciferous vegetables, might help to prevent BC recurrences and to improve the prognosis.[8]

Although potential relationships between lifestyles and health outcomes in BC survivors are well known by scientists and clinicians, the information about a healthy lifestyle is not yet included in oncology protocols and is not currently available for patients. Educational interventions represent a strategy to support BC patients to improve their health behaviors. At present, many of the new educational interventions to prompt change in individual behaviors use mediated approaches, such as telephone, e-mail, and Web sites. Health information acquired online has the potential to enhance knowledge, personal skills, and abilities, and to contribute to better health. Unfortunately, often the quality of online health information is questionable, and a community-based effort involving health educators, researchers, clinicians, BC patients, and Web site organizers can help to supply access on information that is on the basis of scientific evidence.[9]

DianaWeb is a community-based participatory research (CBPR) offered to BC patients that uses a specific interactive Web site (www.dianaweb.org) developed by IT'S Informatica & Comunicazione (Brescia, Italy).[10] In this study, the enrolled patients are invited to fill in specific online forms to gather information on anthropometric data, medical history, dietary and physical activity habits, and results of routine blood tests.

Even when detailed instructions for measuring height, body weight (BW), waist circumference (WC), and blood pressure (BP) at home are provided, individuals might tend to overestimate their height and underestimate their BW and WC; as consequence, BMI derived from self-reported measures might result as underestimated.[11] Consequently, the relationships between overweight and obesity and health outcomes might also be biased. Moreover, according to the literature, biases of self-reported BP measurement could lead to an underestimation of the prevalence of hypertension.[12]

The aims of present study were: (1) to compare self-recorded height, BW, BMI, WC, and BP data with those from standardized ambulatory measurements performed face-to-face; (2) to determine the trueness of a subject classification in the overweight/obese or hypertensive subgroup on the basis of the patients' own measurements and estimates; and (3) to identify confounding variables.

Ambulatory measurements were performed in a randomized subsample of the DianaWeb population to ensure the quality of data collected via Internet.

Patients and Methods

Ethical Approval

This study was approved by the ethics committee of the Fondazione IRCCS Istituto Nazionale dei Tumori di Milano, Protocollo INT 24/16 (27 Luglio 2016).

Study Population

Between September 2016 and March 2018, approximately 1000 BC patients were enrolled in the DianaWeb project, a CBPR study performed to evaluate the effectiveness of a lifestyle intervention to improve the prognosis in women diagnosed with BC by reducing the prevalence of risk factors for recurrences, such as overweight, metabolic syndrome, estrogen levels, etc. To be eligible for this study, participants had to be women with a diagnosis of BC, whatever the disease stage, histological type, and time elapsed since diagnosis. All participants gave informed consent. The study methodology/design and the questionnaire for data collection used in the DianaWeb are described elsewhere. Briefly, DianaWeb participants received a system of interactive electronic technology to modify lifestyle behaviors. Using the Web site (www.dianaweb.org), participants are informed about the most recent scientific evidence regarding BC recurrences prevention and are encouraged to change their lifestyle. The basic lifestyle recommendations are those proposed by the World Cancer Research Fund International 2007-2014-2018[13] and reported in the European Code Against Cancer.[14] On the Web site, these recommendations are integrated with information on nutritional characteristics of nutrients, recipes, calls to perform physical activity of moderate intensity, and so on. During the follow-up, researchers analyze clinical outcomes as a function of baseline risk factors and subsequent changes, as well as share methodologies and results with patients.

To validate the accuracy and precision of the self-reported height, BW, WC, and BP, during the recruitment period we performed on a weekly basis a random sampling of 3 recently recruited patients who had completed the questionnaires with anthropometric and BP data. We invited these patients to visit a DianaWeb Research Center (Milan, for women living in Northern Italy, or Perugia, for patients living in Central or Southern Italy) for anthropometric and BP measurements. Random calling of patients was stopped when 200 women confirmed their participation.

