



Body mass index restrictions in fertility treatment: a national survey of OB/GYN subspecialists

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Abstract

Purpose To explore the attitudes of reproductive endocrinology and infertility (REI) and maternal–fetal medicine (MFM) subspecialists regarding the necessity and appropriateness of body mass index (BMI) cutoffs for women seeking fertility treatment.

Methods Members of the Society for Reproductive Endocrinology and Infertility (SREI) and the Society for Maternal Fetal Medicine (SMFM) were invited to participate in a survey querying their knowledge of existing institutional or clinic BMI policies and personal opinions regarding upper and lower BMI cutoffs for a range of fertility treatments, including oral ovulation agents, gonadotropins, and *in vitro fertilization*.

Results Respondents included 398 MFMs and 201 REIs. The majority of REI and MFM providers agreed with upper limit BMI cutoffs (72.5% vs 68.2%, $p = 0.29$), but REIs were twice as likely to support lower limit BMI restrictions compared to MFMs (56.2% vs 28.4%, $p < 0.0001$). Those who supported upper BMI restrictions were more likely to be female and report existing institutional BMI cutoffs. The majority of respondents (99.3%) believed that an official statement to guide clinicians should be issued by a national professional organization.

Conclusions Although practice patterns widely vary, the majority of REIs and MFMs believe that there should be a BMI cutoff above which women should not be offered immediate fertility treatment. Furthermore, there is a reported need for a written statement by a national professional organization to guide clinical practice and to ensure that OB/GYN subspecialists are providing consistent, fair, and safe recommendations to infertile women at the extremes of BMI.

Keywords Body mass index (BMI) · Fertility treatment

Introduction

Obesity is now considered a global public health crisis and is correlated with a dramatic increase in chronic disease, associated health care costs, and mortality [1, 2]. The Centers for Disease Control estimate that over one-third of reproductive-age women were obese in the USA between 2011 and 2014 [3]. Body mass index (BMI), calculated as weight in kilograms divided by meters squared, is an internationally

employed measure used to define obesity. In pregnancy, women who are overweight (preconception BMI ≥ 25.0 and < 29.9) or obese (preconception BMI ≥ 30.0) experience higher rates of pregnancy complications, including miscarriage, gestational diabetes, hypertensive disorders, preeclampsia, preterm delivery, congenital anomalies, labor complications, and Cesarean delivery [4–8]. Conversely, underweight women (preconception BMI ≤ 18.5) may be at increased risk for preterm birth [9].

Extremes of BMI have also been associated with decreased natural fecundity and increased rates of infertility. Possible etiologies in both under- and overweight women include oligo- or anovulation, changes in endometrial receptivity, and diminished oocyte quality or competence [10–13]. Infertility is considered a disease [14], and medically necessary treatments may include treatments ranging from oral ovulation induction agents to *in vitro fertilization* (IVF). However, when using assisted reproductive technologies (ART),

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overweight or obese women may demonstrate lower pregnancy rates, lower live birth rates, and higher miscarriage rates following IVF, intracytoplasmic sperm injection (ICSI), or frozen embryo thaw/transfer cycles [15–18]. Obesity has also been associated with increased odds of IVF cycle cancellation and reduction in number of oocytes retrieved [19, 20]. Meanwhile, underweight women who conceive using ART are at increased risk of miscarriage, preterm birth, and low birth weight [16, 21].

Acknowledging that patients with infertility often require medical treatment, while recognizing that the extremes of maternal BMI may decrease success rates of fertility interventions and increase maternal–fetal morbidity, many providers within the USA and internationally have established BMI cutoffs for fertility treatment [22–24]. However, individual practice patterns vary, cutoffs may be arbitrary, rather than evidence-based, and national or international standardized practice guidelines do not exist. Furthermore, the opinions of women’s health subspecialists, including fertility specialists and high-risk obstetricians, may be vastly different. The objective of our study was to gather information on existing BMI cutoffs in fertility practices, and to explore the opinions of both reproductive endocrinology and infertility (REI) and maternal–fetal medicine (MFM) physicians regarding the necessity and appropriateness of these restrictions. In addition, we sought to compare characteristics of respondents who agreed with, versus those who disagreed with, BMI cutoffs for offering fertility treatment.

