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The impact of assisted reproduction on perinatal health care

Only fifteen years ago, in 1978, the birth of Louise Brown in England was hailed as one of the major medical achievements of the century. For a short period of time Louise was the most famous human being on earth. Since then, many thousands of infants have followed her path from a test tube in some in vitro fertilization (IVF) laboratory into the welcoming arms of happy parents. While the arms have remained as welcoming as ever, the load that they had to carry, both physically and emotionally, has not always been such that the happiness was easy to sustain. The initial enthusiasm for reproductive technology has turned somewhat sour in the wake of the problems that it brought to families and to society as a whole. Feats that inspired newspaper headlines of heroic achievement a decade ago, now tend to be branded as dubious and irresponsible, while others, such as selective feticide, that were unthinkable a few years ago, are being hailed as safe options whose outcome "may be enhanced by extensive experience with the procedure"[1].

These swings of the pendulum indicate that "assisted reproduction" implies far more than the mere words assistance and reproduction would suggest. It encompasses a whole range of treatments and interventions, but also a number of societal effects that greatly affect the childbearing population and thence perinatal health and perinatal health care. Admittedly, it would be a misrepresentation to suggest that societal effects, such as advancing maternal age and an increasing reliance on fertility treatment without a demonstrated need for it, result directly from developments in assisted reproduction. It would be equally inappropriate, though, to suggest that such developments occur in isolation and bear no relationship to the zeal and glamour with which subfertility became brandished as if it were public enemy number one[2, 3].

While it is not easy to unravel the relative contributions of each of the many elements that profoundly affect today's childbearing population, reproduction enhancing techniques are certainly not among the least influential. This is well recognized and widely publicized, but their impact on perinatal health and the consequences for neonatal care facilities and long-term infant outcome still tend to be glossed over. This is not because of a lack of awareness that assisted reproduction often results not only in "assisted" pregnancies, but also in "problematic" pregnancies. It is mainly because of an underestimation of what "problematic" entails for the mother, the infant, the family, and society as a whole.

Assisted reproduction is often at the root of a multitude of problems. Some of these only materialize after the pregnancy has ended and others tend to continue well beyond the duration of pregnancy. As a consequence they often escape the attention of those who conduct fertility enhancing treatments. Frequently, these persons are not the same ones who have to deal with the complications of pregnancy and childbirth, and they are almost never the ones confronted with the consequences of care after birth and in the long run. This point is clearly exemplified by the full dictionary of new pregnancies that accompanied the rise of assisted reproduction. Notions, such as biochemical pregnancy, clinical pregnancy, ongoing pregnancy, and so forth[4], all help to emphasize that the important issue is not a healthy mother and child, but a pregnancy of whatever description.

Multiple pregnancy

By far the largest problem that assisted reproduction brought to perinatal health care is that of

multiple pregnancy. This is not so much because of the quantity of mothers, but because of the quantity of infants and problems that each pregnancy contributes to the issue. At the same time, it is also the clearest example of how difficult it can be to discern cause and effect in the relationship between assisted reproduction and perinatal health care.

Maternal age	1960–1964	1970–1974	1980–1984
<20	6.9	6.1	5.6
20–24	9.3	8.6	8.9
25–29	11.5	10.7	11.3
30–34	14.4	12.2	13.3
35–39	16.1	14.1	14.1
40+	12.4	9.6	9.5

Table 1. *Rate of multiple births per 1000 births by age of the mother, at the time of her last birthday, in selected 5-years' periods in the Netherlands (after Tas[6]).*

The increasing incidence of multiple pregnancy

There is clear evidence from some countries, such as the Netherlands, Japan, the United Kingdom, and Sweden, that the increase in the rate of multiple births already commenced during the 1970s well before the widespread introduction of assisted reproduction techniques[5–7]. Even today, we do not know to what extent the availability of these techniques has sustained or enhanced trends that already existed beforehand. One thing is certain, though. Trends which occur concurrently in populations tend to influence each other whether it be for the better or for the worse.

