Weight perception and self-rated health: are there differences between cancer survivors and non-cancer survivors?

Kayoung Lee

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Abstract

Purpose To compare relationships between self-perceived weight and self-rated health (SRH) between cancer survivors and non-cancer survivors.

Methods A cross-sectional study based on the 2014–2019 Korea National Health and Nutrition Examination Survey was conducted for the associations of self-perceived weight status, measured BMI categories, and combined categories by self-perceived weight and measured BMI with SRH in 1622 cancer survivors and 29,903 non-cancer survivors using complex samples ordinal regression analysis after adjusting for sociodemographic factors, health behaviors, and concurrent diseases.

Results Compared to the comparison group (those who were normal weight and self-perceived as average weight in non-cancer survivors), adjusted odds for poorer SRH were higher in cancer survivors and non-cancer survivors who were underweight and self-perceived as underweight (adjusted odds ratios [aORs], 2.69 for non-cancer survivors; 2.62 for cancer survivors), those who were normal weight but self-perceived as underweight or overweight (aORs, 1.69–2.38 for non-cancer survivors; 2.34–3.78 for cancer survivors), and those who were overweight and self-perceived as overweight (aORs, 1.52 for non-cancer survivors; 2.42 for cancer survivors). In cancer survivors, the odds for poorer SRH were greater for those who were normal weight and self-perceived as average weight (aOR = 1.84), whereas the odds were not significant for those who were underweight or overweight and self-perceived as average weight. In non-cancer survivors who self-perceived as average weight, the odds for poorer SRH were significant in those with underweight (aOR = 1.35) or overweight (aOR = 0.84).

Conclusion According to actual weight status, the association between self-perceived weight and SRH may differ between cancer survivors and non-cancer survivors.

Keywords Cancer survivors · Non-cancer survivors · Body mass index · Self-perceived weight · Self-rated health

Introduction

Self-rated health (SRH) is a subjective measure of health that is typically defined by responses to a single question like “How do you rate your health?” SRH is considered a health indicator that measures a person’s overall health, taking into account both physical and psychological factors [1–3]. SRH has been a predictor of mortality in general populations [4] as well as patient groups [5, 6]. In oncology, SRH has been found to be a predictor of survival in advanced malignant disorders and a variety of different cancers [7–9].

The negative assessment of SRH in cancer patients has been influenced by a number of factors. Those factors were functional dependence, depressive symptoms [10], the presence of a greater number of comorbidities [11], adverse events related to treatment modalities [12], low education, diabetes, cardiovascular disease, and age [13].

A link between self-perceived weight and SRH has also been proposed. Given that efforts to achieve relatively important health-related goals, such as a sense of self-worth, might influence SRH [14], self-perceived weight may reflect self-worth. In studies on the general population, SRH or health-related quality of life has been linked to self-perceived weight or weight misperception [15–19]. Weight misperception is prevalent (estimated to be as high as 15 to 43%), according to the findings of studies conducted in the general population [20], and the relationships of weight perception with SRH and quality of life differ depending on...
actual weight status [15–18]. Some of these studies have found that the quality of life seems to be better when people perceive their weight as normal, whether they are underweight or overweight [17, 18]. By comparison, overestimation of weight status by those who are of healthy weight is related to lower quality of life [18].

Because cancer patients may be more sensitive to health indicators like weight, the association between self-perceived weight and SRH may differ between cancer survivors and non-cancer survivors. On the other hand, there are few studies on whether weight perception is related to SRH in cancer survivors, though there is one that examines the factors related to weight misperception [21]. The way people behave and respond to health promotion is heavily influenced by how they perceive it [22]. Self-perceived weight in cancer survivors may have a detrimental effect on their desire to become healthier and their assessment of their health. Understanding the relationship between self-perceived weight and SRH across the cancer care continuum has the potential to influence the development of supportive resources and programs designed to address patient needs and alleviate weight-related worries.

This study’s hypothesis was that the SRH of cancer survivors would be worse than that of non-cancer survivors and that there would be a difference in the relationship between self-perceived body weight and SRH in cancer survivors and non-cancer survivors. Thus, this cross-sectional study aimed to compare the relationship between self-perceived weight and SRH in cancer survivors and non-cancer survivors using data from the Korea National Health and Nutrition Examination Survey (KNHANES).