Materials and methods

An anonymous survey was distributed to members of the Society for Reproductive Endocrinology and Infertility (SREI) and the Society of Maternal Fetal Medicine (SMFM). The survey included questions about respondent demographics, geographic location, knowledge of existing institutional or clinic BMI policies, and personal opinions on BMI cutoffs for fertility treatment. Participants were also invited to provide anonymous, free-text comments.

In univariate analyses, distributions of categorical variables were compared using a chi-squared test or Fisher’s exact test. Distributions of continuous variables were compared using a *t* test allowing for unequal variances. A logistic regression model was used to determine the associations between age, sex, race, geographic region, specialty, and degree, with a respondent’s training in weight loss counseling, existing clinic or departmental BMI cutoffs for fertility treatment, and personal opinions on BMI restrictions. Respondents who had missing data for any of these variables were excluded from this model. Statistical inference on the odds ratio was based on the Wald statistic, computed from the regression slope

parameter and its standard error. A 95% confidence interval was computed using the approximate normal distribution for logistic regression parameter estimates. This study was deemed exempt by the University of Michigan Institutional Review Board (HUM00059601).

Results

Respondents included 398 MFM and 201 REI providers, representing a response rate of 23% by SMFM members and 20% by SREI members. Survey respondents had a mean age of 49.4 years, and the majority of respondents identified as non-Hispanic white (80.5%). Additional demographic information is provided in Table 1.

Among all respondents, 23.9% practiced in a clinic or department with reported BMI restrictions for specific fertility treatments, while 33.8% were unaware if such restrictions existed (Table 2). For those practices or departments with existing BMI guidelines, the mean upper limit reported for offering IVF was a BMI of 40.8 kg/m² (SD 5.0). For treatments other than IVF, including injectable or oral superovulation or ovulation induction medications, the mean upper limit reported was a BMI of 42.1 kg/m² (SD 6.3) (Table 2).

Among REI providers, 72.5% believed that there should be a BMI above which patients should not be offered fertility treatment. Similarly, 68.2% of MFM specialists agreed with this statement (Table 3). When broken down by specific fertility treatment, REIs were less likely than MFMs to support upper BMI restrictions for injectable and oral medications; however, the vast majority of REIs and MFMs agreed that there should be an upper limit BMI cutoff for women pursuing IVF (Table 3).

Among all respondents, 41.9% believed that delaying immediate fertility treatment in women above certain BMI cutoffs would stigmatize overweight or obese patients, and 42.3% expressed concern that BMI restrictions would prevent timely treatment in women of advanced reproductive age. These views were more frequently shared by providers who disagreed with upper BMI cutoffs, versus those who supported them (Fig. 1). REI physicians more frequently believed that older infertile women who are overweight or obese should be offered immediate fertility treatment, so as not to compromise an abbreviated reproductive timeline (Fig. 1). The majority of respondents (81.5% of MFMs and 70.5% of REIs) recommended preconception MFM consultation for overweight or obese women, and agreed that morbidly obese infertile women should be offered consultation for bariatric surgery prior to attempting pregnancy (86.4% of MFMs and 80.5% of REIs) (Fig. 1). Most respondents (99.3%) also agreed that infertility providers should recommend weight loss to