Measurements

Height, BW, WC, and BP were self-measured by participants and reported via Internet. We provided detailed instructions with images to perform measurements, and participants were asked to measure and record the requested values according to the instructions. Height and WC were reported in centimeters, BW was reported in kilograms, BP was reported in mm Hg (if a sphygmomanometer was available, participants were asked to measure their BP using standardized operating procedures, if a

sphygmomanometer was not available, we asked them to provide the value from the most recent body check).

We planned to conduct the ambulatory visits within the 2-week period after women uploaded their self-measurements. All ambulatory measurement procedures were on the basis of standard protocols and were conducted by a senior investigator and a trained research assistant. BW was measured using a Tanita BC418 (Tanita Europe GmbH, Sindelfingen, Germany) electronic scale with a 0.100-kg precision, and height was measured using a Seca213 (Seca, Hamburg, Germany) portable stadiometer with a 0.1-cm precision. BMI was then calculated as BW in kilograms divided by the square of height in meters; overweight and obesity were identified using international cutoff points.[15] WC was measured using a standardized inelastic tape with a tension meter attached. As suggested by the World Health Organization, the measure was taken at the midpoint between the highest point of the iliac crest and the last floating rib.[15] Excessive abdominal fat was defined as a WC circumference $\geq$80 cm.[16]

Blood pressure was measured using the automatic BP measuring device OMRON M6 comfort (Omron Healthcare Europe BV, Hoofddorp, The Netherlands). Hypertension was defined as either a systolic BP $\geq$140 mm Hg or a diastolic BP $\geq$90 mm Hg, or current use of antihypertensive medications.[17]

Statistical Analysis

Data are presented as mean ($\pm$ suitable index of variation) or proportion as appropriate.

Student *t* test and χ^2 were used to evaluate differences in age and in the distribution of sociodemographic characteristics between the patients enrolled in the DianaWeb study and those participating in the measurement validation study.

The difference between continuous variables was calculated by subtracting measured values from self-reported values. As a result, positive values represent the overestimation of measurements, and negative results their underestimation. We assessed the discrepancy of the observed mean difference from 0 using 1-sample *t* test.

Degree of correlation and agreement between self-reported and measured values of continuous variables were evaluated using intraclass correlation coefficient (ICC; 2-way mixed effects, single measurement absolute agreement) and 95% confidence interval (CI). Values <0.5 are indicative of poor reliability, values between 0.5 and 0.75 indicate moderate reliability, values between 0.75 and 0.9 indicate good reliability, and values >0.90 indicate excellent reliability.[18]

In addition, the extent of absolute concordance between the self-reported and measured data was examined using Bland–Altman plots.[19] These plots show the differences between self-reported and measured values plotted against the mean of the self-reported and measured values. Limits of agreement (LoA) were computed as the mean difference $\pm$ 1.96 SD. The value of 1.96 is on the basis of the fact that 95% of the area of a normal distribution is within 1.96 SDs of the mean. We also calculated the percentage of misreported data: for clinical purposes, we defined self-reported values acceptable if the discrepancies from recorded values were <10%.[20]

Body mass index, WC, and BP classification on the basis of self-reported data were cross-tabulated with classification on the basis of measured data, and the degree of misclassification was weighted using Cohen κ statistics.[21] The degree of concordance between self-reported and measured values was assessed as follows: <0.20 were considered as poor agreement, between 0.21 and 0.40 as fair agreement, between 0.41 and 0.60 as moderate agreement, between 0.61 and 0.80 as good agreement, and between 0.81 and 1.0as excellent agreement.[21]

Finally, binary logistic regression analysis was performed to understand whether a good level of agreement for clinical purposes between self-reported and measured values can be predicted on the basis of some demographic factors (age, marital status, academic qualification, occupation category). The dependent variables were constructed as binary outcomes; if discrepancies between self-reported and recorded values were smaller than 10% they were coded as 0, and if discrepancies were >10% they were coded as 1.

IBM SPSS Statistics Version 20.0 (IBM Corp., Armonk, NY) was used for data management and statistical analyses. Statistical significance was set at $P < .05$.