**Methods**

**Subjects**

The KNHANES 2014–2019 was used in this investigation. KNHANES was designed and managed by the Korea Disease Control and Prevention Agency to assess the health and nutrition status of the Korean people and provide basic data for health policy formulation [23]. The original data is available to the public on the Korea Disease Control and Prevention Agency’s website (https://knhanes.kdca.go.kr/knhanes/sub03/sub03_01.do.). KNHANES data were collected using a rolling sample strategy that included a complex, multistage, stratified probability cluster survey [24]. Of 37,916 adults aged 19 to 80 years, this study included 1622 cancer survivors and 29,903 non-cancer survivors with data for study variables, including SRH, self-perceived weight, anthropometric data, and confounding variables. Self-response questionnaires about cancer diagnosis were used to identify cancer survivors. Non-cancer survivors were defined as individuals who had never been diagnosed with cancer.

Written informed consent was obtained from all the participants. The current study and the original KNHANES 2014–2017 were classified under the exemption category for ethical review in the Bioethics and Safety Act. The ethical review board of the Korea Disease Control and Prevention Agency approved the KNHANES 2018–2019 [23].

**SRH, self-perceived weight, BMI, and covariates**

Self-response questionnaires were used to assess SRH. The SRH survey had a single question (“How is your general health?”) and five responses (“very good,” “good,” “fair,” “poor,” and “very poor”). Subjects who responded “very good” or “good” were grouped together in “good,” while those who responded “poor” or “very poor” were grouped together in “poor,” and responses to SRH were then divided into three categories (“good,” “fair,” and “poor”). SRH has been found to have moderate test–retest reliability and a difference in reliability depending on sociodemographic factors [25, 26].

Trained study assistants took weight and height measurements. The body mass index (BMI) was computed by dividing the weight in kilograms by the height in meters squared. According to the 2018 Korean Society for the Study of Obesity Guideline for the Management of Obesity and the Asia–Pacific area criteria of the World Health Organization, BMI was classified as follows: 18.5 kg/m² (underweight), 18.5–<23.0 kg/m² (normal weight), and ≥23.0 kg/m² (overweight) [27, 28].

In self-administered surveys, five categories of self-perceived weight status were evaluated. “What do you think about your current body shape?” was the query. “very thin,” “somewhat thin,” “just right,” “somewhat fat,” and “very fat” were the five options for this inquiry [23]. When the group self-perceived as “very thin” was included in the underweight group, it accounted for 4.0% of all individuals, but when “very thin” and “somewhat thin” were classed as underweight, it accounted for 16.1% of them, as in prior research [29]. Given that 4.2% of all individuals were underweight by BMI, “very thin” was considered underweight, and “somewhat thin” was considered average weight in this study. Then, these five body shapes were categorized as self-perceived weight status such as underweight (“very thin”), average weight (“somewhat thin” and “just right”), and overweight (“somewhat fat” and “very fat”).

Potential confounding variables were demographics, educational attainment, household income, marital status, current smoking status, alcohol use (for drinking at least once a month for the past year), physical activity (for engaging in high-intensity physical activity for >75 min/week, or moderate-intensity physical activity for >150 min/week, or...
a mixture of moderate-intensity and high-intensity physical activity [1 min of high intensity is 2 min of moderate intensity], functional status, medical history of depression, and medical history of hypertension, diabetes, or dyslipidemia.

Statistical analyses

All analyses were weighted to account for the multistage, clustered probability sampling for KNHANES. Complex samples chi-square test was applied to compare categorical variables between cancer survivors and non-cancer survivors. Complex samples chi-square test was used to compare BMI, self-perceived weight, and the combination of BMI category and self-perceived weight status by SRH in cancer survivors and non-cancer survivors, respectively. Complex samples chi-square test was performed to evaluate the relationship between self-perceived weight status (or BMI category) and poorer SRH after adjusting for the covariates and BMI category (or self-perceived weight status) in cancer survivors and non-cancer survivors, respectively. The same model was used to examine the relationship between the combination of BMI category and self-perceived weight status and poorer SRH after adjusting for the covariates in cancer survivors and non-cancer survivors, respectively as well as among all subjects. In a separate analysis of cancer survivors and non-cancer survivors, individuals of normal weight and the self-perceived average weight in each group were used as a comparison group. In the integrated analysis of cancer survivors and non-cancer survivors, non-cancer survivors who were normal weight and self-perceived as average weight were defined as a comparison group. In a separate analysis of cancer survivors and non-cancer survivors, respectively as well as among all subjects. In a separate analysis of cancer survivors and non-cancer survivors, the combination of BMI category and self-perceived weight status was evaluated using complex samples ordinal regression analysis was performed to evaluate the relationship between self-perceived weight status (or BMI category) and poorer SRH in cancer survivors and non-cancer survivors, respectively. The IBM Statistical Package for the Social Sciences, version 27 software was used to conduct the analyses (IBM Corp., Armonk, NY, USA).