Table 1 Characteristics of survey respondents

	Overall (<i>N</i> = 607)	Agree with upper BMI restrictions (<i>N</i> = 410)	Disagree with upper BMI restrictions (<i>N</i> = 183)	<i>p</i> value*	Maternal–fetal medicine (<i>N</i> = 398)	Reproductive endocrinology and infertility (<i>N</i> = 201)	<i>p</i> value*
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)		<i>N</i> (%)	<i>N</i> (%)	
Age (years)							
30–35	62 (10.6)	44 (11.2)	18 (9.9)	0.66	33 (8.4)	27 (14.8)	0.06
36–49	210 (35.8)	143 (36.5)	61 (33.7)		146 (37.0)	63 (34.4)	
50+	314 (53.6)	205 (52.3)	102 (56.4)		216 (54.7)	93 (50.8)	
No response	21	18	2		3	18	
Sex							
Male	318 (52.7)	201 (49.3)	110 (60.4)	0.01	202 (51.0)	112 (56.0)	0.25
Female	286 (47.4)	207 (50.7)	72 (39.6)		194 (49.0)	88 (44.0)	
No response	3	2	1		2	1	
Race/ethnicity							
Non-Hispanic white	450 (80.5)	304 (80.9)	136 (79.5)	0.34	292 (80.2)	152 (80.4)	0.05
Non-Hispanic black	27 (4.8)	16 (4.3)	11 (6.4)		22 (6.0)	5 (2.7)	
Hispanic	26 (4.7)	19 (5.1)	6 (3.5)		14 (3.9)	12 (6.4)	
Asian	51 (9.1)	32 (8.5)	18 (10.5)		35 (9.6)	16 (8.5)	
Other	5 (0.9)	5 (1.3)	0 (0)		1 (0.3)	4 (2.1)	
No response	48	34	12		34	12	
Region							
USA, Northeast	162 (27.7)	115 (29.1)	46 (25.7)	0.67	111 (28.4)	49 (26.3)	<0.001
USA, Southeast	119 (20.3)	78 (19.8)	36 (20.1)		68 (17.4)	50 (26.9)	
USA, Midwest	131 (22.4)	89 (22.5)	39 (21.8)		93 (23.8)	33 (17.7)	
USA, Southwest	41 (7.0)	30 (7.6)	11 (6.2)		31 (7.9)	10 (5.4)	
USA, West	116 (19.8)	72 (18.2)	43 (24.0)		87 (22.3)	29 (15.6)	
USA, no region specified	7 (1.2)	6 (1.5)	1 (0.6)		0 (0)	7 (3.8)	
Outside USA	9 (1.5)	5 (1.3)	3 (1.7)		1 (0.3)	8 (4.3)	
No response	22	15	4		7	15	
Training in weight loss counseling							
Yes, I have received formal training	109 (18.5)	79 (19.7)	30 (16.6)	0.17	69 (17.7)	39 (20.4)	0.40
No, but I have acquired the knowledge elsewhere	371 (62.9)	257 (63.9)	110 (60.8)		244 (62.4)	122 (63.9)	
No, I could not provide adequate counseling	110 (18.6)	66 (16.4)	41 (22.7)		78 (20.0)	30 (15.7)	
No response	17	8	2		7	10	

Abbreviations: body mass index (BMI)

**p* values were computed using a chi-square test or Fisher’s exact test (when >20% of cells had expected counts < 5 and at least one cell had expected count < 1) for categorical comparisons and *t* test allowing for unequal variances for comparisons of means

their overweight and obese patients seeking conception. Although 63.9% of REI providers reported knowledge and experience in weight loss counseling, only 20.4% reported receiving formal training in this regard.

In logistic regression, providers who agreed with upper BMI limits were more likely to be female, work in a department with existing BMI restrictions, recommend preconception MFM consultation for overweight or obese women, and disagree with the sentiments that weight

restrictions stigmatize patients and prevent timely access to fertility care (Table 4).

At the opposite BMI extreme, only 37.6% of respondents agreed that there should be a BMI below which patients should not be offered fertility treatment (Table 5). Of these respondents, lower BMI limits were supported for women undergoing IVF (95.4%), injectable medications (94.1%), and oral agents (88.1%). The mean proposed lower limit for all treatments was BMI of 17.3 (SD 1.6). Approximately twice