Results

Table 1 shows the main characteristics of the women enrolled in the DianaWeb study (minus validation study participants) until March 2018 and women who participated in the measurement validation study. We found that the 2 groups were very similar for some demographic characteristics; in both groups the enrolled women were in their 50s, were married or cohabiting, and had secondary school or were college-educated. Most participants performed professional, managerial, or administrative work: 646 (74.4%) in DianaWeb study cohort, and 126 (63%) in validation group; in the validation group there was a significant majority of retired: 41 (20.5%) versus 79 (9.1%). Moreover, the smokers were equally distributed between the 2 groups.

Comparisons of measured and self-reported height, BW, BMI, WC, and systolic and diastolic BP are shown in Table 2. On average, BW, BMI, and systolic and diastolic BP were underreported (negative mean differences) by 0.63 kg, 0.41, and 13.29 and 7.08 mm Hg, respectively. For each parameter, the average differences between the self-reported and measured data were significantly different from 0 ($P < .05$). The ICC for height, BW, and BMI showed a good reliability. A moderate reliability was observed for WC. Systolic and diastolic BP showed a poor concordance between measured and self-reported values.

Figure 1 shows the Bland–Altman plots for height, BW, WC, BMI, and systolic/diastolic BP. The horizontal lines represent the mean difference and 95% LoA. According to the Bland–Altman approach, the present study showed that for height there were 185 paired values (92.5%) situated within the LoA (from −3.86 to 5.06 cm). For BW 184 (92%) of paired values fell within the LoA (from −5.92 to 4.66 cm). Consequently, the value of measured BMI showed that 188 (94%) of points were situated within the LoA (from −2.82 to 2.00; $P = .000$). In the case of WC, and systolic and diastolic BP there were the systematic differences between self-reported and measured values. On average, WC self-reported by women was approximately 3 cm larger than ambulatory measurements, and in Bland–Altman analysis, 14 points of 200 (7.0 %) were inconsistent. For systolic and diastolic BP, Bland–Altman plots showed that there were more data points below the line of 0 than above. This confirms that individuals underestimate these measurements.

Table 1 Characteristics of the DianaWeb Cohort and Validation Study Participants

Characteristic	Full Cohort Minus Validation Study Participants (n = 868)	Validation Study Participants (n = 200)	*P*
Mean Age ± SD, Years	52.35 ± 8.42	54.05 ± 9.43	.012[a]
Married or Cohabitating, n (%)			
Yes	564 (65.5)	130 (65.0)	.995[b]
No	304 (35.5)	70 (35.0)	
Smoking Habits, n (%)			
Yes	62 (7.1)	11 (5.5)	.503[b]
No	806 (92.9)	189 (94.5)	
Education, n (%)			
Primary school or less	70 (8.1)	22 (11.0)	.115[b]
Secondary school	395 (45.5)	100 (50.0)	
College or university	403 (46.4)	78 (39.0)	
Occupation Category, n (%)			
Unemployed	18 (2.1)	2 (1.0)	.000[b]
Retired	79 (9.1)	41 (20.5)	
Home worker	64 (7.4)	13 (6.5)	
Blue collar	25 (2.9)	5 (2.5)	
White collar	646 (74.4)	126 (63.0)	
Other	36 (4.1)	13 (6.5)	

[a]Student *t* test.
[b]χ^2 test.

In Bland–Altman analysis it is important to define the clinically acceptable LoA. We defined self-reported values acceptable if the discrepancies from recorded values were smaller than 10%. Most of the height, BW, and BMI home measurements were within the a priori standard: 200 (100%), 191 (95.5%), and 186 (93%), respectively. Approximately 57 (28%) of WC self-measurements differed more than 10% from ambulatory measurements. Systolic and diastolic BP self-reported values showed an elevated percentage of misreported measurements: 119 (59.8%) for systolic BP and 114 (57%) for diastolic BP.