Delayed childbearing is a phenomenon that has increased dramatically in developed countries and to some extent also in segments of the population in developing countries[5]. There is no doubt that the increase in maternal age at conception is responsible for a large proportion of the increased incidence of twin pregnancy in the last decades. The effect of both an increase in average maternal age and the age-dependent increase in twin pregnancies is large enough to be discernible at the population level. For example, population data in the Netherlands show that the rate of twin pregnancies roughly doubles from a maternal age of 20 to 30 years (Table 1)[6], whilst the average age at which women give birth to their first child increased with 3 years between 1970 and 1990. Admittedly, there are large differences among countries in the proportion of births occurring amongst women aged 30 or more, but the trends are universal. Thus, in the USA the rate of first births to women aged 30–34 years increased from 8 to 17 per 1000 between 1975 and 1986[5]. In Sweden, it increased from 15.6 to 28.7 per 1000 between 1980 and 1990[8]. There is more than one way in which advancing age at conception and assisted reproduction can facilitate each other in augmenting the rate of multiple pregnancies. Postponing pregnancy until all conditions, however trivial, for the arrival of a new family member are deemed to be fulfilled is an easier undertaking, if medical science can be relied upon to produce a baby when necessary. On the other hand, with advancing age and fading chances of fertility[9,10], assisted reproduction will be resorted to more readily than it would have been at a younger age. When the urgency to achieve pregnancy has to wage war not only against subfertility, but also against the threat of the biological clock[10], both women and their caregivers will be more inclined to put all weaponry in the field promptly[3].

Villar et al.[5] tried to assess the independent effects of the age distribution of pregnant women and the introduction of new assisted reproduction techniques for England and Wales using data on the rate of multiple births, stratified by age of the mother at the time of delivery, between 1977 and 1987[7]. As one would expect, throughout this period, there was a higher rate of multiple births among women aged 30 years or more than among younger women. Commencing in 1983 there was also an increase in the agespecific rate of multiple births. This was noted particularly in women of 30 years or more, but to a lesser extent also in younger women. Furthermore, in England and Wales, after a 40 years' period of a stable, "natural" pattern in the incidence of triplets and higher order births from 1939 to 1979 (approximately 0.15 per 1000 maternities), the rate of these births began to increase in the early 1980s. The rate had already doubled by 1990[7].

Similar data exist in other countries. For instance, in the Netherlands since the beginning of this century, most years went by without the birth of a quadruplet, quintuplet or sextuplet, but this period of relative calm ended after 1979[11]. In 1987, the treshold of 50 triplets per annum was even exceeded for the first time in this century[11]. In Switzerland, Arletta and Duc reported a significant increase in the number of triplets even between 1985 and 1988[12]. In the Netherlands, twin births rose by

31%, but triplet births by 173% in the 15 years from 1975 to 1989[6]. In France, the incidence of twin births increased from 8.8 to 11.2 per 1000 between 1972 and 1989 and that of triplet births from 0.1 to 4.4 per 10,000[13]. In the state of Victoria, Australia, the rate of higher order multiple births tripled from 3.5 per 10,000 in 1982 to 10.9 per 10,000 in 1990[14]. Flanders, with about 68,000 births per annum saw an average of about 140 infants per year from triplet, quadruplet and quintuplet pregnancies as well as twelve times as many infants from twin pregnancies in the 5-years' period from 1988 to 1992[15]. It is selfevident that such developments and their impact on neonatal care facilities have been influenced more by the introduction of assisted conception techniques than by maternal age. A conservative estimate is that about a third of multiple pregnancies and a much higher proportion of high-order multiple infants is directly related to the new wave of assisted reproduction techniques.