Table 2 Reported upper BMI restrictions for fertility treatment

	Overall (<i>N</i> = 607)	Agree with upper BMI cutoff (<i>N</i> = 410)	Disagree with upper BMI cutoff (<i>N</i> = 183)		Maternal–fetal medicine (<i>N</i> = 398)	Reproductive endocrinology and infertility (<i>N</i> = 201)	<i>p</i> value*
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	<i>p</i> value*	<i>N</i> (%)	<i>N</i> (%)	
Does your department have a BMI cutoff for fertility treatment?							
Yes	73 (14.0)	69 (19.4)	4 (2.5)	< 0.001	18 (24.7)	55 (28.1)	< 0.001
Yes, for some treatment	52 (9.9)	39 (11.0)	13 (8.0)		2 (0.6)	50 (25.5)	
No	221 (42.3)	131 (36.9)	87 (53.4)		132 (41.1)	87 (44.4)	
Do not know	177 (33.8)	116 (32.7)	59 (36.2)		169 (52.7)	4 (2.0)	
Not applicable	75 (12.5)	54 (13.2)	18 (9.9)		72 (18.3)	0 (0)	
No response	9	1	2		5	5	
What is your BMI cutoff for IVF?							
Mean (SD)	40.8 (5.0)	40.8 (4.8)	40.9 (6.3)	0.98	41.1 (6.5)	40.8 (4.8)	0.84
30–34	5 (4.5)	5 (5.2)	0 (0)	0.19	1 (6.3)	4 (4.2)	0.98
35–39	16 (14.3)	11 (11.3)	5 (33.3)		2 (12.5)	14 (14.6)	
40–44	69 (61.6)	61 (62.9)	8 (53.3)		10 (62.5)	59 (61.5)	
45–49	9 (8.0)	9 (9.3)	0 (0)		1 (6.3)	8 (8.3)	
50+	13 (11.6)	11 (11.3)	2 (13.3)		2 (12.5)	11 (11.5)	
No response	13	11	2		4	9	
What is your BMI cutoff for non-IVF fertility treatment?							
Mean (SD)	42.1 (6.3)	41.9 (5.9)	45.0 (13.2)	0.73	40.9 (6.9)	42.5 (6.1)	0.47
30–34	3 (5.2)	3 (5.5)	0 (0)	0.67	1 (7.1)	2 (4.6)	0.40
35–39	9 (15.5)	8 (14.6)	1 (33.3)		2 (14.3)	7 (15.9)	
40–44	27 (46.6)	26 (47.3)	1 (33.3)		9 (64.3)	18 (40.9)	
45–49	7 (12.1)	7 (12.7)	0 (0)		0 (0)	7 (15.9)	
50+	12 (20.7)	11 (20.0)	1 (33.3)		2 (14.3)	10 (22.7)	
No response	67	53	14		6	61	

BMI body mass index, IVF in vitro fertilization

**p* values were computed using a chi-square test or Fisher's exact test (when > 20% of cells had expected counts < 5 and at least one cell had expected count < 1) for categorical comparisons and *t* test allowing for unequal variances for comparisons of means

as many REI specialists supported lower BMI restrictions compared to MFM providers (56.2% vs 28.4%, $p < 0.0001$).

The vast majority of respondents (99.3%) believed that an official statement or guideline on BMI cutoffs should be issued by a national professional organization. The American Society for Reproductive Medicine (ASRM), the American College of Obstetrics and Gynecology (ACOG), and the Society for Maternal Fetal Medicine (SMFM) were supported by respondents to be the most appropriate organizations to do so (82.2%, 58.3%, and 43.4%, respectively).

Discussion

In our national survey of REI and MFM providers, our findings demonstrate that there is a wide difference of opinion as to whether fertility treatments should be offered to infertile

women at the extremes of BMI. While the majority of REI and MFM respondents agree with upper BMI cutoffs for initiation of fertility treatment, particularly IVF, only 24% of respondents reported existing BMI policies within their clinic or department. Our findings also demonstrate a need for a data-driven, formal statement on BMI guidelines issued by a professional OB/GYN organization such as ASRM, ACOG, or SMFM, due to the vast variation in practice patterns. Furthermore, despite an overwhelming consensus that patients should be counseled on weight loss, only a minority of respondents reported ever receiving formal training in this regard.

Our results are consistent with results from similar survey studies. In a survey of Canadian IVF directors, the median upper BMI limit for allowing IVF was 38 (interquartile range 35 to 40) [22]. Meanwhile, in the USA, a survey of IVF clinics in the Society for Assisted Reproductive Technology database demonstrated that the upper BMI cutoffs for fertility

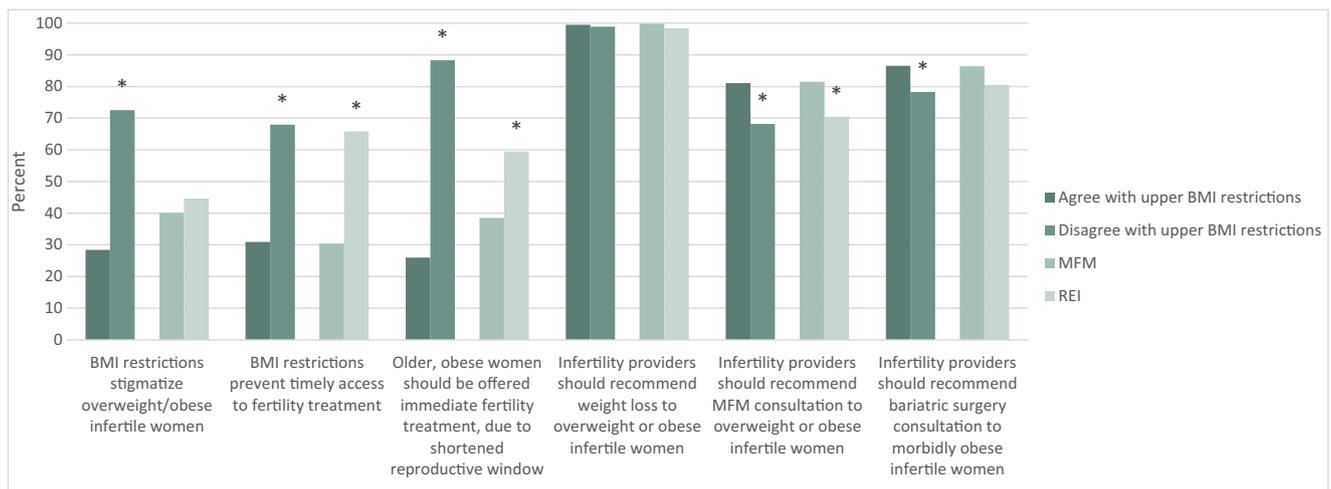
Table 3 Opinions on upper BMI restrictions for fertility treatment