κ Statistics was used to assess the intracategory agreement of WC, BMI, and hypertension classifications (Table 3).

The κ value indicated a good agreement for BMI ($\kappa = 0.688$; $P < .000$), moderate agreement for WC ($\kappa = 0.542$; $P < .000$), and fair agreement for hypertension ($\kappa = 0.319$; $P < .000$).

Table 4 shows results of the logistic regression analysis. Of the 4 analyzed independent variables, only one (ie, age) bears a statistically significant relationship to the prediction of good level of agreement for clinical purposes between self-reported and measured values ($P < .05$). The value for the odds of this variable indicates that, as the age increases, the odds of level of agreement for WC and diastolic BP decrease.

Discussion

The aim of this work was to evaluate whether, in the DianaWeb CBPR, self-reported anthropometric parameters and BP values were in agreement with ambulatory measurements.

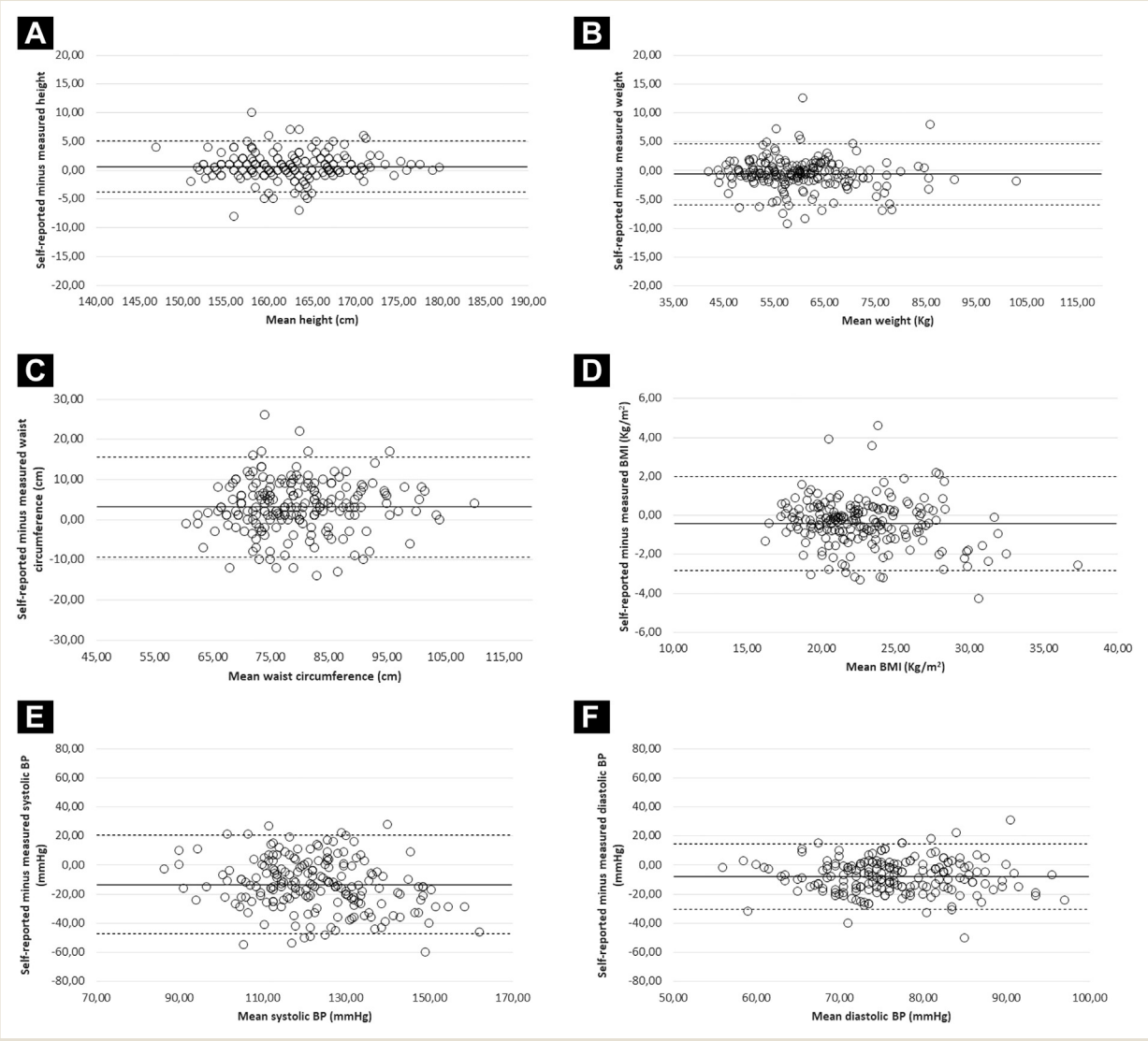
Self-reports have the advantages of practicality and low cost. Data collection via Internet is quick and represents a good method for sampling large numbers of individuals. However, the tools might

