The Effects of a Provider's Weight and Health Habits on Their Ability to Provide Patient Lifestyle Counseling

Justin K. Maio
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Abstract

Background: Obesity affects 1/3rd of all U.S. adults and is associated with an increased risk of all-cause mortality. Health care providers see patients multiple times a year and are an educational conduit to counsel patients on the benefits of health habits and appropriate weight management. It is a common thought that providers should act as role models to their patients, but many struggle with being overweight themselves. How does this affect patient care? The purpose of this review was to determine how lifestyle counseling to patients is affected when a provider does not follow the health practices they prescribe.

Method: An exhaustive search of the available medical literature was conducted using the OVID, CINAHL, and Web of Science databases with physician weight, health advice, and patient care as search headings. Five articles met the inclusion criteria for final review. A GRADE approach was utilized to assess the quality of the reviewed articles.

Results: Studies indicated that physicians who were of appropriate weight and/or noted healthier lifestyle habits reported higher rates of lifestyle counseling, were more likely to initiate weight loss conversations with their obese patients, and reported higher confidence in their diet and nutrition counseling compared to physicians who did not claim healthy habits or had a high body mass index (BMI). In another study, participants reported higher confidence in health education when it came from a provider who admitted to exercise and healthy nutrition. Other studies, although of limited utility because of poor design, reported similar findings.

Conclusion: It appears beneficial for providers to engage in healthy habits and weight management. Although healthy providers report higher efficacy in their counseling and patients reflect higher confidence and motivation when counseled by healthier providers, no current literature shows the long term efficacy of counseling between healthy vs. non-healthy providers. Future studies should also highlight patient perceptions of obese/non-healthy physicians.

Keywords: physician weight, health advice, patient care, obesity, health habits, counseling

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The Effects of a Provider’s Weight and Health Habits on Their Ability to Provide Patient Lifestyle Counseling

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A Clinical Graduate Project Submitted to the Faculty of the
School of Physician Assistant Studies
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Biography

Justin K. Maio was raised in Kaneohe, Hawaii. In June 2004, he graduated from Oregon State University with Bachelor and Master of Science degrees in Exercise Sport and Science. After four years as an elementary school physical education teacher, he decided he was ready to pursue the challenge of becoming a Physician Assistant. He became a phlebotomist at Tuality Hospital in Hillsboro, Oregon and started physician assistant school at Pacific University in May 2011. Upon graduation, Justin and his wife will relocate to Hawaii where he will practice family medicine and proudly fulfill his commitment as a Native Hawaiian Health Scholar.
Abstract

**Background:** Obesity affects 1/3rd of all U.S. adults and is associated with an increased risk of all-cause mortality. Health care providers see patients multiple times a year and are an educational conduit to counsel patients on the benefits of health habits and appropriate weight management. It is a common thought that providers should act as role models to their patients, but many struggle with being overweight themselves. How does this affect patient care? The purpose of this review was to determine how lifestyle counseling to patients is affected when a provider does not follow the health practices they prescribe.

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**Keywords:** physician weight, health advice, patient care, obesity, health habits, counseling
Acknowledgements

From the bottom of my heart, I would like to thank my wife, family, and friends for their continuing love and support. I would not be where I am today were it not for your inspiration.

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# Table of Contents

Biography ................................................................. 2
Abstract ................................................................. 3
Acknowledgements ..................................................... 4
Table of Contents ...................................................... 5
List of Tables .......................................................... 6
List of Abbreviations..................................................... 6
Background ............................................................. 7
Method ................................................................. 8
Results ................................................................. 9
Discussion ............................................................. 16
Conclusion ............................................................. 19
References ............................................................. 20
Tables ................................................................. 21
List of Tables

Table 1: Risk of Bias and Quality Assessment
Table 2: Summary of Findings
Table 3: Co-variant Analysis of Survey Results for Physician’s Weight Study
Table 4: Disclosure Study Survey and Responses
Table 5a: Impact Study Results-Appropriate Weight to Record an Obesity Diagnosis and to Initiate a Weight Loss Discussion by Personal BMI
Table 5b: Impact Study Results-Physician Beliefs on Personal Health Habits and Self-Efficacy by Personal BMI
Table 5c: Impact Study Results-Secondary Outcome Survey Questions and Results

List of Abbreviations

BMI     Body mass index
Disclosure Study Physician Disclosure of Healthy Personal Behaviors Improves Credibility and Ability to Motivate
GRADE Grading of Recommendations Assessment, Development and Evaluation
Impact Study Impact of Physician BMI on Obesity Care and Beliefs
Nurses’ Body Size Study Nurses’ Body Size and Public Confidence in Ability to Provide Health Education
PHI Personal Health Index
Physician’s Weight Study Does Physician Weight Affect Perception of Health Advice?
Predictors Study Predictors of Canadian Physicians’ Prevention Counseling Practices
SD Standard deviation
The Effects of a Provider’s Weight and Health Habits on Their Ability to Provide Patient Lifestyle Counseling