Results

The health status of 31.1% of cancer survivors and 16.6% of non-cancer survivors were rated as poor. Cancer survivors were more likely than non-cancer survivors to self-perceive their weight as underweight or average weight, self-perceive as underweight even when they were normal weight or as an average weight while overweight, be women, be older, have lower educational attainment and household income, have spouse, and suffer from depression and chronic diseases. Stomach, breast, cervical, and colorectal cancer were the most prevalent cancers diagnosed among cancer survivors (Table 1).

Table 2 presents the relationships between weight-related characteristics and SRH in cancer survivors and non-cancer survivors, respectively. SRH was poorly rated in both non-cancer survivors and cancer survivors who

| Table 1 | The comparison of self-rated health, weight-related factors, and other characteristics between cancer survivors and non-cancer survivors (n = 31,525) |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|         | Non-cancer survivors (n = 29,903)                                                                                      | Cancer survivors (n = 1622)                                                                                           | P-value* |
|         | n                        | %             | n          | %             |                                      |
| Good    | 8239                     | 31.6          | 303        | 19.9          | <0.001                               |
| Fair    | 14,474                   | 51.8          | 773        | 48.9          |                                      |
| Poor    | 5349                     | 16.6          | 546        | 31.1          |                                      |
| BMI category |                            |                            |            |                |                                      |
| <18.5 kg/m² | 1177                     | 4.2            | 62         | 3.7           | 0.108                                |
| 18.5–<23 kg/m² | 11,541                   | 39.0          | 672        | 41.5          |                                      |
| ≥23 kg/m² | 17,084                   | 56.7          | 884        | 54.7          |                                      |
| Self-perceived weight |                            |                            |            |                |                                       |
| Underweight | 1219                     | 3.9            | 109        | 5.7           | <0.001                               |
| Average weight | 15,333                   | 52.3          | 888        | 54.5          |                                      |
| Overweight | 12,605                   | 43.8          | 612        | 39.8          |                                      |
| BMI/Self-perceived weight |                            |                            |            |                | <0.001                                |
| <18.5 kg/m²/Underweight | 415                     | 1.5            | 33         | 1.9           |                                      |
| <18.5 kg/m²/Average | 717                     | 2.6            | 28         | 1.8           |                                      |
| <18.5 kg/m²/Overweight | 7                      | 0.0            |            |               |                                      |
| 18.5–<23 kg/m²/Average | 676                     | 2.1            | 68         | 3.4           |                                      |
| 18.5–<23 kg/m²/Overweight | 9154                   | 32.0          | 532        | 33.7          |                                      |
| ≥23 kg/m²/Average | 1451                   | 5.1            | 68         | 4.4           |                                      |
| ≥23 kg/m²/Overweight | 114                     | 0.3            | 6          | 0.3           |                                      |
| ≥23 kg/m²/Average weight | 5416                   | 17.7          | 328        | 19.1          |                                      |
| ≥23 kg/m²/Overweight | 11,123                  | 38.7          | 542        | 35.4          |                                      |
| Women | 17,314                   | 49.8          | 1013       | 62.3          | <0.001                               |
| Age, 60–80 y | 10,631                   | 22.8          | 1020       | 52.9          | <0.001                               |
| Education, < High school | 8800                  | 22.4          | 767        | 40.5          | <0.001                               |
| Household income < 2nd quartile | 13,283                  | 39.0          | 904        | 48.7          | <0.001                               |
| Marital status, With spouse | 20,750                  | 65.8          | 1230       | 77.4          | <0.001                               |
| Current smoker | 5018                    | 21.3          | 124        | 8.7           | <0.001                               |
| Alcohol drink ≥ 1/month | 15,502                  | 58.8          | 563        | 38.1          | <0.001                               |
| Regular physical activity | 12,528                  | 49.4          | 643        | 43.4          | 0.001                                |
| Depression | 1354                    | 4.0            | 104        | 6.1           | 0.015                                |
| DM, HT, or dyslipidemia | 10,493                  | 28.3          | 835        | 48.0          | <0.001                               |
| Limitation of activity | 2333                    | 6.1            | 249        | 13.8          | 0.001                                |