Table 2 Self-Reported Parameters Compared With Measured Data

Parameters	Self-Reported Value	Measured Value	Mean of Difference	ICC	95% CI
Height, cm	163.03 ± 5.95	162.43 ± 5.93	0.60 ± 2.27[a]	0.922	0.894-0.943
Body Weight, kg	59.94 ± 9.61	60.57 ± 9.83	−0.63 ± 2.70[a]	0.960	0.945-0.970
WC, cm	81.08 ± 9.72	77.91 ± 9.40	3.18 ± 6.38[a]	0.737	0.572-0.830
BMI	22.56 ± 3.44	22.97 ± 3.64	−0.41 ± 1.23[a]	0.934	0.903-0.953
Systolic BP	115.96 ± 14.27	129.27 ± 17.92	−13.29 ± 17.36[a]	0.321	0.045-0.525
Diastolic BP	72.52 ± 9.15	80.28 ± 9.36	−7.80 ± 11.40[a]	0.179	0.009-0.333

Abbreviations: BMI = body mass index; BP = blood pressure; ICC = intraclass correlation coefficient; WC = waist circumference.
[a]$P < .05$ 1-sample *t* test, difference between self-reported and measured values versus 0.

Figure 1 Bland–Altman Plots Illustrating the Agreement Between Self-Reported and Measured (A) Height, (B) Weight, (C) Waist Circumference, (D) Body Mass Index (BMI), (E) Systolic Blood Pressure (BP) and (F) Diastolic BP



incur problems of fidelity in the self-reported data: anthropometric data might be prone to respondent biases and measurement errors.

Our study indicated that patients participating the DianaWeb study accurately reported their height, BW, and BMI, but overestimated WC and underestimated BP values. When considering sociocultural variables that can affect the quality of self-reported measurements, binary logistic regression analysis revealed that only age seemed to be associated with a misreporting of WC and diastolic BP.

Most authors reported that the use of self-reported data leads to height overestimation and BW underestimation, resulting in an underestimation of BMI as well as overweight prevalence.[22] In our study the average differences were small: −0.63 kg for BW, 0.60 cm for height, and −0.41 for BMI. These differences were comparable with those obtained in other studies.[11,23]

Over-reported WC was an unexpected finding, as under-reporting of WC has been consistently found in most other studies.[24,25] However, consistent with our data, a slight over-reporting of WC has been observed in postmenopausal women aged 55 to 69 years,[26] in overweight employees taking part in the ALIFE@Work project,[27] and in men and women recruited in a cross-sectional study to evaluate if video instruction could improve the accuracy of self-measurement of WC compared with written instruction.[28]

Explanation for the over-reporting of WC is unclear. Cullum et al[24] suggested that subjects with considerable deposits of abdominal fat might have had trouble in identifying the mid-point between their ribs and hips and they might have measured their WC inadvertently at another, larger site than at the midpoint. Furthermore, possibly women might not have placed the measuring tape tight enough around their waist. The type of clothing worn by

Table 3 Classification of Study Population According to Self-Reported and Measured Waist Circumference, BMI, and Hypertension Categories