The contribution of in vitro fertilization

In the public eye in vitro fertilization is usually seen as the largest contributor to the high rate of multiple pregnancies. Specialists in the field are usually quick to point out that IVF is only a small part of the problem when compared with other techniques of assisted reproduction and especially with non-IVF related use of ovulation induction. This may be true in general and in some countries[13, 16], but it is by no means universal. For instance, in Flanders, IVF was responsible for 17.5% of all multiple pregnancies in 1993, a precentage that is higher than the, already high, 13.1% that could be attributed to other hormonal treatments for infertility[17]. There is thus more to this discussion than meets the eye even if the use of ovarian stimulation appears to be the main culprit[13, 16].

Those who tend to minimize the impact of IVF and its allied techniques on the increasing number and proportion of multiple pregnancies and, thence, on perinatal health care may be right on two counts. First, the number of infants from multiple pregnancies born as a result of IVF constitutes a small proportion of all births. Second, multiple pregnancies that result from this technique may not necessarily bring greater problems for perinatal health care than multiple pregnancies conceived in some other way, including natural conceptions[18]. Overemphasizing these two points is not particularly helpful, however. Among others, it tends to overlook the fact that IVF is currently the most perfect technique, even better than natural conception, for controlling the number of fetuses per pregnancy.

Admittedly, the population-attributable risk of IVF, i.e. the proportion of multiple pregnancies in the population that can be expected to disappear if IVF were to be abolished, is relatively small. However, this is only because a limited number of women undergo IVF and because fertility specialists tend to overlook other elements that were brought about by the introduction of IVF. Even if we accept these omissions (to which we shall refer later), there is still a major issue here. Except for the rare occasions that IVF is accompanied by spontaneous fertilization or monozygous twins, any multiple pregnancy resulting from IVF is the direct consequence of a medical action that has perfect control over this very outcome (i.e. the number of fetuses).

It is, thus, inappropriate to consider multiple pregnancy resulting from IVF as anything else than a medical failure to achieve what one intended to achieve. Considering the ease with which the number of fetuses can be limited[19, 20] it is difficult even to envisage why this failure should be seen as anything else than a deliberate failure. Few women, if any, embark on an IVF programme with the express wish to obtain twins or triplets. For all other women, multiple pregnancy is a medical failure that entails a multitude of risks, physically, emotionally and socially, not only for them, but also for their infants and for society at large. When this occurs in about 1 in 4 or 1 in 5 (Table 2), it is not particularly relevant how large or how small the population-attributable risk is. The risks to the individual, whether it be mother or baby, and the demand on scarce and expensive facilities that could be put to better use, are too great. This applies especially when compared with the simple measure (i.e. limiting the number of embryos transferred per cycle) that is needed to avoid the problem in the first place[19, 20].

Whilst IVF specialist may underplay their contribution to the rate of multiple pregnancies, for each individual women the risk of multiple pregnancy is still greater with IVF than with any of the other reproductive techniques, auch as gonadotrophins or gonadotrophins combined with intrauterine insemination[21]. Clearly, the risk should be smaller as the number of fetuses is more readily controlled than with other reproductive techniques. Data gathered by Drs. Cohen, Lancaster and de Mouzon for the *VIIIth World Congress on In Vitro Fertilization and Alternate Assisted Reproduction* in September 1993, an excerpt of which is presented in Table 3[22], certainly show that the blame attached to IVF is not unjustified. The table indicates that transfer of 3 or more fetuses was still practised with appalling frequency in 1991. This has remained so and will probably remain so for some time to come[23]. It is inevitable that the mystifica-

Author	Country	Year	% Multiple pregnancy
Friedler et al.[57]	Israel	1982–1989	23.6
SPE[15, 17]	Flanders	1992	26.9
		1993	34.0
Medical Research International[58]	USA	1989	24.0
Society for Assisted Reproductive Technology[60]	USA + Canada	1991	30.0
Rufat et al.[52]	France	1987–1989	27.0
FIVNAT[61]	France	1990	28.3
Saunders & Lancaster[62]	Australia + New Zealand	1979–1986	22.2
MRC Working Party[39]	Great Britain	1978–1987	22.8
Sunde et al.[63]	Nordic countries	1981–1987	18.2