*Values represent unweighted number and estimated %

BMI, body mass index; DM, diabetes; HT, hypertension

*a Some of the participants had multiple cancers

*Using complex samples chi-square test
### Table 2  Relationships between weight-related factors and self-rated health in cancer survivors and non-cancer survivors

| BMI category                        | SRH in non-cancer survivors |          |          |          |          |          | SRH in cancer survivors |          |          |          |
|------------------------------------|-----------------------------|----------|----------|----------|----------|----------|--------------------------|----------|----------|----------|
|                                    | Good (n = 8239)             | Fair (n = 14,474) | Poor (n = 5349) |          |          |          | Good (n = 303)          | Fair (n = 773) | Poor (n = 546) |          |
|                                    | *n*                          | *%*      | *n*      | *%*      | *n*      | *%*      | *n*                      | *%*      | *n*      | *%*      | *P*      |
| < 18.5 kg/m²                        |                             |          |          |          |          |          |                          |          |          |          |          |
|                                    | 287                         | 27.4     | 550      | 49.9     | 264      | 22.7     | 11                       | 22.9     | 23       | 36.3     | 0.328    |
| 18.5 – < 23 kg/m²                   |                             |          |          |          |          |          | 128                      | 20.2     | 323      | 50.3     | 0.001    |
|                                    |                             |          |          |          |          |          |                          |          |          |          |          |
| ≥ 23 kg/m²                         |                             |          |          |          |          |          | 164                      | 19.5     | 425      | 48.8     | 0.001    |
| Self-perceived weight               |                             |          |          |          |          |          |                          |          |          |          |          |
| Underweight                        | 194                         | 18.9     | 508      | 46.3     | 437      | 34.8     | 12                       | 11.4     | 45       | 45.2     | < 0.001  |
| Average weight                      | 4884                        | 36.6     | 7538     | 50.8     | 2222     | 12.6     | 197                      | 23.7     | 429      | 49.0     | < 0.001  |
| Overweight                         | 3138                        | 26.9     | 6352     | 53.5     | 2617     | 19.6     | 94                       | 16.3     | 294      | 49.4     | < 0.001  |
| BMI/Self-perceived weight           |                             |          |          |          |          |          |                          |          |          |          |          |
| < 18.5 kg/m² / Underweight         | 69                          | 20.4     | 177      | 45.1     | 150      | 34.6     | 4                        | 14.9     | 13       | 41.9     | < 0.001  |
| < 18.5 kg/m² / Average weight      | 215                         | 31.5     | 368      | 53.0     | 109      | 15.5     | 7                        | 31.9     | 10       | 31.1     | < 0.001  |
| < 18.5 kg/m² / Overweight          | 2                           | 42.8     | 3        | 55.8     | 1        | 1.3      |                          |          |          |          |          |
| 18.5 – < 23 kg/m² / 106             |                             |          |          |          |          |          | 176                      | 27.7     | 243      | 35.0     | < 0.001  |
| Underweight                        | 2977                        | 36.8     | 4549     | 50.7     | 1264     | 12.4     | 114                      | 22.4     | 258      | 49.9     | < 0.001  |
| 18.5 – < 23 kg/m² / Average weight |                             |          |          |          |          |          | 352                      | 13.7     | 37       | 58.9     | < 0.001  |
| 18.5 – < 23 kg/m² / Overweight     |                             |          |          |          |          |          | 19                       | 13.7     | 37       | 58.9     | < 0.001  |
| ≥ 23 kg/m² / Underweight           |                             |          |          |          |          |          | 19                       | 21.6     | 47       | 44.1     | < 0.001  |
| ≥ 23 kg/m² / Average weight        |                             |          |          |          |          |          | 370                      | 25.1     | 161      | 49.2     | 0.056    |
| ≥ 23 kg/m² / Overweight            |                             |          |          |          |          |          | 2781                     | 27.1     | 5556     | 53.0     | 19.9     | 0.001    |

Values represent unweighted number and estimated %

*Using complex samples chi-square test

SRH, self-rated health; BMI, body mass index
were either underweight or normal-weight but self-perceived to be underweight.

