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Lifestyle-related factors and access to medically assisted reproduction†

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Lifestyle is increasingly recognized as an outcome-determining factor in assisted reproduction, not only with regard to the cost-effectiveness but also in view of the balance of benefits and risks, including risks related to the welfare of the future child. This document briefly summarizes the evidence concerning the impact of three lifestyle-related factors (obesity, tobacco smoking and alcohol consumption) on both natural and assisted reproduction (IVF) and discusses the implications of this for the practice of medically assisted reproduction in the light of relevant ethical principles. The central question is whether and to what extent fertility treatment of obese, smoking or drinking patients should be made conditional on prior lifestyle changes.

Key words: assisted reproduction / environmental effects / lifestyle / access to treatment / ethics

Introduction

There is a debate about personal responsibility for health in general. Furthermore within the field of infertility, the relevance of personal behaviour or lifestyle-related factors which may adversely affect fertility and reproductive outcome is increasingly discussed. This document will focus on three paradigm cases: obesity, tobacco smoking and alcohol consumption. It will consider the complex issues of personal/patient, professional and societal responsibilities and address the implications of these responsibilities with regard to safety issues and fair or equitable access to fertility treatments.

Background and facts

This section summarizes the evidence concerning the impact of obesity, smoking and alcohol consumption on (i) natural reproductive potential; (ii) IVF results; (iii) pregnancy complications and outcomes and (iv) the health of the future child.

Obesity

The worldwide epidemic of obesity and related morbidity significantly affects fertility and reproduction in both men and women. Currently, a person is classified as overweight at a body mass index (BMI) of $\geq 25 \text{ kg/m}^2$ and obese when the BMI is $\geq 30 \text{ kg/m}^2$ (moderate

obesity ≥ 30 ; severe obesity ≥ 35 ; morbid obesity ≥ 40). The recommended BMI range is between 18.5 and 24.9 kg/m^2 .

Effect of obesity on natural reproductive potential

Obesity negatively affects natural reproductive potential through interference with hormonal and metabolic mechanisms. Female obesity, especially with abdominal fat distribution, leads to a lower ovulation frequency and reduced chances of conception, also in women without anovulatory infertility. It is accepted that women with moderate obesity and an increase in waist circumference ($W:H > 0.85$) halve their spontaneous conception rate. There are strong associations between obesity, Polycystic Ovarian Syndrome (PCOS)—a frequent cause of ovulation dysfunction—and insulin resistance. Although the possible effects of obesity on male reproductive potential have been less studied, it is clear that obesity leads to lower testosterone levels and other endocrine abnormalities, higher scrotal temperature and higher rates of erectile dysfunction. In couples affected by obesity-related fertility problems, weight reduction can improve chances of natural conception.

Effect of obesity on IVF results

The negative influence of obesity on conception is also manifest in results obtained by those turning to medically assisted reproduction. Although most reports show generally poorer outcomes of assisted reproduction for overweight or obese women, there are important

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discrepancies in the literature. This may be due to observational studies using heterogeneous inclusion criteria and outcome measures. The general thrust of the evidence is that when compared with women with a recommended BMI, overweight and obese women need higher doses of gonadotrophins, have a lower chance of pregnancy (decrease around 30%) and an increased miscarriage rate (increase around 30%). As suggested by studies using oocyte donation as a research model, it seems that the negative impact of obesity affects both ovarian and uterine functions. However, the precise mechanisms are still in need of further clarification.

Effect of obesity on pregnancy complications and outcomes

Apart from having a higher miscarriage rate, obese women are at a higher risk of serious pregnancy and peripartum complications, including pre-eclampsia and gestational diabetes, hypertensive disorders, thromboembolic disorders, preterm labour and delivery, macrosomia and increased Cesarean delivery rates. Most of these higher risks (with the exception of spontaneous preterm delivery) are related to the degree of maternal obesity. For example, the risk increase (when compared with women with a recommended BMI) of gestational diabetes ranges from 2-fold in overweight women to 8-fold in women who are morbidly obese (BMI \geq 40). The risk for pre-eclampsia doubles in overweight women and triples in the obese.

On the basis of the available evidence, it seems reasonable to assume that reproduction after weight loss will not only lead to improved fertility, but also to improved reproductive outcomes. However, more data about this are needed.