Table 2. *Rate of multiple pregnancies with in vitro fertilisation (only data which appear to be reasonable representative for geographically defined areas are included).*

Country	Transfer cycles	Number of transferred embryos 1	2	3	≥4
Australia + New Zealand	4,216	11.6	25.0	57.8	5.6
Austria	364	13.7	17.6	52.5	16.2
Belgium	2,720	12.8	20.3	56.1	11.9
Canada	2,558	15.3	17.6	30.3	36.8
Czechoslovakia	823	39.2	24.5	20.5	15.7
France	15,001	16.1	20.5	38.0	25.4
Germany	4,088	19.5	24.9	55.0	0.5
Greece	3,080	11.8	15.1	32.2	40.9
Israel	3,501	10.0	14.0	25.0	51.0
Italy	325	16.9	16.6	24.9	41.5
Japan	7,610	15.5	19.9	21.3	43.3
Netherlands	2,403	10.5	13.6	37.0	38.9
Scandinavia	6,272	10.9	19.0	51.2	18.9
Slovenia	1,071	28.6	26.1	17.0	28.4
Switzerland	206	25.2	14.1	41.7	18.9
United Kingdom	9,747	12.9	26.7	58.8	1.4

Table 3. *In vitro fertilisation transfer cycles and number of transferred embryos per cycle as reported in the 1991 World Collaborative Report, presented at the VIIIth World Congress on In Vitro Fertilisation and Alternate Assisted Reproduction in Kyoto, Japan, September 12–15, 1993*[22].

tion of high technology (whether it be IVF or any other technique) eventually leads to demystification and from there on to vulgarisation. The result of this process is that increasing access to what is perceived as high technology, usually induces a score of would-be innovators to take it on. More often than not they do so with the same zeal of the pioneers, while usually lacking the restraint that the first steps on an unorthodox path require. This may well be why in Flanders, for example, the contribution of IVF to the total number of multiple pregnancies was still on the increase in 1993[17]. Recent data from the French IVF registry also appear to testify to this effect. Although the number of transfers of 4 embryos decreased in the 1990s[23, 24], the proportion of transfers involving 3 embryos increased from 37.9% in 1992 to 39.1% in 1993[24]. Further technical advances, such as the cryopreservation of embryos, that allows fertilized ova to be used more judiciously and reduces the perceived need to achieve a pregnancy in every cycle[20, 25], are often not available at the smaller centres eager to participate in the assisted reproduction race. Admittedly, such techniques will require appropriate evaluation and assessment of long-term outcome, but currently they may be a reasonable option to contain the epidemic of multiple pregnancies while maintaining a reasonable success rate with IVF[20, 25].

The other option of reducing multifetal pregnancies if and when they occur, although widely practised[1, 26–29], clearly is not a suitable alternative to avoiding the problem in the first place. Irrespective of the optimism with which it is sometimes recommended[1], there is not enough evidence that the reduction in obstetric and perinatal problems runs in parallel with the number of fetuses that is "reduced"[28, 29]. Moreover, the emotional and psychological impact of such a proce-

dure on the pregnant women cannot be overemphasized. Even if women appear to be "back to normal" for most of pregnancy, we know little, if anything, about its impact in the long term. Nor do we know how it influences the remaining siblings or future maternal-infant bonding.

Data, as exemplified in Tables 2 and 3, clearly are a disgrace to a profession that considers not some type of pregnancy, but the well-being of mothers and babies as its prime priority. This applies especially when there is increasing evidence that elective transfer of more than two embryos has less impact on the likelihood of pregnancy than it has on the number of fetuses in such pregnancy[19,30].