After adjusting for self-perceived weight and confounding variables, underweight (vs. normal weight) was associated with an increased odds for poorer SRH in non-cancer survivors but not in cancer survivors. Overweight (vs. normal weight) had a 15–34% lower odds for poorer SRH in both groups. After adjusting for BMI and confounding variables, the odds for poorer SRH in individuals who self-perceived as underweight or overweight were 1.78–2.17 times higher in non-cancer survivors and 1.71–1.87 times higher in cancer survivors compared to those who self-perceived as average weight. In non-cancer survivors, the adjusted odds for poorer SRH were 2.37–2.71 times higher in those who were underweight or normal weight but self-perceived as underweight and 1.52–1.70 times higher in those who self-perceived as overweight while being normal weight or overweight compared to the comparison group. When compared to the comparison group, those who were normal weight but self-perceived as underweight had 1.97 times higher odds of having poorer SRH, whereas those who were overweight but self-perceived as the average weight had 42% lower odds in cancer survivors (Table 3).

Figure 1 shows the relationship between the combination of BMI-based weight group and self-perceived weight group and poorer SRH among cancer survivors and non-cancer survivors. Compared to the comparison group (those who were normal weight and self-perceived as average weight in non-cancer survivors), adjusted odds for poorer SRH were higher in those who were underweight and self-perceived as underweight (adjusted odds ratios, 95% CI; 2.62 [1.24–5.53] for cancer survivors, 2.69 [2.08–3.49] for non-cancer survivors), in those who were normal weight but self-perceived as underweight (3.78 [2.46–5.81] for cancer survivors, 2.38 [1.97–2.97] for non-cancer survivors), in those who were normal weight but self-perceived as overweight (2.34 [1.55–3.52] for cancer survivors, 1.69 [1.52–1.87] for non-cancer survivors), and in those who were overweight and self-perceived as overweight (2.42 [2.01–2.91] for cancer survivors, 1.52 [1.43–1.61] for non-cancer survivors). In cancer survivors, the odds for poorer SRH were greater for those who were normal weight and self-perceived as average weight (1.84 [1.49–2.27] vs. the comparison group).

| BMI category | SRH in non-cancer survivors | SRH in cancer survivors |
|--------------|----------------------------|-------------------------|
|              | Model 1 | Model 2 | Model 3* | Model 1 | Model 2 | Model 3* |
| <18.5 kg/m²  | 1.68    | 1.47–1.93 | 1.37    | 1.19–1.57 | 1.32    | 1.14–1.52 | 1.36    | 0.74–2.52 | 1.04    | 0.53–2.03 | 0.91    | 0.50–1.67 |
| 18.5 ~ <23 kg/m² | 1.00 | 1.00 | 1.0 | 1.0 | 1.0 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| ≥23 kg/m²     | 1.22    | 1.16–1.29 | 0.91    | 0.86–0.97 | 0.85    | 0.80–0.90 | 1.08    | 0.88–1.32 | 0.90    | 0.71–1.15 | 0.66    | 0.51–0.86 |
| Self-perceived weight |       |       |         |         |       |         |         |         |         |         |         |
| Underweight    | 3.06    | 2.64–3.56 | 2.66    | 2.28–3.10 | 2.17    | 1.85–2.56 | 2.04    | 1.36–3.05 | 1.99    | 1.26–3.15 | 1.71    | 1.10–2.65 |
| Average weight  | 1.00    | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Overweight     | 1.68    | 1.60–1.76 | 1.80    | 1.69–1.91 | 1.78    | 1.68–1.90 | 1.48    | 1.21–1.81 | 1.56    | 1.25–1.96 | 1.87    | 1.47–2.38 |
| BMI/Self-perceived weight |       |       |         |         |       |         |         |         |         |         |         |
| <18.5 kg/m²/Underweight | 3.28 | 2.52–4.27 | 2.71    | 2.09–3.50 | 2.00    | 0.88–4.55 | 1.36    | 0.64–2.90 | 1.00    | 1.00 | 1.00 |
| <18.5 kg/m²/Average weight | 1.43 | 1.23–1.67 | 1.36    | 1.16–1.60 | 0.92    | 0.34–2.47 | 0.98    | 0.42–2.26 | 1.00    | 1.00 | 1.00 |
| <18.5 kg/m²/Overweight | 0.56 | 0.14–2.30 | 0.47    | 0.09–2.48 | 0.20    | 0.06–2.48 | 0.20    | 0.06–2.48 | 0.10    | 0.03–3.39 | 0.05    | 0.01–2.79 |
| 18.5 ~ <23 kg/m²/Underweight | 2.92 | 2.45–3.49 | 2.37    | 1.97–2.87 | 2.28    | 1.42–3.65 | 1.97    | 1.24–3.13 | 1.00    | 1.00 | 1.00 |
| 18.5 ~ <23 kg/m²/Average weight | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 18.5 ~ <23 kg/m²/Overweight | 1.70 | 1.53–1.88 | 1.70    | 1.53–1.89 | 1.18    | 0.79–1.76 | 1.17    | 0.76–1.80 | 0.80    | 0.42–2.80 | 0.58    | 0.34–1.90 |
| ≥23 kg/m²/Underweight | 1.75 | 1.10–2.79 | 1.31    | 0.85–2.03 | 0.36    | 0.08–1.63 | 0.20    | 0.06–0.72 | 0.10    | 0.03–3.39 | 0.05    | 0.01–2.79 |
| ≥23 kg/m²/Average weight | 0.90 | 0.84–0.97 | 0.84    | 0.78–0.90 | 0.83    | 0.62–1.12 | 0.58    | 0.42–2.00 | 0.58    | 0.42–2.00 | 0.58    | 0.42–2.00 |
| ≥23 kg/m²/Overweight | 1.65 | 1.56–1.75 | 1.52    | 1.43–1.61 | 1.44    | 1.13–1.83 | 1.24    | 0.96–1.60 | 1.00    | 1.00 | 1.00 |