BACKGROUND

America has a big problem. Americans are obese. In fact, more than one-third of U.S. adults are obese costing the U.S. health care system approximately 150 billion dollars annually. Obesity, characterized as increased amounts of body fat and measured by a BMI greater than thirty, is associated with increased mortality and increased risk of cancer, hypertension, diabetes mellitus, and heart disease. Concentrated efforts such as Healthy People 2010 have failed to curb this epidemic and the problem appears to be getting worse. The rate of adults aged twenty years and older who are obese has risen from 23% of the population in 1990 to 34% of the population in 2008. Seventeen percent of all U.S. children and adolescents are obese, three times the rate from just one generation ago. At the forefront of battling this problem are health care providers. Patients often view their provider as the most credible and respected source of health information. Coupled with the notion that they commonly treat the same patients multiple times a year, providers not only have the opportunity, but are an ideal conduit to provide health counseling to a large portion of the obese and/or overweight population.

A common belief in health care is to “practice what you preach”; health care providers should serve as role models to their patients. Robert M. Centor, MD, associate dean for the Huntsville Regional Medical Center and Director for the Division of General Internal Medicine at the University of Alabama at Birmingham, comments, “How can we recommend lifestyle changes to our patients if we do not believe in those changes strongly enough to apply them to ourselves?” However, some disagree, arguing that it is not a provider’s responsibility to model healthy behaviors. Despite their wealth of knowledge concerning the topic, physicians are still
susceptible to the same obstacles many patients face when it comes to healthy lifestyle habits and weight management. Ajani et al\textsuperscript{4} found that 44 percent of male physicians are overweight, and 6 percent are obese\textsuperscript{4}. A survey in 2008 by Miller et al\textsuperscript{5} demonstrated, out of 760 nurses, 54% were overweight or obese\textsuperscript{5}. How is patient obesity care impacted when the providers delivering it struggle with being overweight themselves? If a health care clinician practices healthy habits, is he or she more effective at convincing his or her patients to do the same? Do patients perceive health counseling equally from obese vs. non-obese providers? The purpose of this review is to determine the impact of a provider’s weight and health habits on his or her ability to counsel patients on lifestyle. Knowing the answers to these questions will help in future efforts to fight obesity. It also determines if more focus should be on modifying patient behaviors or on the health habits of their providers.

METHODS

An exhaustive literature search using the OVID, CINAHL, and Web of Science databases was conducted. The terms “physician weight, health advice, and patient care” were entered into the search headings. Bibliographies of the reviewed studies were screened for relevant articles. To be considered for review, articles had to address the issue of how a health care worker’s weight and/or exercise or diet habits (as measured by BMI or appearance) impacted their patient interaction, patient perception, health education, or lifestyle counseling. Randomized controlled trials and cross-sectional surveys from both provider and potential patient perspectives were included. Studies were excluded if they were published in any language other than English or prior to the year 2000. Each study was evaluated to determine its overall quality of evidence based on participants, study design, and risk of biases including selection bias, performance bias, detection bias, attrition bias, and self-reporting bias.
RESULTS

The initial search yielded 86 total studies. Screening for relevancy and eliminating articles that were duplicates or of editorial in nature, resulted in four studies meeting the aforementioned criteria. Upon screening the bibliographies of the four studies, a retroactive search of references yielded one more, bringing the total to five articles for final review. Table 1 demonstrates the risk of bias assessment and overall quality grade of the studies reviewed, followed by a summary of findings for each article in Table 2.

Physician’s Weight Study

Hash et al\textsuperscript{6} attempted to address the issue of how the weight of a provider affected how a patient perceived the health advice he or she was giving. A 43 question survey was developed and broken into three main scales of ten questions each, with the final 13 questions addressing patient demographics and health habits. Scale 1 was subdivided into three subscales regarding physician appearance and reputation (1a), physician physical characteristics (1b), and physician likableness (1c). Scale 2 was also subdivided into three subscales including chance health locus of control (2a), internal health locus of control (2b), and personal health locus of control (2c). Lastly, scale 3 was comprised of two subscales addressing patient perception on advice for weight and fitness (3a), and patient perception on advice for treatment of illness (3b)\textsuperscript{6}.

Five physicians, from multiple offices, were selected based on their appearance and body mass, and agreed to participate in the study by allowing one study author to interview patients while in their office waiting room. Physicians reported their height, weight, and BMI measurements and agreed to be blinded to the results of the survey until the study was completed. Physicians were classified as obese (BMI $\geq$ 30) or non-obese (BMI < 30). Each office was visited randomly four times throughout January 2001 and patients were asked if they
were willing to participate in the survey. Forms of consent were signed if they agreed. Responses to the three scales were graded on an ordinal scale from 1-7.