Parameter	Self-Reported Value, n (%)	Measured Value, n (%)	κ (SE)	*P*
Central Adiposity				
Yes	94 (47.0)	71 (35.5)	0.542 (0.058)	.000
No	106 (53.0)	129 (64.5)		
BMI Classification				
Low weight	19 (9.5)	15 (7.5)	0.688 (0.050)	.000
Normal weight	133 (66.5)	137 (68.5)		
Over weight	42 (21.0)	37 (18.5)		
Obese	6 (3.0)	11 (5.5)		
Hypertension				
Yes	36 (18.0)	43 (57.0)	0.319 (0.059)	.000
No	164 (82.0)	114 (43.0)		

Abbreviations: BMI = body mass index; SE = standard error.

participants might have also affected measurements, because some did not wear the requested loose, light clothing. Finally, participants might have measured their WC at the end of an inhalation, when their waist is pulled out, instead of at the end of an exhalation.

In general, when subjects were trained to follow a measurement protocol (as in the DianaWeb study), the anthropometric measures were reported with reasonable accuracy. For example, in a large cohort of women[29] (3756 participants, aged 30-72 years, participating in the Mexican Teachers' Cohort), the authors collected the self-reported weight, height, waist, and hip circumference, after summary instructions to measure waist and hip circumferences. The authors showed that mean differences of direct minus self-reported measures were 1.3 (95% CI, 1.2-1.5) kg for BW, −2.2 (95% CI, −2.3 to −2.1) cm for height, 1.8 (95% CI, 1.5-2.0) cm for WC, and 1.9 (95% CI, 1.7-2.1) cm for hip circumference. In an another study of 41 women[20] (between 18 and 45 years of age), the authors provided a 9-minute instructional video explaining how to measure waist, hip, and neck circumferences. The authors reported that differences between participant self- and technician measurements were small (ie, mean difference were 0.11 kg for BW, 1.13 cm for WC, and 0.16 cm for height).

Regarding systolic and diastolic BP, our results revealed significant differences between self-reported and measured value. In addition, the κ score, used to measure the strength of agreement between self-reported and ambulatory measures, indicated a poor agreement. For these parameters, different studies have shown moderate to substantial agreement between the two evaluation methods in comparison.[30-33] Our results concur with those of Tolonen et al,[34] who observed that self-reported information tends to underestimate prevalence of hypertension, and of those of Dave et al[35] and Taylor et al,[36] who reported considerable variation between self-reported and clinically measured BP and hypertension.

There might be many reasons whereby self-reported and ambulatory BP measurements differ. It is known that an individual's BP varies considerably across the day and from day to day. Humoral and emotional factors, physical activity, postural, and limited accuracy of self-measurements might contribute to the generation of BP fluctuations. In particular, in our study, systolic and diastolic BP ambulatory measurements tended to be higher than self-reported data. This increase in BP levels might be because of a possible "white coat effect," defined as persistently elevated BP in the presence of a health care worker, particularly a physician, in patients not taking medication with an average awake ambulatory BP monitoring <135/85 mm Hg.[37] Indeed, available evidence suggests that conventional ambulatory systolic BP readings might be at least 5 to 15 mm Hg higher than BP levels obtained by unattended measurements, such as home BP monitoring. Although the prevalence varies between studies, white-coat hypertension can account

Table 4 Binary Logistic Regression Analysis for Age, Marital Status, Education, and Occupation Category in Relation to Good Level of Agreement for Clinical Purposes Between Self-Reported and Measured BW, WC, BMI, and Systolic and Diastolic BP