Table 3 Odds ratios* for poorer self-rated health according to weight-related factors in cancer survivors and non-cancer survivors

*Using complex samples ordinal regression after adjusting for age and sex (model 1); age, sex, and BMI category (or perceived weight) (model 2); and age, sex, BMI category (or perceived weight), education, household income, marital status, chronic diseases, functional limitation, depression, physical activity, smoking status, and alcohol use (model 3); the same variables except for weight-related factors in model 3 for the combined category of BMI and perceived weight

SRH, self-rated health; BMI, body mass index

Bold fonts denotes statistical significance (P < 0.05)
whereas the odds for poorer SRH were not significant for those who self-perceived as average weight even though they were underweight or overweight. However, in non-cancer survivors, even though they self-perceived as average weight, the odds for poorer SRH were higher in those underweight (1.35 [1.15–1.59]) and lower in those overweight (0.84 [0.78–0.91]).

**Discussion**

As considered in the hypothesis, cancer survivors experienced twice as many poor SRH as non-cancer survivors in the current study that compared the association between self-perceived weight and SRH of cancer survivors and non-cancer survivors using KNHANES 2014–2019 data. Although there were similarities in the relationship between self-perceived weight and SRH in cancer survivors and non-cancer survivors, there were differences between them, as considered by another hypothesis.

Self-perceived weight was associated with SRH in both cancer survivors and non-cancer survivors, and this association was independent of actual weight status. Individuals who self-perceived their weight as underweight or overweight even if they were normal weight had a higher odds of having a poorer SRH (vs. comparison group of non-cancer survivors) among cancer survivors and non-cancer survivors. In addition, the aOR for poorer SRH was similarly high in those who were underweight and self-perceived as underweight (2.62 [2.01-2.91] for cancer survivors, 1.52 [1.43-1.61] for non-cancer survivors). However, the odds were lower in non-cancer survivors who were overweight but self-perceived as average weight (0.84 [0.78-0.91]).
self-perceived weight and SRH may differ between cancer survivors and non-cancer survivors. In all individuals, cancer survivors who self-perceived their weight as underweight despite being normal weight had the highest odds ratio for poorer SRH (3.78 times), followed by non-cancer survivors and cancer survivors who were underweight and self-perceived as underweight (2.69 times, 2.62 times respectively) compared to the comparison group of non-cancer survivors. In cancer survivors, only a group of normal weight but self-perceived as underweight had a greater aOR for poorer SRH than the control group.

Because the majority of studies on self-perceived weight and SRH have been conducted on the general population [15–18], this study is significant in terms of being undertaken among cancer survivors and non-cancer survivors to compare the association between these groups. These findings may add to previous understanding, as there appear to be none that focus on the relationship in cancer survivors and compare the relationship between cancer survivors and non-cancer survivors. In particular, this study suggests that cancer survivors who self-perceive as underweight despite having a normal BMI have a high likelihood of having a poor SRH, implying that cancer survivors’ self-perceived weight is crucial in SRH evaluation.