Each scale was assessed for reliability using Crohnbach’s $\alpha$. Analysis of co-variance was used to check for differences between scale scores and patient BMI. A total of 226 participants completed the survey. Analysis of co-variance indicated that patient BMI was not a significant co-variant when comparing the scale scores of the two physician groups and was thus dropped. Table 3 shows the results of the analysis.

No statistically significant differences were found between the patients of obese physicians and non-obese physicians for the first two scales and their related subscales. Statistically significant differences were found in scale 3 and subscale 3b ($P = 0.038$ and $P = 0.049$), in which the non-obese physician group had higher scores. No explanation was provided on the interpretation of the scores.

Nurses’ Body Size Study

Hicks et al utilized a quasi-experimental post-test only design to see how participant perception of health advice differed if the nurse providing it was “normal weight” or “overweight”. The study was conducted at a large university in upstate New York. Walking traffic comprised the participant pool, consisting of students, faculty, and staff of the university. The survey that was created was administered at two common areas for a two hour period on March 17, 2008. There was no prior notification of the survey taking place, so participants were unaware it was being conducted until they were approached by study personnel. To be included, participants must have been 18 years or older and must have been able to read or speak English.

Two pictures were created and displayed on the survey. One image was of a normal weight woman, approximate dress-size 10/12 while the other image depicted an overweight
woman, approximate dress-size 20/22. Participants were shown one of the images which was chosen at random. Using a visual analysis scale and marking a response ranging from one through ten, participants were asked, “Please indicate on this scale, by placing a line across or through the existing solid line, indicating how confident you would feel in receiving diet and exercise education from this nurse.”

Participant demographic data indicated that both groups were similar in weight measured by BMI, by gender breakdown, and by educational background. Data analysis was conducted using Windows software. An independent t test was conducted, showing that the participants who viewed the image of the overweight nurse felt less confident in her ability to provide education on diet and exercise than the participants who viewed the image of the weight appropriate nurse (P = 0.00). The mean response (standard deviation) for the group who viewed the overweight nurse was 5.8 (2.86) while the group who viewed the normal weight nurse was 7.3 (2.0).

**Disclosure Study**

Frank et al’s research highlighted how a physician’s credibility and a patient’s willingness to follow health counseling were affected by a physician’s disclosure of their own health practices. On various afternoons from November 1997 to April 1998, patients in an Emory University clinic were asked to participate in the study, which involved viewing a video and answering a questionnaire. Participants who agreed were randomly assigned to one of two groups. Both groups watched a similar video in which a female physician provided health education regarding diet and exercise. In the “disclosure group” video, there were an extra 32 seconds where the physician briefly discussed her own personal healthy dietary and exercise
activities and had a bike helmet and an apple visible on her desk. In the “non-disclosure group” video, the physician did not discuss her own health practices and there was no apple or bike helmet displayed. Participants in both groups (66 in the “disclosure group” and 65 in the “non-disclosure” group) were found to be similar in all demographic aspects except for one. The viewers of the “disclosure-video” were more likely to have tried smoking (P = 0.03). After viewing the video, patients answered seven questions using a Likert Scale Rating of 1 through 10. The questions of the survey and its results are displayed in Table 4.\(^8\)

In comparison to those who watched the “non-disclosure video”, the participants that viewed the “disclosure-video” considered the physician to be healthier, reported being more motivated to have healthy habits, and trusted the doctor to a stronger degree regarding the diet and exercise counseling provided.\(^8\)

**Impact Study**

Bleich et al\(^9\) employed a cross-sectional study to determine how physician BMI affected obesity care, physician self-efficacy, perceptions of role-modeling weight-related behaviors, and perceptions of patient trust in weight loss advice. After expert consultation and adjustments based on pilot study recommendations, the final survey was comprised of 49 questions. It was distributed to 500 physicians, all members of The Epocrates Honors panel, who were selected at random and who were either general or family practitioners. With the primary independent variable of interest being BMI, participants were divided into two groups, classified as either overweight or normal. The overweight group was comprised of 268 physicians who reported a BMI of \(\geq 25\). The normal group consisted of the 230 physicians who reported a BMI of \(< 25\). Two respondents were classified as being underweight (BMI \(< 18.5\)) and their responses were not taken into account in the final analysis.\(^9\)
The primary outcome was to assess the appropriate body weight at which a physician would initiate a weight loss conversation or would record an obesity diagnosis in a medical chart. The survey displayed five images of different body sizes varying from normal BMI to class III obese. By choosing an image, participants were asked to select at which patient size they would start a weight loss discussion and record an obesity diagnosis. Other questions addressed how confident the physicians felt about providing diet and exercise counseling, how patients would perceive weight loss recommendations from an obese vs. non-obese provider, and assessed participant health behaviors to determine if they thought it was important to serve as healthy role models to patients.9