	Overall	Maternal–fetal medicine	Reproductive endocrinology and infertility	<i>p</i> value*
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	
There should be a BMI <i>above</i> which patients should not be offered fertility treatment.	410/593 (69.1)	266/390 (68.2)	142/196 (72.5)	0.29
There should be an upper limit BMI cutoff for IVF.	402/410 (98.0)	261/266 (98.1)	138/142 (97.2)	0.74
If yes, what is your proposed BMI cutoff?				
Mean (SD)	40.1 (5.7)	40.1 (6.1)	40.0 (4.8)	0.77
25–29	3 (0.8)	2 (0.8)	1 (0.8)	0.17
30–34	32 (8.3)	25 (9.9)	7 (5.2)	
35–39	84 (21.7)	50 (19.8)	33 (24.6)	
40–44	184 (47.4)	119 (47.2)	65 (48.5)	
45–49	38 (9.8)	21 (8.3)	17 (12.7)	
50+	47 (12.1)	35 (13.9)	11 (8.2)	
No response	16	11	5	
There should be an upper limit BMI cutoff for injectable medications.	368/410 (89.8)	252/266 (94.7)	113/142 (79.6)	< 0.001
If yes, what is your proposed BMI cutoff?				
Mean (SD)	40.2 (5.9)	40.1 (6.1)	40.5 (5.5)	0.54
25–29	3 (0.8)	2 (0.8)	1 (0.9)	0.51
30–34	31 (8.7)	24 (9.8)	7 (6.3)	
35–39	77 (21.6)	49 (20.1)	27 (24.3)	
40–44	162 (45.4)	116 (47.5)	46 (41.4)	
45–49	33 (9.2)	19 (7.8)	14 (12.6)	
50+	51 (14.3)	34 (13.9)	16 (14.4)	
No response	14	10	4	
There should be an upper limit BMI cutoff for oral medications.	327/410 (79.8)	233/266 (87.6)	91/142 (64.1)	< 0.001
If yes, what is your proposed BMI cutoff?				
Mean (SD)	40.0 (6.0)	40.1 (6.2)	40.0 (5.6)	0.85
25–29	3 (1.0)	2 (0.9)	1 (1.2)	0.95
30–34	30 (9.5)	23 (10.1)	7 (8.1)	
35–39	70 (22.2)	47 (20.7)	22 (25.6)	
40–44	142 (45.1)	105 (46.3)	37 (43.0)	
45–49	24 (7.6)	17 (7.5)	7 (8.1)	
50+	46 (14.6)	33 (14.5)	12 (14.0)	
No response	15	9	6	
Which organization should establish BMI cutoffs for fertility treatment, if an official statement were to be issued?				
American Society for Reproductive Medicine	337 (82.2)	216 (81.2)	121 (85.2)	0.31
Society for Maternal-Fetal Medicine	178 (43.4)	128 (48.1)	49 (34.5)	0.008
American College of Obstetricians and Gynecologists	239 (58.3)	164 (61.7)	73 (51.4)	0.046
Other	5 (1.2)	0 (0)	5 (3.5)	0.005
No statement should be made	3 (0.7)	0 (0)	3 (2.1)	0.04