Misperception of “healthy weight” was associated with a higher quality of life in Australian adults, while overestimation of weight status by those of healthy weight was associated with lower quality of life [18]. In cross-sectional data from adults aged 18–65 from the Canadian Community Health Survey, perceptions of being underweight or overweight were related to greater odds of suboptimal SRH in both genders, regardless of self-reported BMI [17]. In a nationally representative sample in the USA, young adults who thought they were underweight or overweight reported poorer health than those who thought their weight was normal, regardless of measured BMI [16]. In middle-aged and older Koreans, those who accurately estimated their weight as underweight, regardless of gender or age, and those who accurately estimated their weight as obesity in their middle years were the most likely to have poorer SRH [19]. Another study found that Koreans who misperceived their weight, whether normal or overweight, had a greater odds of having a lower health-related quality of life [15], and even those with a normal weight who perceived themselves as obese were more likely to make efforts to weight control [30].

As a result, both studies on the general population and this study on cancer survivors and non-cancer survivors imply that if normal or healthy weight is perceived regardless of actual weight, SRH or quality of life is likely to be better. The perception of being underweight or overweight/obese, on the other hand, is likely to be associated with a lower quality of life and a poorer SRH. Consequently, these findings indicate that self-perceived weight status may have the potential to impact the evaluation of self-rated health in non-cancer survivors as well as cancer survivors. Self-perceived weight as normal or average, regardless of actual weight, might bring psychological comfort and foster positive thinking about self-rated health [15, 17, 19, 31]. Self-perceived weight outside the normal range may be regarded as a sign of health worsening from the same perspective.

Given the findings of previous studies on cancer survivors for the association between underweight or obesity and high risk of death [32, 33] and the association between poor SRH and worse prognosis [7–9], as well as the findings of the current study on the association between self-perceived weight with SRH in cancer survivors, assessing self-perceived weight as well as actual weight in cancer survivors may be clinically crucial in predicting the prognosis. Since self-assessed health status and self-perceived weight status can be quickly evaluated using questionnaires in clinical practice, these questionnaires combined with weight measurement may be considered. If the patient is found to be in this evaluation’s weight combination group, which is a high-risk category for poor SRH, lifestyle adjustments, psychiatric counseling, or social support may be advised to assist with SRH.

The strength of this study is that representative data were used to compare cancer survivors with non-cancer survivors, which sets it apart from past research on similar topics. Nevertheless, there are limitations to consider. Cross-sectional studies make it difficult to understand the causal relationship between variables. SRH may have an effect on self-perceived weight status, or a higher component may be in control of both SRH and perceived weight status. In the combination of the weight group according to BMI and the self-perceived weight status, there is a difference in the association between these combinations and SRH according to the two weight categorization criteria. Probably the relationship between self-perceived weight and SRH may differ depending on the type of cancer. More research is needed to examine if the association between self-perceived weight and SRH differs depending on the cancer type. Because self-perceived weight may vary according to cultural backgrounds, there are limitations in applying current results to populations with different weight perceptions.

In conclusion, this study found that self-perceived underweight and overweight, regardless of actual weight status, were positively associated with poorer SRH in Korean cancer survivors and non-cancer survivors. However, the relationship between self-perceived weight and SRH may differ between cancer survivors and non-cancer survivors, depending on actual weight status. Cancer survivors who self-perceived their weight as underweight despite having normal weight had the highest odds ratio for poorer SRH in all individuals, followed by non-cancer survivors and cancer survivors who were underweight and self-perceived
as underweight. Longitudinal studies on the relationship between self-perceived weight and SRH would be required to assess the clinical significance of self-perceived weight status in cancer survivors as well as non-cancer survivors.

Author contribution  The author contributed to the study conception, analysis, and writing of manuscript.

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Declarations

Ethics approval and consent to participate  The current study and the original KNHANES 2014–2017 were classified under the exemption category for ethical review in the Bioethics and Safety Act. The ethical review board of the Korea Disease Control and Prevention Agency approved the KNHANES 2018–2019 (approval number: 2018–01-03-P-A, and 2018–01-03-C-A). Written informed consent was obtained from all the participants.

Competing interests  The author declares no competing interests.

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