The secondary outcome attempted to address physician beliefs regarding patients trusting weight loss advice depending on the weight of the provider. To measure this outcome, two survey questions were used, “Do you think overweight/obese patients are more likely, less likely, or as likely to trust weight loss advice from overweight/obese physicians?” and “Do you think overweight/obese patients are more likely, less likely or as likely to trust weight loss advice from healthy weight physicians?” The results of the Impact study are summarized in Tables 5a, 5b, and 5c.9

No statistically significant relationship was shown when recording an obesity diagnosis based on physician BMI. However, a relationship between the physician’s and patient’s BMI was demonstrated. When the provider’s perception of the patient’s body weight was equal to or exceeded their own weight, the physician was more likely to record an obesity diagnosis (93% vs. 7%, P < 0.001) and more likely to discuss weight loss (89% vs. 11%, P < 0.001). The majority of physicians would initiate a weight loss discussion once a patient was in one of the obese categories, while just a few reported they would counsel a patient in the normal or
overweight classification. Physicians with a normal BMI reported higher rates of weight loss discussions with their patients with class II obesity compared with the overweight/obese physician group (30% vs. 18%, \( P = 0.010 \)).

When examining the participants health habits and reports on self-efficacy of weight loss counseling, fewer obese physicians strongly agreed that “physicians should be role models by maintaining health weight” (56% vs. 72%, \( P = 0.002 \)) and “physicians should be role models by exercising regularly” (57% vs. 73%, \( P = 0.001 \)). Overweight/obese physicians reported lower self-efficacy when providing diet counseling (37% vs 53%, \( P = 0.0021 \)) and exercise counseling (38% vs, 56%, \( P = 0.0001 \)) to obese patients. However, overweight/obese physicians did report higher self-efficacy in prescribing weight loss medication to obese patients (26% vs. 18%, \( P = 0.043 \)) and were more likely to strongly agree with the statement, “I am usually successful in helping my obese patients lose weight” (5% vs. 2%, \( P = 0.034 \)).

Regarding physician beliefs of patient trust on weight loss advice from physicians of normal vs. high BMI, normal BMI physicians were more likely to think that overweight/obese patients would be less likely to trust weight loss advice from overweight/obese doctors (79% vs. 69%, \( P = 0.03 \)).

**Predictors Study**

The goal of this study was to examine the relationship between a physician’s personal health practices and their clinical prevention practices. Frank et al\(^{10}\) developed a survey which assessed a physicians’ smoking, drinking, exercise and diet habits. Based on responses, each participant was assigned a personal health index (PHI) score, with higher scores indicating healthier habits. Scoring for tobacco and alcohol categories were as follows:
### Tobacco Use

- Daily use or >10 cigarettes on days they smoked w/in last month  
  • Point Value 1
- Occasional use or <10 cigarettes on days they smoked w/in last month  
  • Point Value 2
- Past user  
  • Point Value 3
- Never used  
  • Point Value 4

### Alcohol Use

- Women: 4 or more drinks during last episode w/in last month  
  • Point Value 1
- Men: 5 or more drinks during last episode w/in last month  
  • Point Value 1
- Women: averaging 3 drinks/episode w/in past month  
  • Point Value 2
- Men: averaging 3-4 drinks/episode during past month  
  • Point Value 2
- Averaging ≤ 2 drinks during past month  
  • Point Value 3
- No alcohol intake  
  • Point Value 4

Questions on exercise were based on frequency and duration of minimal, moderate, and strenuous exercise. A validated dietary screener was used to assess vegetable and dietary consumption. PHI scores, plus dietary and exercise responses were ranked by quartile. To examine clinical practices, participants responded to several counseling topics (nutrition, exercise, pedometer use, weight management, tobacco cessation, alcohol abuse, cholesterol testing) using one of three responses- 1) Never/rarely, 2) Sometimes, or 3) Usually/always. Scores of each counseling topic were averaged and rounded to the nearest integer for interpretation.10

The survey was promoted in several Canadian Medical Association venues and was mailed to 8100 randomly selected Canadian physicians. There was a 41% response rate with a total of 3213 physicians participating. Physicians who were assigned higher PHI scores were more likely to report that they “usually/always” counseled patients on the assessed counseling topics. Scores by individual health habit correlated with counseling practices. Physicians who did not smoke provided more tobacco cessation counseling. Physicians who drank less often or less
Participants who reported higher levels of exercise and fruit and vegetable consumption were more likely to report exercise and dietary counseling respectively. Physicians with lower BMI were more likely to counsel patients on nutrition, weight, or exercise. Lastly, physicians who agreed that “they will perform better counseling if they have healthy habits” reported higher average rates of performing counseling in each of the assessed topics.¹⁰