Effect of obesity on the health of the child

Infants of obese mothers are at an increased risk of birth complications and perinatal death. Moreover, maternal obesity is associated with a significantly higher risk of a range of congenital abnormalities, including neural tube defects (80% increase) and cardiovascular anomalies (30% increase). Furthermore, it has been established that there is a positive association between maternal pregravid BMI and the development of overweight in the child. There is also some evidence of maternal obesity leading to a higher risk of other components of the metabolic syndrome (hypertension, dyslipidaemia, glucose intolerance) developing in the offspring. More generally, the 'fetal programming hypothesis' (fetal conditions may predispose for adult disease) raises concerns about the long-term health perspectives of children born from obese mothers.

Smoking

Smoking is associated with a dose-dependent compromised reproductive outcome. This is true not only for actively smoking women, but also for non-smoking women with smoking partners or otherwise exposed to a smoking environment. A problem for analysis is posed by the lack of unanimity concerning the definition of who is a smoker.

Effect of smoking on natural reproductive potential

The risk of infertility may be twice as high for smokers when compared with non-smokers in the general population. It is suspected that this is due to the vulnerability of gametogenesis to toxic effects of chemical components of tobacco smoke such as cadmium and cotinine. Numerous studies have found that smoking women need more time to become pregnant, are less likely to do so spontaneously and

have a higher risk of miscarriage in the first trimester. Smoking women are also found to reach menopause a few years earlier. Importantly, the impact of passive smoking on women's natural fertility is only slightly less than that of active smoking. In smoking men, sperm quality and concentration are often found to be reduced. There is also evidence that smoking may lead to DNA damage in sperm. However, data on whether smoking effectively influences male fertility are inconclusive. It is estimated that most of the reproductive effects of smoking will be reversed after 1 year after cessation.

Effect of smoking on IVF results

Despite the heterogeneity of the quality of the available literature, there is sufficient evidence that smoking also has a negative influence on IVF outcome, which implies that assisted reproduction may not be able to overcome the effects of smoking on natural fertility. It is accepted that smoking women need up to twice the number of IVF cycles to conceive as non-smokers. The negative impact of smoking is more marked in older women, which may reflect an accelerating effect on oocyte depletion. It has been suggested that the effect of smoking on IVF outcome is comparable to an increase in female age with 10-year, more specifically from age 20 to 30 years. A strong relation between the number of smoking years during the women's life time and her risk of not conceiving through IVF has also been found.

Effect of smoking on pregnancy complications and outcomes

Smoking during pregnancy is regarded as an important preventable risk factor for an adverse pregnancy outcome. Higher risks are reported for spontaneous miscarriage, placental complications, fetal growth restriction, preterm birth, stillbirth and early neonatal death. Several studies have shown that these higher risks are dose-dependent. They are also open to being reversed (as shown in subsequent pregnancies of the same women) by smoking cessation. The relation with lower birthweight is a longstanding and consistent finding that is now regarded as causal. Women smoking 10 cigarettes or more per day bear children that on average weigh 200 g less.

Effect of smoking on the health of the child

Maternal smoking has been associated with a higher risk of having a child with oral-facial clefts. However, there is no conclusive evidence that smoking women are at a higher overall risk of having children with congenital abnormalities. Children of mothers who did smoke during pregnancy are at a higher risk of Sudden Infant Death Syndrome and of childhood respiratory disorders (whether and to what extent this should be attributed to pre- or post natal exposure is difficult to establish). A possible association between smoking during pregnancy and higher risks of childhood leukaemia and other cancers needs further exploration. The same holds for a possible association with behavioural and psychiatric disorders. There is a general concern that the lower birthweight of infants of smoking mothers may expose them to higher risks of adult disease. Finally, indications have been found for a possible adverse effect of maternal smoking on semen parameters in male offspring. This would indeed substantially add to the reproductive burden of smoking.

Alcohol consumption

Alcohol is known to be teratogenic and its consumption has been reported to reduce fertility. Studying effects of alcohol consumption is difficult because of heterogeneous measures and classifications and also because self-reported data tend to underestimate intake.

Effect of alcohol consumption on natural reproductive potential

The number of studies of a possible effect of alcohol consumption on fertility is limited. Although not all results point in the same direction, it seems that alcohol consumption by both women and men adversely affects natural reproductive potential in a dose-dependent way. Reduced conception has been reported already at doses as low as one drink per week.