**p* values were computed using a chi-square test or Fisher’s exact test (when > 20% of cells had expected counts < 5 and at least one cell had expected count < 1) for categorical comparisons and *t* test allowing for unequal variances for comparisons of means

treatments range from 35 to 50 [23]. In that survey, reasons cited for having BMI restrictions in place for obese women

included anesthesia safety concerns during oocyte retrieval, concern for lower IVF success rates, adverse pregnancy



*p<0.05

Fig. 1 Opinions on upper BMI restrictions for fertility treatment. *p < 0.05

outcomes, and technical difficulties with speculum and ultrasound visualization during treatment monitoring [23]. Unlike these prior studies, our survey was distributed to both REI and MFM providers, two subspecialty groups who may be involved in the preconception care of overweight or obese women. Furthermore, our survey also inquired about respondents’ views on underweight women, and fertility interventions other than IVF, including oral or injectable ovulation agents.

Table 4. Characteristics associated with support of upper BMI restrictions (N = 426 respondents)

	Odds ratio (95% CI)*
Female sex	2.32 (1.16–4.66)
Existing departmental BMI restrictions	
Yes	5.37 (2.18–13.3)
No	1.00 (reference)
Do not know	0.95 (0.42–2.14)
Opinions	
Weight restrictions on fertility treatment do <i>not</i> stigmatize overweight and obese women.	3.10 (1.58–6.08)
I am <i>not</i> concerned that BMI restrictions would limit timely access to fertility treatment.	2.53 (1.17–5.49)
Older overweight and obese women should <i>not</i> be allowed fertility treatment, even if they lose the “reproductive window.”	31.5 (14.4–69.0)
Providers should recommend preconception MFM consultation to infertile women who are overweight or obese.	2.99 (1.39–6.43)

BMI body mass index, MFM maternal–fetal medicine

*Logistic regression model included age, sex, race, region, specialty (MGM, REI, other), degree (MPH, PhD, MS, MBA, other), training in weight loss counseling, existing departmental BMI restrictions, and opinions on BMI restrictions

The argument in support of BMI restrictions

In our analyses, we explored the opinions of those who supported, versus those who did not support, BMI restrictions in the setting of fertility treatment. In general, those who supported upper limit BMI cutoffs were less likely to believe that BMI restrictions stigmatized, or delayed access to fertility care, for obese women. Respondents who supported BMI restrictions were also more likely to be female, and less likely to believe that obese, older women should be offered immediate fertility treatment due to a shortened reproductive timeline. By inviting respondents to include free-text comments, the following sentiments were anonymously shared:

“It is fairly well established that obesity is associated with decreased pregnancy rates and is a major contributor to pregnancy complications... I believe that national guidelines set by the ASRM for BMI, similar to that for [number] of embryos to transfer at IVF, will support physicians in impressing upon patients the importance of losing weight before initiating active fertility treatment. I also believe that REIs require more training in metabolism, and fertility programs need to offer appropriate referrals for genuine weight loss management to match the needs of these patients.”

“Infertility treatment is an elective service. Although informed consent and patient autonomy are hallmarks of proper patient care, provision of an elective treatment to women at the extremes of BMI greatly increases potential harm to both the patient and the future offspring that may be conceived.”

“The only specialty that has a chance to have an impact on the obesity epidemic is OB-GYN. Pre-pregnancy

Table 5. Opinions on lower BMI restrictions for fertility treatment

	Overall	Maternal–fetal medicine	Reproductive endocrinology and infertility	<i>p</i> value*
	<i>N</i> (%)	<i>N</i> (%)	<i>N</i> (%)	
There should be a BMI <i>below</i> which patients should not be offered fertility treatment.	219/583 (37.6)	108/381 (28.4)	109/194 (56.2)	< 0.0001
There should be a lower limit BMI cutoff for IVF.	209/219 (95.4)	104/108 (96.3)	103/109 (94.5)	0.75
If yes, what is your proposed cutoff?				
Mean (SD)	17.3 (1.6)	17.4 (1.8)	17.3 (1.4)	0.47
12–15	28 (14.1)	19 (19.6)	9 (8.8)	< 0.001
16–17	66 (32.8)	20 (20.6)	46 (45.1)	
18–22	104 (52.5)	58 (59.8)	47 (46.1)	
No response	11	7	4	
There should be a lower limit BMI cutoff for injectable medications.	206/219 (94.1)	104/108 (96.3)	99/109 (90.8)	0.17
If yes, what is your proposed cutoff?				
Mean (SD)	17.3 (1.6)	17.5 (1.8)	17.2 (1.4)	0.35
12–15	28 (14.3)	18 (18.6)	8 (8.0)	< 0.001
16–17	64 (32.7)	20 (20.6)	44 (45.4)	
18–22	104 (53.1)	59 (60.8)	43 (45.4)	
No response	10	7	4	
There should be a lower limit BMI cutoff for oral medications.	193/219 (88.1)	97/108 (89.8)	93/109 (85.3)	0.32
If yes, what is your proposed cutoff?				
Mean (SD)	17.3 (1.6)	17.4 (1.8)	17.2 (1.4)	0.55
12–15	26 (14.1)	18 (19.8)	6 (6.7)	< 0.001
16–17	64 (34.8)	20 (22.0)	44 (49.4)	
18–22	94 (51.1)	53 (58.2)	39 (43.8)	
No response	9	6	4	