**DISCUSSION**

Obesity plagues America. It costs the country billions of dollars every year and, as of 2008, has become the leading cause of death by a chronic disease¹. Even with new physical activity guidelines and health recommendations, the problem is getting worse as close to two-thirds of the American population is overweight, obese, or morbidly obese². Determining if a provider’s weight or own health habits are possible obstacles to optimal obesity care is critical and has serious implications as to how health should be promoted. Even though some controversy exists regarding a health care worker’s responsibility to act as a healthy role model to their patients¹¹, the findings of this review indicate that providers’ health and lifestyle habits can affect their ability to counsel patients on lifestyle and weight management. Three of the five analyzed studies⁶,⁷,⁸ examined the effects of clinician weight and/or health practices on patient perception of health counseling. Hash et al⁶ demonstrated a statistically significant difference in the way patients perceived health advice from obese versus non-obese physicians. Interestingly though, it specifically showed that patients of non-obese physicians had higher confidence scores for general disease treatment, but not necessarily weight control and fitness. The usefulness of this study’s findings is limited, however, due to its design flaw and low quality. The obese physician group was all male and older than the non-obese group, possibly confounding results.
More importantly, it did not take into account the history of the relationship between the provider and patient. Providers who had a successful (or unsuccessful) track history with a certain patient would likely elicit a biased score. The authors described the scales of the questions, but did not give a sample of the survey to show what the questions exactly were. Lastly, it was reported that the non-obese physician group had higher scores, but at explanation of how the scores were derived was not provided.

The Nurses’ Body Size Study\(^7\) indicated that participants showed more confidence in health education counseling when being delivered by a normal weight nurse than when being given by an overweight nurse. It was noted that several participants inquired about the educational background of the nurse depicted by the image. Although it was not assessed by the study, this subtlety could suggest that experience and/or training plays a role in patient perception in addition to provider health habits and weight on counseling. The participant population was isolated to the university atmosphere and the randomization was not described in the study’s methodology, both of which contributed to increasing the risk of bias. This somewhat limited the findings and the overall quality of low.

The Disclosure Study\(^8\) demonstrated the impact of a provider’s health practices on patient confidence of health counseling being given. During a health education video, when a provider discussed her own health habits with patients and placed fruit and exercise equipment in sight of the viewer, the patient perceived the physician to be healthier and reported to be more motivated to exercise and to have a healthy diet when compared to patients who viewed a similar video in which the provider did not discuss her own health practices. Sample size limited the usefulness of these results, but the study is still of moderate quality. Though the Physician’s Weight Study\(^6\) and Nurses’ Body Study\(^7\) were of low quality, their findings were consistent with the Disclosure
Study\textsuperscript{8} suggesting that patient perception and confidence in counseling may be negatively impacted when the physician appears to be overweight or unhealthy.

The remaining two studies\textsuperscript{9,10} addressed how physician health habits impacted their counseling practices and beliefs toward counseling. The results of the research by Bleich et al\textsuperscript{9} showed that physicians with normal BMI were more likely to engage their obese patients in weight loss discussion. Physicians with overweight or obese BMI reported lower self-efficacy than physician with normal BMI when providing lifestyle counseling. The Predictors Study\textsuperscript{10} highlighted how physicians who drank less, smoked less, exercised more, and ate more fruits and vegetables were more likely to report higher rates of counseling concerning alcohol, tobacco cessation, exercise, and diet, respectively. Though minor, the studies’ flaws included their reliance on self-reporting by the physicians who participated and their narrowing of the participant pool by only including general and/or family practitioners. The Predictors Study\textsuperscript{10} proclaimed to use a validated dietary screener to assess the diet of the physician participants, but no description of that tool was given. Overall, both studies had no major limitations and were of moderate quality and usefulness. Neither the Impact Study\textsuperscript{9} nor the Predictors Study\textsuperscript{10} addressed how the efficacy of counseling was affected by provider health, but both did suggest that healthier clinicians were more confident and more likely to counsel on lifestyle.

One study from the original literature search was excluded from the review because it was published in Dutch. The abstract, however, was published in English. Wendel et al\textsuperscript{12} found through a survey of 1000 panel members, that it was important for providers to rode model healthy behaviors. Shockingly though, two-thirds of the respondents would follow the advice of a provider who did not act as a healthy role model. Furthermore, participants who were overweight, smokers, and/or drinkers were more likely to follow the advice from a provider who
had the same unhealthy habit in common. Due to the inherent language obstacle of this study, a risk of bias assessment was not done, and the impact and quality of its findings remain unknown.