Effect of alcohol consumption on IVF results

Even less is known about alcohol consumption as a primary risk factor for IVF. The scarce data suggest that female alcohol consumption prior to the IVF attempt adversely affects oocyte retrieval and leads to lower pregnancy and higher miscarriage rates; male drinking leads to more miscarriages and lower live birth rates. These effects were found to be dose-dependent and considerably greater when timing of consumption was closer to the IVF attempt.

Effect of alcohol consumption on pregnancy complications and outcomes

Prenatal alcohol exposure has been associated with a higher risk of miscarriage, fetal death, preterm labour and compromised fetal growth. Indications for these effects are stronger at higher consumption levels. Whether women with a low-to-moderate consumption of alcohol (up to one standard unit per day) are also at a higher risk is inconclusive.

Effect of alcohol consumption on the health of the child

Prenatal alcohol consumption has been associated with adverse effects on embryonic and fetal development during all the stages of pregnancy. The known effects range from physical anomalies to behavioural and cognitive deficits, summarized under the umbrella term of Foetal Alcohol Spectrum Disorders (FASD). The type and extent of the damage is related to the timing, level and duration of the exposure. There are indications that drinking 1–2 units per day negatively affects the child's psychomotor development. In addition to this, women drinking between 2 and 6 units per day may be at a higher risk of a child that will itself develop alcohol-related problems. It is accepted that women consuming six or more standard units of alcohol per day are at risk of having a child with Foetal Alcohol Syndrome (FAS), involving specific facial features, growth retardation and neurodevelopmental abnormalities. A higher risk of having a child with congenital abnormalities is also suspected in women who episodically drink six or more units ('binge drinking'). There is a debate about whether a safe level of drinking during pregnancy exists. There is no evidence that 'light drinking', defined as not more than 1–2 units per week or per occasion, would have adverse effects on the child's cognitive and behavioural development.

Combined effects of lifestyle factors

Studies looking at the combined effect of several lifestyle factors, including obesity, smoking and drinking, have found that increased risks (specifically: delayed conception, preterm labour, low birthweight and fetal growth restriction) were greater than the sum of the expected effects of the separate factors. Since these factors do often occur together, this suggestion of a synergistic effect is highly relevant and needs further exploration.

General ethical principles

The fertility treatment relationship

Fertility treatment takes place in the moral context of the patient–doctor relationship. The patient here is usually (but not necessarily) a couple. As always, the patient–doctor relationship comes into being upon mutual agreement and implies responsibilities for both parties. Within this relationship, the doctor has an obligation to provide medical help. This may include information, counselling, diagnosis, treatment or referral. The patient's responsibility is to provide the doctor with information needed for medical decision-making, to keep appointments and to contribute to a successful outcome by following prescriptions and medical advice, also concerning relevant life-style factors.

Fertility treatment is special in that it is not just concerned with solving or managing a medical problem in the patient, but aims at the birth of a healthy child. This has implications for the moral fabric of the fertility treatment relationship: the interests of the future child should be taken into account not only by the couple requesting medical help, but also by the doctor whose help is being requested. As stated in this Task Force's earlier document on 'The welfare of the child in medically-assisted reproduction', the fertility doctor's causal and intentional contribution to the parental project makes him/her co-responsible for the welfare of the future child. Fertility doctors, therefore, have a double responsibility: to the patient and the child.

Beneficence and non-maleficence

Reproductive assistance, as a form of medical help, can be accounted for in terms of the principle of beneficence. However, medical help often comes at a price: there are usually burdens and risks involved that must be outweighed by the benefits of the treatment, in order for the intervention to be proportional. Treatment with a negative ratio of expected benefits and harms for the patient is in violation of the principle of non-maleficence ('first do no harm') and should therefore not be offered. Other things being equal, an expected positive benefits to harms ratio means that offering treatment is morally acceptable. In this field, given the double responsibility of fertility doctors, the principle of non-maleficence also refers to the welfare of the child. Following the Task Force's earlier statement, the bottomline is that fertility doctors should refuse to provide reproductive assistance 'if he or she judges that there is a high risk of serious harm to the future child'. Even when fertility treatment is morally acceptable, both in view of maternal risks and the welfare of the child, doctors are still under a *prima facie* obligation to reduce reproductive risks to the extent that doing so is reasonably possible and proportional.