Gonadotrophin stimulation also needs to be considered in relation to IVF. While its effect cannot be attributed to IVF per se, there is no doubt that the zeal and excesses of its use largely originate from the development of IVF. Only a few decades ago, general gynaecologists tended to be reluctant or, at least, very cautious in their use of these powerful agents. Ovarian hyperstimulation was seen as highly undesirable and something that needed to be avoided at all cost. The introduction of IVF, however, made maturation of several follicles desirable rather than unwarranted. With it disappeared the widespread fear for ovarian hyperstimulation not only amongst persons who desired to gather a good supply of ova, but also amongst their colleagues who were used to tackle ovulatory problems in a different manner. Ovarian stimulation spread from specialized units to the whole of the specialty and from being perceived as a precise and hazardous procedure to one that requires not much more than a prescription pad. While the latter statement is not devoid of some exaggeration, there is no doubt that the IVF experience is in part to blame for the widespread overzealous use of ovarian stimulation that is considered to be the main contributor to the high number of multiple pregnancies resulting from assisted reproduction[13,16,31]. Clearly, if IVF specialists led the way to the current epidemic of multiple pregnancies, they will also have to lead the way back if they wish to maintain their credibility in the field of perinatal health care.

Problems associated with multiple pregnancy

The problems that multiple pregnancy brings to perinatal health care need hardly be emphasized. Ever since McKeown and Record[32] argued, in 1952, that each additional fetus in utero causes an earlier and more severe curtailment of both fetal growth and length of gestation, the effects of multiple pregnancy on the major perinatal problems "too early" and "too small'" are well recognized. These problems are paramount in high-order multiple pregnancy and the poor outcomes of these pregnancies provide the reason for the current – often misplaced – enthusiasm about selective fetal reduction in early pregnancy[1].

These problems are not negligible in twin pregnancies either and they account for a large part of the excess mortality, both fetal and neonatal, seen in twin as opposed to singleton pregnancies[33]. Powers and Kiely[34] in a population-based analysis of births in the USA, found that the 2.1% twins among more than 7 million live births in 1985 and 1986 accounted for 11.2% of neonatal deaths and 8.4% of deaths in the first year of life. Relative risks of neonatal death and infant death for twins as opposed to singletons were respectively 7.06 (95% confidence interval: from 6.89 to 7.25) and 5.43 (95% confidence interval: from 5.30 to 5.55). The risk of death is not limited to liveborn infants,

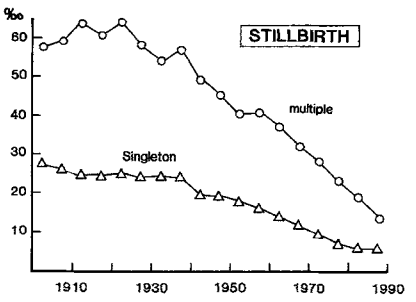

Figure 1. *Stillbirth rate (per 1000 births) in singleton and twin pregnancies between 1900 and 1990 in the Netherlands.*

however[33]. Data from the Netherlands show that throughout the century the risk of fetal death in twin pregnancies was roughly twice that in singleton pregnancies (Fig. 1). It is remarkable that the decrease in perinatal mortality witnessed in the second half of this century has affected singleton and twin pregnancies in roughly the same way, but that the differential in mortality between them has remained relatively stable.

The differential in mortality is to a large extent due to a higher incidence of preterm birth (over 40% in twin pregnancies) and of low and very low birthweight. In the population-based survey of Powers and Kiely[34] the relative risk of low birthweight was 8.61 (95% confidence interval: 8.36 to 8.66) and of very low birthweight (<1500 g) even 9.97 (95% confidence interval: 9.81 to 10.14). Even among preterm infants and infants of very low birthweight the risk of death remains higher for twins than it is for singletons. Thus, a national survey of all infants born in the Netherlands in 1983 with a weight below 1500 gram or gestational age below 32 weeks[35] found a neonatal mortality of 30% in twins as opposed to 20% in singletons with the difference being roughly maintained (38% versus 28%) when total in-hospital mortality was considered.