**CONCLUSION**

According to the literature included in this review, it seems that providers who engage in healthy habits and manage their weight appropriately are more likely to counsel their patients on lifestyle and more likely to have their counseling received with confidence by their patients. The overall quality and utility of the reviewed studies were low due to the high risk of bias. However, all of the findings were consistent with one another. Coupled with the benefits of healthy diet, exercise, and appropriate weight management, it is suggested that providers try to engage in the healthy practices they prescribe because it positively affects their patient care in obesity treatment in terms of frequency, self-efficacy, and patient perception.

Future research on how patient confidence is impacted by provider weight and/or health habits should be conducted with larger sample sizes, less potential for biases, and with stronger study designs such as randomized controlled trials. If a randomized controlled trial design is utilized, a description of the randomization process should be included. Physicians’ perspectives on the issue are helpful, but the strongest evidence and most useful information would be in determining the differences in efficacy of lifestyle counseling over time from obese/non-healthy providers versus normal weight/healthy providers. More studies demonstrating the power of affect, if any, on the provider having the same unhealthy habit in common with their patient on counseling and advice should be conducted too.
References


Table 1: Risk of Bias and Quality Assessment

<table>
<thead>
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<th>Study Detail</th>
<th>Risk of Bias</th>
<th>Overall Risk of Bias</th>
<th>Quality of Evidence</th>
<th>Comments</th>
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<td>Design</td>
<td>Selection bias</td>
<td>Performance bias</td>
<td>Detection bias</td>
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<td>Quality research (survey)</td>
<td>High risk*</td>
<td>High risk**</td>
<td>High risk***</td>
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<tr>
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<td>Quasi-experimental post-study</td>
<td>High risk: isolated population and no discussion of randomization process</td>
<td>Low risk</td>
<td>Low risk</td>
</tr>
<tr>
<td>131</td>
<td>Quality research (survey)</td>
<td>Low risk (although no randomization process given)</td>
<td>Low risk</td>
<td>Low risk</td>
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<tr>
<td>2313</td>
<td>Cross Sectional Survey</td>
<td>Low risk</td>
<td>High risk</td>
<td>Low risk</td>
</tr>
</tbody>
</table>

*Participants were assigned to groups solely by who their provider was (did not take into account the providers rapport with patient) and sample was made up of a small, isolated population
**Obese physicians were all male and older
***Survey questions were not listed
+National survey sent to 500 primary care physicians in the United States.
Table 2: Summary of Findings by Study

<table>
<thead>
<tr>
<th>Study</th>
<th>Control Group</th>
<th>Study Group</th>
<th>Results Summary</th>
<th>Findings Significant</th>
</tr>
</thead>
</table>
| Does Physician Weight Affect Perception of Health Advice?             | Patients of physicians with normal BMI (23 or less)                           | Patients of physicians with high BMI (33 or greater)                       | - In survey scales 1 and 2 (questions regarding physician BMI and health locus of control), no significant differences between groups were found.  
- In scale 3 (questions concerning perceptions of advice from overweight physicians), patients of normal weight providers reported higher confidence levels in disease treatment counseling than did the patients of high BMI providers.                                                                                               | Yes                  |
| Nurses’ Body Size and Public Confidence in Ability to Provide Health Education | Participants who viewed an image of a “normal weight” nurse (dress size 10/12) | Participants who viewed an image of an “overweight nurse” (dress size 20/22) | - Using a VAS of 1-10, participants indicated how confident they felt in receiving diet and exercise education from the nurse the photo depicted. The mean score of the study group was 5.8 out of 10 versus 7.3 out of 10 in the control group.                                                                                       | Yes                  |
| Physician Disclosure of Healthy Personal Behaviors Improves Credibility and Ability to Motivate | Patients who viewed a video showing a female provider discussing diet and exercise recommendations. | Patients in the study group watched a similar video. However, in addition to diet and exercise recommendations, the female provider discussed her own exercise practices. An apple and a bicycle were also in the camera’s view in the study group video. | - Study group participants considered the provider to be healthier, more believable, and more motivating compared to control group participants (p<0.001).                                                                                                                                                           | Yes                  |
| Impact of Physician BMI on Obesity Care and Beliefs                   | Not applicable+                                                                | Not applicable++                                                           | - Normal BMI physicians more frequently reported initiating weight loss discussions with their class II obesity patients (30% vs 18%).  
- Normal BMI physicians felt more confident in diet and exercise counseling to obese patients (53% vs. 37%)  
- Providers were more likely to record an obesity diagnosis (93% vs 7%) and initiate weight loss discussions (89% vs. 11%) when the patient was perceived to be of equal or greater BMI than the provider.  
- No significant relationship between physician BMI and recording of obesity diagnosis was shown.                                                                                                                                         | Yes                  |
| Predictors of Canadian Physicians’ Prevention Counseling Practices    | Not applicable*                                                                | Not applicable                                                             | *Physicians with higher PHI scores (demonstrating healthier habits) reported higher rates of lifestyle counseling their patients than physicians with lower PHI scores.  
*Physicians with BMI <25 reported higher rates of nutrition counseling, exercise/physical activity counseling, and weight counseling vs. physicians with BMI>25.                                                                                                                   | Yes                  |