	Age		Marital Status		Education		Occupation Category	
	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI	Odds Ratio	95% CI
BW	1.008	0.921-1.102	1.199	0.274-5.250	0.337	0.105-1.081	1.219	0.646-2.297
WC	0.946[a]	0.908-0.986	1.420	0.722-2.792	0.938	0.559-1.576	0.810	0.609-1.077
BMI	1.010	0.939-1.085	0.719	0.230-2.248	0.462	0.187-1.141	1.217	0.725-2.044
Systolic BP	0.990	0.955-1.026	1.020	0.557-1.867	1.147	0.718-1.834	0.891	0.689-1.151
Diastolic BP	0.949[a]	0.914-0.986	1.762	0.955-3.250	0.789	0.490-1.271	0.915	0.707-1.183

Abbreviations: BMI = body mass index; BP = blood pressure; BW = body weight; WC = waist circumference.
[a] $P < .05$.

for up to 30% to 40% of people (and >50% in the very old) with an elevated ambulatory BP.[38] Recent meta-analyses of the few available prospective studies have indicated that home BP monitoring better predicts cardiovascular morbidity and mortality than office BP.[38]

The present study also showed that the most self-reported height, BW, and BMI were within the a priori standard and, hence, not deemed clinically meaningful.

Finally, several strengths and limitations of this study should be considered.

A particular strength of this study was the short period (ie, up to 2 weeks) between the collection of Internet-based data and direct, ambulatory measurement. To avoid potential bias that could be introduced by inaccuracies in procedures of taking measurements, standard protocols were applied for all measurements and identical equipment was used throughout the 2 DianaWeb research centers (ie, Milan and Perugia). We can exclude the possibility that participants involved in the measurement validation study might have reported their parameters more accurately than the other DianaWeb participants might have done, because the randomization was conducted after collecting self-reported parameters.

Anyway, because our population consisted of BC patients, the generalization of our results is limited. In fact, because DianaWeb women are well aware about the importance of obesity and WC as risk factors for BC, this might result in a slight misreporting of BW, height, and WC. Moreover, our sample size is adequate to extend the results of the validation study to the whole DianaWeb cohort (20% of women enrolled, and no significant difference in all demographic characteristic); however, it might not be large enough to generalize the results to all the Italian women.

Finally, despite our efforts to minimize the risk of data entry errors (ie, by establishing data entry parameters and limits of validity), we have observed that it is possible that some women in the DianaWeb study made data entry errors. In the future, the data collection system would ideally question not only data entered outside of a typical range, but also data reported below or above an expected range compared with earlier data entries.

Conclusion

Although researchers are often critical of self-reported measures in epidemiological studies, the self-reported height, BW, BMI, WC, and BP in our samples can be considered as valid for patients in the DianaWeb study.

In addition, the classification accuracies of overweight/obesity and central obesity were acceptable, and these data can be useful for our etiological research.

In our Internet-based study, we provided the measurement methods in text format with pictures; McEneaney and Lennie[28] suggest that video instruction can improve reliability and accuracy of self-measurement of WC compared with written instruction. To increase accuracy of anthropometric and BP measures in the DianaWeb study, written instructions could be integrated with a standardized, easy-to-follow video instruction. The development of a smartphone app could be useful to ease the input of data required by the study.

Finally, the slight misreporting of hypertension observed in our study reminds us of the importance of a careful interpretation of data when self-reported indicators are used in scientific studies.

Clinical Practice Points

- Researchers are often critical of self-reported measures in epidemiological studies, because individuals might tend to overestimate or underestimate those parameters.
- In our substudy of the DianaWeb cohort, Bland–Altman analysis showed a close agreement for self-reported and ambulatory-measured height, weight, and BMI.
- On the contrary, women overestimated WC and underestimated BP.
- Cohen κ statistics showed fair agreement only for hypertension.
- Binary logistic regression analysis showed that BMI and diastolic BP self-measurements were biased according to age.
- These results suggest that self-reported height, weight, and BMI are satisfactorily accurate for patients in the DianaWeb study, and that these data can be useful for our research.
- To increase accuracy of WC and BP measures in the DianaWeb study, written instructions could be integrated with a standardized, easy-to-follow video instruction.
- The development of a smartphone app could be useful to ease the input of data required by the study.

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Disclosure

The authors have stated that they have no conflicts of interest.

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