In the case of ART, the proportionality of reproductive help may be affected by procedure-related aspects, such as the choice of stimulation regime or the number of embryos transferred, but also by patient characteristics implying a considerably lower effectiveness of the procedure, higher maternal risks and/or risks to the future child. Maternal age, of course, is a well-known example of a proportionality affecting characteristic of this kind, inviting an age limit for IVF with a woman's own (fresh) oocytes somewhere between ages 41 and 44. Lifestyle-related patient characteristics such as obesity, smoking or alcohol consumption differ from age in that the impact they have on the outcome of both natural and assisted reproduction can in principle be avoided or mitigated by lifestyle modification. Although the question of where to draw a line and refuse IVF or other forms of assisted reproduction may eventually also arise in this context, the primary issue here is to what extent fertility doctors should insist on prior lifestyle modification by the woman (and her partner) that may either pre-empt the need for medical assistance or else lead to a greater effectiveness and/or a reduction of reproductive risks.

Autonomy and responsibility

Respect for patient autonomy is another central principle of healthcare ethics. To what extent should it be left to the patient to decide about the acceptability of assisted reproduction? Clearly, patient autonomy cannot be a reason for doctors to provide futile treatment. But if treatment may still be effective (although less than in those with a more healthy lifestyle) and if the patient accepts a less favourable balance of benefits and risks as a price for habits she is not willing to give up, should her choice not be respected?

Reference to patient autonomy does not exempt doctors from their own responsibility to deliver good-quality care. As professionals, they cannot ignore the fact that a better expected outcome could sometimes be achieved through a prior change of lifestyle on the part of the patient. In many patients with anovulatory infertility, such a change may even lead to the restoration of natural reproductive capabilities, thereby exempting the need for assisted reproduction. Pointing this out when counselling patients to whom this would apply is not in violation of patient autonomy. Rather, it is to enable them to make better informed reproductive decisions and thus to take them seriously as autonomous authors of their own lives. Failure to provide this information is at odds with professional responsibility.

If decision-making about assisted reproduction was only a matter of how best to serve the patient's own interests, the more directive stance of making medical help conditional upon lifestyle modification—or serious attempts at achieving this—would amount to 'paternalism', the justification of which would indeed be difficult in case of competent patients. Where addicted patients are concerned, decisional competence may well be compromised. If so, insisting on efforts to stop smoking or drinking (and referring those patients to professional help) may be regarded as aimed at restoring rather than limiting patient autonomy.

However, there are also important non-paternalist reasons for insisting on lifestyle modification (efforts). These have to do with third-party interests in assisted reproduction: those of society and of the future child. Respect for patient autonomy must be balanced with the moral weight of these interests.

The interests of society are at stake when assisted reproduction is collectively funded and (whether or not this is the case) when healthcare costs related to maternal and neonatal complications (including possible long-term negative health effects) are carried by public health insurance. In view of this, patients cannot claim that it should be left to them to decide about the proportionality of treatment under conditions associated with lower cost-effectiveness and adverse reproductive outcomes. Where these conditions are in principle open to change, fertility doctors working in a collectively funded healthcare system are entitled to request a prior change of lifestyle or at least a serious attempt at achieving this. Moreover, the appeal to respect for autonomy ignores how treatment of patients who are obese or who continue smoking or drinking may also affect the welfare of the future child. Even when this remains below the threshold of a 'high risk of serious harm' and would therefore not lead to making ART morally unacceptable without prior lifestyle changes, the fact that certain risks can be avoided through preconceptional lifestyle changes is still morally important. This gives fertility doctors a (further) reason to insist that making such changes should at least be seriously attempted before considering the requested treatment. Doing so is to take patients seriously in their role of future parents and to address them from the perspective of a joint (parental and professional) responsibility for the welfare of the child to be.

Justice

Is it unfair to require prior lifestyle changes (or efforts) from those who happen to be dependent upon medical help? It is true that men and women who are able to reproduce naturally can do so without having to adapt their lifestyle to medical or societal requirements. Although the latter are increasingly also targeted in preconception programmes aimed at reproductive health education, it is left to them whether or not to follow this advice.

However, differential treatment is only unjust when cases are similar in all relevant aspects. The relevant differences with those able to reproduce naturally are doctors' involvement in the conception of the intended child and possible societal funding. Given their active role in the realization of the couple's reproductive plans, medical professionals (and society) are not acting unjustly when requiring patient compliance with lifestyle recommendations for which there is sufficient evidence that this would lead to improved outcomes and reduced risks, both for the woman and the child-to-be.