+ Physicians with BMI <25 kg/m² (BMI must be >18.5 kg/m²) that responded to a survey

++ Physicians with BMI>25 kg/m² that responded to a survey

*Physicians were divided into groups based on PHI scores based on survey responses.
Table 3: Co-variant Analysis of Survey Results for Physician’s Weight Study

<table>
<thead>
<tr>
<th>Scale</th>
<th>X (SD) Patients of Obese Physicians</th>
<th>X (SD) Patients of Non-obese Physicians</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale 1</td>
<td>39.6 (8.7)</td>
<td>39.8 (10.1)</td>
<td>0.736</td>
</tr>
<tr>
<td>Subscale 1a</td>
<td>9.4 (3.9)</td>
<td>9.6 (5.2)</td>
<td>0.772</td>
</tr>
<tr>
<td>Subscale 1b</td>
<td>12.6 (2.6)</td>
<td>12.8 (2.5)</td>
<td>0.536</td>
</tr>
<tr>
<td>Subscale 1c</td>
<td>12.1 (3.5)</td>
<td>12.7 (3.4)</td>
<td>0.148</td>
</tr>
<tr>
<td>Scale 2</td>
<td>40.9 (10.9)</td>
<td>38.1 (9.4)</td>
<td>0.072</td>
</tr>
<tr>
<td>Subscale 2a</td>
<td>19.3 (5.1)</td>
<td>18.6 (4.7)</td>
<td>0.283</td>
</tr>
<tr>
<td>Subscale 2b</td>
<td>8.4 (4.0)</td>
<td>8.1 (3.5)</td>
<td>0.554</td>
</tr>
<tr>
<td>Subscale 2c</td>
<td>13.3 (5.7)</td>
<td>12.5 (5.5)</td>
<td>0.259</td>
</tr>
<tr>
<td>Scale 3</td>
<td>26.3 (13.5)</td>
<td>31.7 (16.9)</td>
<td>0.038</td>
</tr>
<tr>
<td>Subscale 3a</td>
<td>15.7 (7.8)</td>
<td>17.8 (9.2)</td>
<td>0.075</td>
</tr>
<tr>
<td>Subscale 3b</td>
<td>12.2 (6.9)</td>
<td>14.4 (8.4)</td>
<td>0.049</td>
</tr>
</tbody>
</table>

Table 4: Disclosure Study Survey Questions and Responses

<table>
<thead>
<tr>
<th>Question</th>
<th>Likert Scale Rating</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>How healthy did you think the doctor in the video seemed?</strong></td>
<td>1-2 3-4 5-6 7-8 9-10</td>
<td></td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>3 21 42 32 2</td>
<td>0.001</td>
</tr>
<tr>
<td>Disclosure Group</td>
<td>0 5 30 55 11</td>
<td></td>
</tr>
<tr>
<td><strong>How much did you believe what the doctor in the video told you?</strong></td>
<td>0 8 32 52 9</td>
<td>0.11</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>0 2 26 51 22</td>
<td></td>
</tr>
<tr>
<td><strong>How much did the doctor in the video motivate or encourage you to have healthy habits?</strong></td>
<td>0 6 52 41 2</td>
<td>0.001</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>0 3 26 49 22</td>
<td></td>
</tr>
<tr>
<td><strong>How much did you believe what the doctor told you about diet in the video?</strong></td>
<td>2 8 41 45 5</td>
<td>0.006</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>0 2 25 54 20</td>
<td></td>
</tr>
<tr>
<td>Disclosure Group</td>
<td>2 6 47 42 5</td>
<td></td>
</tr>
<tr>
<td><strong>How much did the doctor in the video motivate or encourage you to have a healthy diet?</strong></td>
<td>0 6 47 42 5</td>
<td>0.006</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>2 6 25 46 22</td>
<td></td>
</tr>
<tr>
<td><strong>How much did you believe what the doctor told you about exercise in the video?</strong></td>
<td>0 8 39 45 8</td>
<td>0.002</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>0 0 22 54 25</td>
<td></td>
</tr>
<tr>
<td>Disclosure Group</td>
<td>0 8 44 47 2</td>
<td></td>
</tr>
<tr>
<td><strong>How much did the doctor in the video motivate or encourage you to exercise?</strong></td>
<td>0 8 44 47 2</td>
<td>0.001</td>
</tr>
<tr>
<td>Non-Disclosure Group</td>
<td>0 6 25 46 23</td>
<td></td>
</tr>
<tr>
<td>Disclosure Group</td>
<td>0 8 44 47 2</td>
<td></td>
</tr>
</tbody>
</table>
Table 5a: Impact Study Results-Appropriate Body Weight to Record an Obesity Diagnosis and to Initiate a Weight Loss Conversation by Personal BMI