**p* values were computed using a chi-square test or Fisher’s exact test (when > 20% of cells had expected counts < 5 and at least one cell had expected count < 1) for categorical comparisons and *t* test allowing for unequal variances for comparisons of means

weight, weight gain during pregnancy, and gestational diabetes all contribute to obesity in their offspring and probably have epigenetic consequences for generations to come.”

The argument against BMI restrictions

In our analyses, respondents who disagreed with upper BMI cutoffs were more likely to believe that these restrictions would stigmatize and delay access to care for obese women. They were also more likely to believe that older, obese women should receive immediate fertility treatment. The following written comments were anonymously provided by survey respondents who disagreed with BMI restrictions:

“It does not make sense to impose limits based on BMI, when there are no mandatory policies on [elective single

embryo transfer], age, or other medical illnesses that are known to be associated with increased perinatal or neonatal morbidity.”

“It is patently paternalistic to suggest that women should not be able to control their own reproductive choices. Give good counseling about the risks, support weight loss in the overall plan, and let patients be adults and make informed choices.”

“It is discriminatory to penalize obese women by refusing treatment.”

“In general, we strongly advise weight loss before treatment. However, we have never been able to establish an evidence-based [BMI] cut-off. I favor individualized decisions rather than strict guidelines.”

The withholding of fertility treatment from certain medical populations, such as those with HIV, cancer, or other potentially life-threatening diseases, has been deemed inappropriate and unethical [25]. However, guidelines do not exist about the

ethical implications of withholding immediate fertility treatment from patients at the extremes of BMI. Obese patients may experience bias and stigma from their health care providers at baseline, which may lead to avoidance of seeking care, mistrust in the patient–provider relationship, and poorer quality of life [26]. Importantly, the prevalence of obesity varies by race and economic status, with higher obesity rates in non-Hispanic whites, non-Hispanic blacks, Hispanics, and those of lower socioeconomic status [6, 27]. BMI restrictions in the setting of fertility treatment may indirectly discriminate against specific socioeconomic or racial populations. There is already evidence to suggest that minority populations seek fertility care less often [28, 29] and BMI may be a contributing factor to these disparities in access to care. Indeed, the issue of withholding fertility treatment due to patient BMI is a controversial one, particularly in light of a recent randomized controlled trial which found that delaying fertility interventions to allow for lifestyle interventions, compared to immediate fertility treatment, did not result in higher live birth rates of healthy singleton pregnancies [30].

The strengths of our study include a nationally representative sample of fertility specialists and high-risk obstetricians. Because both groups of these subspecialists have the opportunity to provide care for women during the preconception and prenatal periods, involving both REI and MFM specialists is a unique aspect of our survey study. For this same reason, not including general obstetrician/gynecologists is a limitation. Clinical practice type was also not assessed in the survey, and the particular distribution of clinicians practicing in academic, community-based, and private settings may have impacted our results. Another limitation is that a validated survey was not used in our study. However, to our knowledge, ours is the first study to explore the opinions and practice patterns of subspecialty OB/GYNs on a national level.

In conclusion, practice patterns are inconsistent among OB/GYN subspecialists in regard to BMI restrictions and fertility treatments. Differences in opinion between REI and MFM providers suggest different priorities and experiences in patient care. Importantly, there is a need for written consensus guidelines by women’s health leaders. Fertility specialists and high-risk obstetricians should work together to provide consistent, reasonable, and fair patient recommendations to balance the tenets of patient autonomy with *primum non nocere*.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval “All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”

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