Interesting as such mortality data at the national level may be[33–35], they mean little to the individual mother. What matters to her is whether her baby will live or die, whether it will be healthy or sick, and whether its long-term prognosis will match that of its peers. It is the sum of these individual successes and failures that finds its way into national statistics. Such sums do not reveal the real tragedy, however. It is rarely appreciated, for example, that a mortality risk of 10% does not mean that 9 mothers out of 10 will have babies who survive. What it means, in twin pregnancies, is that as many as one in five mothers may suffer a perinatal loss of either one or both infants. It is merely our preoccupation with survival rather than human suffering that prevents us from interpreting the data in this way.

Yet, mortality is no more than the top of a wave that floods neonatal care units throughout the Western World. Indeed, there is virtually no form of perinatal morbidity or it occurs with increased frequency amongst infants from multiple as opposed to singleton pregnancies[16,36–38]. The excess morbidity is mainly due to the high incidence of preterm birth, which ranges from 40% to 65% for twin[39,40] and from 80% to 95% for triplet pregnancies[39,41]. Whether the morbidity is severe or moderate, life-threatening or merely warranting "neonatal observation", birth asphyxia or respiratory distress, the picture is constant. So is the demand on scarce and expensive resources for neonatal care[16,31,42]. For example, Arletta and Duc, in Switzerland, taking only surviving infants into account, found that triplets were hospitalized for an average of 37 days and quadruplets for an average of 65 days and that none were hospitalized for less than 10 days[12]. This implies that each such pregnancy accounts – at the very least – for a full month's occupancy of a neonatal "bed", the size of which is hardly proportional to the level of care that is required, the cost of providing that care[42,43], or the suffering that it brings to babies and their families[43].

This suffering, all too often, does not end upon discharge from the neonatal unit. It has a well-established tendency to protract itself for months, years, and – on occasions – a lifetime[43,44]. The fact that many specialists in reproductive medicine, obstetrics, or even neonatology[45] close their eyes for it in the pursuit of short-term successes does not make the suffering any less real or less severe. And the suffering can be quite severe. It should not be forgotten, for example, that twin pregnancies produce a child with cerebral palsy eight times more often than singleton pregnancies do and triplet pregnancies even 47 times more often[38].

While the problems of multiple gestation are usually seen in terms of fetal and neonatal outcomes, there are also a host of maternal issues to be considered. These range from an increased incidence of potentially life-threatening disorders (such as preeclampsia)[36,46–48], an increase in the risks associated with treatments used to control pregnancy complications (for example, pulmonary oedema with tocolytic treatment)[49], and a much greater likelihood of operative delivery[41], up to the comparatively benign prophylactic or therapeutic hospitalisations in pregnancy which, nevertheless, have been found to be often more harmful than beneficial[50]. Add to this a much higher frequency of so-named subjective symptoms of pregnancy – as if suffering from nausea, vomiting, and a range of other problems for several months can be considered as merely subjective. Irrespective of the weight that one accords to all of these, it is clear that concentrating only on fetal and neonatal issues is a gross underestimation of the cost of multiple pregnancy both to the mother and to perinatal health care systems.

Singleton pregnancies

Already in one of the earliest reports on pregnancy outcome after in vitro fertilization its authors commented on the high incidence of preterm birth not only in multiple but also in singleton pregnancies[51]. Among singletons the incidence was three times the national average and as many as 5% of these infants were born before 32 weeks of gestation[51]. Comparable data have been reported from the British IVF register funded by the Medical Research Council; 13% of singletons were born preterm, an incidence that is twice the national average[36]. There was a clear tendency for outcomes, such as preterm birth, low birthweight, and low weight for gestation, to be more frequent even in singleton pregnancies if 4 or more embryos had been replaced instead of a smaller number[36]. French data also indicate a frequency of preterm birth in singleton pregnancies resulting from IVF that is more than twice the national average (12.2% versus 5.6% in the years 1987 to 1989)[52]. Not surprisingly, IVF singletons were found to need 2.5 times more neonatal ventilator beds per 1000 live births than other liveborn infants[53].