<table>
<thead>
<tr>
<th>Patient BMI threshold for.....</th>
<th><a href="#">Patient BMI Image</a></th>
<th>Normal BMI (18.5-24.9 kg/m²)</th>
<th>Overweight BMI (25.0-29.9 kg/m²)</th>
<th>Class 1 Obese (30.0-34.9 kg/m²)</th>
<th>Class 2 Obese (35.0-39.9 kg/m²)</th>
<th>Class 3 Obese (&gt;40 kg/m²)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Physician to record an obesity diagnosis</td>
<td>Physician BMI</td>
<td>Normal BMI (N = 230)</td>
<td>1.6%</td>
<td>0.1%</td>
<td>36.0%</td>
<td>55.0%</td>
<td>6.4%</td>
</tr>
<tr>
<td></td>
<td>Overweight or obese (N = 267)</td>
<td>0.1%</td>
<td>1.5%</td>
<td>42.0%</td>
<td>50.0%</td>
<td>5.6%</td>
<td></td>
</tr>
<tr>
<td>*Physician to initiate a weight loss conversation</td>
<td>Physician BMI</td>
<td>Normal BMI (N = 230)</td>
<td>---</td>
<td>9.3%</td>
<td>72.0%</td>
<td>18.0%</td>
<td>1.1%</td>
</tr>
<tr>
<td></td>
<td>Overweight or obese (N = 267)</td>
<td>---</td>
<td>5.1%</td>
<td>64.0%</td>
<td>30.0%</td>
<td>1.4%</td>
<td></td>
</tr>
</tbody>
</table>

Table 5b: Impact Study Results-Physician Beliefs on Personal Health Habits and Self-Efficacy by Personal BMI

<table>
<thead>
<tr>
<th>Statement on Survey</th>
<th>Normal BMI N = 233</th>
<th>Overweight/obese N = 265</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians should be role models for their patients by.......</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→Maintaining healthy weight</td>
<td>72%</td>
<td>56%</td>
<td>0.002</td>
</tr>
<tr>
<td>→Exercising regularly</td>
<td>73%</td>
<td>57%</td>
<td>0.001</td>
</tr>
<tr>
<td>I feel competent...........</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→Counseling about diet</td>
<td>53%</td>
<td>37%</td>
<td>0.002</td>
</tr>
<tr>
<td>→Counseling about exercise</td>
<td>56%</td>
<td>38%</td>
<td>0.001</td>
</tr>
<tr>
<td>→Prescribing weight loss medications</td>
<td>18%</td>
<td>26%</td>
<td>0.043</td>
</tr>
<tr>
<td>→I am usually successful in helping my obese patients lose weight</td>
<td>2%</td>
<td>5%</td>
<td>0.034</td>
</tr>
</tbody>
</table>

*Percentage based on respondents stating that they “strongly agreed” to the statements

Table 5c: Impact Study Results-Secondary Outcome Survey Questions and Results

<table>
<thead>
<tr>
<th>Secondary Outcome Questions</th>
<th>Normal BMI (N = 233)</th>
<th>Overweight/obese (N = 265)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you think overweight/obese patients are more likely, less likely or as likely to trust weight loss advice from overweight/obese physicians?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→More likely</td>
<td>4%</td>
<td>10%</td>
<td>0.029</td>
</tr>
<tr>
<td>→As Likely</td>
<td>17%</td>
<td>21%</td>
<td></td>
</tr>
<tr>
<td>→Less Likely</td>
<td>79%</td>
<td>69%</td>
<td></td>
</tr>
<tr>
<td>2. Do you think overweight/obese patients are more likely, less likely or as likely to trust weight loss advice from healthy weight physicians?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>→More likely</td>
<td>75%</td>
<td>64%</td>
<td>0.063</td>
</tr>
<tr>
<td>→As likely</td>
<td>19%</td>
<td>28%</td>
<td></td>
</tr>
<tr>
<td>→Less likely</td>
<td>6%</td>
<td>8%</td>
<td></td>
</tr>
</tbody>
</table>