Two further arguments questioning the justice of this are the following. One is that lifestyles should be respected as expressions of identity and as views about the good life. From this perspective, making assisted reproduction conditional upon prior lifestyle modification (efforts) is really to discriminate against people with certain values and beliefs. Why should obese persons or those with the habit of smoking or drinking not have the same rights to be helped to have children as people with other, socially more accepted, lifestyles?

However, this argument fails. The point of requiring lifestyle modification (efforts) before providing assisted reproduction is not to deny medical help for self-inflicted conditions. Nor should it be seen as a way of 'punishing' those with socially less accepted lifestyles. Rather, it is aimed at enhancing chances of successful treatment while reducing costs and limiting avoidable harm, both with regard to the patient and to the future child.

The second argument takes a different perspective. It stresses that it is far from easy or even impossible for those concerned to change their unhealthy lifestyles, especially when underlying habits are in fact addictions. This is the case for smoking, more than moderate drinking and other forms of drug abuse. But, as recent research indicates, it may to some extent also be applicable to overeating patterns associated with obesity ('food addiction'). There is also a socio-economic dimension to this: unhealthy lifestyles are more common in less advantaged societal strata. Moreover, within groups with a lower socio-economic status (SES), it may be more difficult for individuals to make meaningful changes than for those living among others who tend to regard healthy behaviour as important.

The valid part of this argument is that it would indeed be unfair to insist on changes that are really beyond people's control. However, insisting on making a serious effort may still be justified, especially when help is being offered. The fact that lifestyle modification efforts will be more often required from those in less advantaged socio-economic groups does not make it discriminatory. Nor would it be necessarily stigmatizing. These concerns cannot be construed as valid reasons for not addressing all fertility patients as responsible individuals, citizens and future parents.

Specific ethical considerations

Requiring successful lifestyle modification

Making assisted reproduction conditional upon successful lifestyle modifications can only be justified for characteristics or behaviour of which there is sufficiently strong evidence that without such modifications assisted reproduction either entails a high risk of serious harm for the child or renders treatment disproportional in terms of cost-effectiveness or obstetric risks. For the most part, the fact that the available evidence rests on observationally obtained data of varying quality makes it difficult to justify drawing firm lines.

Although obesity, smoking and low-to-moderate drinking (up to one standard unit per day) may all negatively affect the future child's chances of a normally healthy life, none of these conditions has been shown to lead to the 'high risk of serious harm' required for justifying a refusal of treatment in view of the welfare of the future child. Whether this is different for the combined effects of these (and other) lifestyle-related conditions is a question warranting further research.

However, things are clearly different with regard to more than moderate drinking. Because of a clearly established high risk of serious harm to the future child, assisted reproduction should not be available for women not willing or able to minimize their alcohol consumption. For alcoholic women with a chronic record of heavy drinking, this may be in addition to a possible contra-indication referring to the psychosocial impact of being raised by (an) alcoholic parent(s).

With regard to obesity, the debate is about whether cost-effectiveness and obstetric risks would render assisted reproduction disproportional and if so at what BMI. Existing recommendations and policies requiring a BMI under a certain limit differ considerably (lines being drawn at 30, 32, 35 and 40 kg/m²). This is not only due to remaining uncertainties about underlying data, but also to a different weighing of benefits, risks and costs. Also in order to avoid unjust denial of access, there is a clear need for an evidence-based consensus on this matter.

However, the available data do suggest that treating women with severe or morbid obesity would require special justification.

With regard to smoking, the debate is about cost-effectiveness and justice. On the basis of a generalization of the finding that (for women aged around 20) the negative effect of smoking on the success of IVF was comparable to that of a 10-year increase in age, some have argued that justice would require a 10-year lower age limit for smoking women, i.e. somewhere between 30 and 34. This is on the presumption that at that age their chances of success are indeed as low as for non-smoking women over 40. Whether the evidence warrants this presumption is a matter for debate. Limiting access without such evidence, however, is certainly unjust.

When making assisted reproduction conditional on lifestyle modification, fertility doctors have a clear responsibility to help their patients achieve this (in the following section). A further issue is how far doctors should go in verifying the results. Results are obvious where weight loss is concerned, but not with regard to other lifestyle changes. To the extent that urine or blood sampling would be helpful for this purpose, imposing such controls as a further condition would be morally acceptable.