It has been argued that the extra risks in singleton pregnancies do not relate to the methods of assisted reproduction, but to characteristics of the women undergoing these procedures[54]. Similar conclusions have been reached in twin pregnancies where the rate of complications was not statistically different from that seen in naturally conceived twin pregnancies[18]. Be this as it may. Such conclusions are founded on a flimsy body of observational data that would hardly detect anything but gross devia-

tions from normality. On the other hand, there are also studies suggesting that base-line characteristics of the women, such as a higher age at conception, a history of infertility or a higher frequency of poor obstetric history, do not explain all of the differences with naturally conceived pregnancies[36,47]. The difficulties of assessing or even recognizing causal relationships in the absence of an adequately construed experimental design ought to be self-evident[55]. Nevertheless, there is at least suggestive evidence that being restrictive in the number of embryos transferred reduces not only the risk of multiple pregnancy, but also the perinatal risks in singleton pregnancies[36].

Since preterm birth is one of the major adverse outcomes associated with assisted reproduction, it may serve as a useful reminder of how little we know about the mechanisms that precipitate preterm birth, whether in "natural" or in "assisted" pregnancies[43]. Even the simple differentiation between the spontaneous curtailment of gestation and that which results from deliberate obstetric intervention, by induction of labour or caesarean section, is only rarely found in the tons of paper that have been sacrificed to publicize outcomes of assisted reproduction[36,47]. If such essential information, the importance of which was emphasized many years ago and well before the current wave of reproductive technologies[40,56], is so often lacking when assessing outcome, we may well wonder what further surprises are in store. At present, it would seem that assisted reproduction is already thwarting the considerable amount of energy and resources spent in recent years toward the prevention of preterm birth[43]. If, for example with IVF, we consider a doubling of the frequency of preterm birth in singleton pregnancies[52,36,51], about 20% twin pregnancies[57,58,52,39] with 50% preterm births and 3–4% triplet pregnancies[57,58,52,39] with 80% preterm births, every 100 pregnancies contribute at least 33 preterm infants (a ratio of 1 in 3) to perinatal health care. Many of them will also be very preterm, thus placing further demands on an already overstretched health care system.

Conclusions

While it may be tempting to swing the pendulum full circle on the development of reproductive technology, this would be a gross underestimation of the very real needs of people suffering from and struggling with infertility. They deserve care and attention. However, they equally deserve that such care is not only believed, but also shown to do more good than harm. Fortunately, the belief in biochemical pregnancies, clinical pregnancies, ongoing pregnancies, and so forth, is fading, making room for a more genuine concern for the prime objective of pregnancy: a healthy mother and child. Nevertheless, it is a sour realisation that not a single country or professional body succeeded in ensuring a full and comprehensive follow-up of the modern reproductive technology from its very inception[59]. It is clear that the responsibility for this does not lay with the women and couples anxious to find a cure for their problem. Few others, however, can wash their hands in innocence while proclaiming servitude to reproductive health.

It is also clear that many of the perinatal problems associated with assisted reproduction, foremost that of multiple pregnancy, are either "complications" or "failures" of well-intended, but ill-conceived medical intervention. Certainly, one cannot lay all of the blame for it at the door of the fertility specialists. Their obstetric colleagues and specialists in fetal-maternal medicine dealing with the results of assisted reproduction often show a similar lack of restraint in applying well-intended interventions that, on occasions, do more harm than good[41]. Similarly, neonatologists can pride themselves that they carry no responsibility for assisted reproduction itself, only for its consequences. It remains to be seen, though, whether so much would have gone wrong, if enthusiastic reports on the achievements of neonatal intensive care had been tempered more widely by a healthy degree of criticism and common sense[45]. With combined efforts across specialties and subspecialties it may not be too late to find the way back, not to infertility, but to an assisted reproduction that assists not only reproduction, but also perinatal health.

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