Requiring lifestyle modification efforts

Patients whose lifestyle may compromise (assisted) reproductive outcomes, but not to the extent that without prior lifestyle modification refusal of treatment would be justified, may still do better by making a serious effort to that effect. There is a broad consensus that fertility doctors should advise their obese and smoking patients that weight loss (ideally aiming at a recommended BMI) and smoking cessation may have important reproductive benefits and support them in trying to achieve the relevant modifications. With regard to alcohol consumption, there is a debate about what the precise message should be. Recommendations calling for total abstinence prior to and during pregnancy seem to be based on a precautionary perspective rather than on hard evidence about harmful effects of low-to-moderate drinking. Commentators have warned that this stance may have the counterproductive effect of undermining the credibility of scientific advice in this matter. Still, fertility doctors can be expected to advise their patients that, given the known dangers of alcohol in pregnancy, it may be better to err on the side of safety.

Whether fertility doctors should go beyond advising lifestyle changes and insist that serious modification efforts must indeed be made before treatment can be considered is a more contentious issue. As indicated in General ethical principles, the case for this is stronger where assisted reproduction is collectively funded, but can also be argued on the basis of paternalistic arguments (aimed at avoiding obstetric risks), or arguments referring to the health of the future child (e.g. aimed at giving it better chances of having a normal birthweight, or avoiding higher risks of congenital malformations).

The fact that in anovulatory infertility a small-to-moderate amount of weight loss may often be enough to restore ovulation and natural fertility is a powerful argument, both from a societal and a paternalistic point of view, to insist that this should indeed be seriously tried before accepting obese patients for treatment. In the case of smoking, a similar argument can be made with regard to the reversible effects on natural fertility. In both cases, the possible benefits to the child are further arguments supporting such a requirement. Where

alcohol consumption is concerned, the reproductive risks of low-to-moderate drinking are not sufficiently established to making efforts to achieve complete abstinence a condition for treatment.

When making assisted reproduction conditional on lifestyle modification efforts, fertility doctors have a clear responsibility to help their patients achieve this. This involves informed referral to lifestyle change assistance in the form of dietary counselling, controlled exercise programmes, behaviour therapy and, when appropriate, medical interventions (pharmacological, surgical). When assisted reproduction is collectively funded, society may well have a responsibility to also provide for such assistance. It would then be reasonable to also incorporate this in an overall assessment of cost-effectiveness.

Lifestyle modifications are time-consuming. A reasonably achievable weight reduction of 5–10% would require a focused effort of 6 months or more. After successful smoking cessation, it takes a further year to reverse most of the negative effects of smoking on reproductive potential and outcomes. The time factor is indeed a complicating element here, since many fertility patients, especially those of more advanced age, already tend to feel that time is running out for them. Requiring a serious attempt at making the relevant changes will for many patients entail a deferral of treatment. If age is not prejudicial, this can be justified if a better reproductive outcome is to be expected as a result. With regard to women approaching the end of their fertile years, however, the gains to be expected from further attempts at lifestyle modification may no longer outweigh the lower effectiveness of delayed IVF or other forms of assisted reproduction. In their case, no such delay can justifiably be imposed.

A difficult issue is how to determine whether a serious effort to lose weight or stop smoking has indeed been made even if success has been limited or wanting. Doctors cannot be expected to police their patients. But they can make it clear that if they are not convinced that a serious try was made, they reserve the right to refuse the wanted treatment.

Recommendations

- (i) In view of the risks for the future child, fertility doctors should refuse treatment to women used to more than moderate drinking who are not willing or able to minimize their alcohol consumption.
- (ii) With regard to obesity and smoking, more data are needed to establish whether assisted reproduction should be made conditional upon prior lifestyle changes (and if so, where the line should be drawn). However, the available data seem to suggest that treating women with severe or morbid obesity would require special justification.
- (iii) Since on the basis of the available evidence, a positive reproductive effect of weight loss and smoking cessation can reasonably be assumed, fertility doctors should insist that a serious effort at achieving these results must be made before treatment can be considered. Because of the implied time delay, this should, however, not be asked from women approaching the end their fertile period.
- (iv) When making assisted reproduction conditional on lifestyle modification or efforts to that effect, fertility doctors should support their patients in achieving the intended results.
- (v) More scientific data about the reproductive effects of obesity, smoking, drinking and other lifestyle-related factors are needed. Fertility doctors have a responsibility to contribute to further scientific research in this area.

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