

From Sex for Reproduction to Reproduction without Sex

Gian Carlo Di Renzo, Valentina Tosto, Valentina Tsibizova, and Giuseppe Benagiano

1.1 Introduction

Throughout human history the connection between sexuality and reproduction has been at the core of the life of the vast majority of men and women, although this has manifested itself in various, sometimes conflicting ways, ranging from placing sexuality at the center of a person's existence to its complete elimination in search of a higher level of human achievement. In many ways, sexuality – historically driven by the imperative to reproduce [1] – if properly used, can be at the core of human progress, whereas its abuses can lead to totally dehumanizing and violent behaviors.

While sexual activity has been the norm, over the millennia there have always been voices advocating abstinence for a variety of reasons. In the sixth century BC, Pythagoras dictated that sex should be practiced in the winter but not the summer; in addition, he believed that it was harmful to male, but not female, health [2]. During Christianity's first 15 centuries of existence, abstinence was considered a means of achieving a higher level of spirituality, and celibacy has a place in all the major religions [3,4].

Even centuries ago, well before the age of modern methods of family planning, abstinence was also preached as a means of avoiding the risk of overpopulation [5]. At the same time, well before the age of modern contraception, humans attempted to separate sexual activity and reproduction by means other than abstinence, as evidenced by the millenia-old descriptions of rudimentary contraceptive techniques in Egyptian papyri and the writings of the Greek Soranus and the Romans Pliny the Elder and Dioscorides [6].

1.2 Sex without Reproduction

Separation of sex from reproduction remained a dream until the end of the nineteenth century when Sigmund Freud wrote: "Theoretically, it would be one of the greatest triumphs of humanity if the act responsible for procreation could be raised to the level of voluntary and intentional behavior in order to separate it from the imperative to satisfy a natural urge" [7]. Freud's dream became a reality around the middle of the twentieth century when effective methods of family planning were developed. Research in this field was driven by an event that will remain unique in the history of humanity, when, in only one century, the human population increased from some 1.6 billion to more than 6 billion [8].

Besides bringing population growth under control, the availability of effective methods of contraception made possible for the first time the separation of the two acknowledged meanings of sexuality – procreation and recreation – producing the first revolution in reproduction [5].

Credit for this advance should be given to the introduction, some six decades ago, of hormonal and intrauterine contraception. Granting women sexual freedom without the fear of an unwanted pregnancy, enabled them for the first time to take charge of their own reproductive potential. This in turn helped to shape a new place for women in society: Young women are now in a position to complete their education and develop careers in every field without abstaining from sexual activity, something that young men had always taken for granted.

Such a change deserves the title of “sexual revolution,” one capable of challenging and transforming relationships between men and women. No progress, however, comes without a price: Delaying the first pregnancy by as much as 10 years, as is now the case in some Western countries, carries important consequences for reproduction. The decline in female fertility that starts in the thirties and increases rapidly after age 37 [9] will force more and more women to turn to Assisted Reproductive Technology (ART), with less and less satisfactory results. In addition, childbearing in the late thirties and early forties carries an increased risk of complications [10].

Clearly, the pleasure intrinsic in the sexual act has been the instrument through which reproduction took place, although in many cultures this pleasure has been regarded with disapproval. Today, the idea of sex for pleasure has gained such wide acceptance that some have concluded that sex is mostly for pleasure and not simply procreation. In this respect, Abramson and Pinkerton concluded that if it is undeniable that pleasure in sexual activity developed in order to promote procreation, it does not represent a simple by-product of the drive to procreate. Sexual pleasure facilitates interpersonal bonding, promotes interpersonal relationships, and can reduce social tensions [11].

In conclusion, starting during the twentieth century, the relationship between reproduction and sexuality has continuously evolved [12], each beginning to move independently and, in many ways, becoming separate. What seems surprising is that, after the first revolution separated sex from reproduction, within a few decades a new, even more dramatic revolution took place: reproduction without sex.

1.3 Reproduction without Sex

The new paradigm, made possible by the pioneering work of Edwards and Steptoe [13], eliminated the need for a sexual act to bring new life into the world, ending the ancient and seemingly untouchable meaning of sex as the indispensable ingredient of procreation, as every society in human history had believed.

Given this reality, it is not surprising that ART was initially regarded with great suspicion and even rejected outright [14]. However, within a few years, scientific progress, in association with marked sociocultural changes, led to an ever-increasing acceptance of ART in its various forms (see Chapter 9 for more details about ART). A global report published in 2018 (but referring to 2011) estimated that global utilization, including China, amounted to approximately 2.0 million cycles with 0.5 million babies born [15]. Of interest is the presence of an increasing trend: From 2010 to 2011, the number of reported oocyte aspirations and that of frozen embryo transfer cycles increased by 13.1% and 13.8%, respectively. The latest statistics from Europe are from 2016 and refer to 20 countries (with a total population of approximately 325 million inhabitants), in which ART clinics reported a total of 461 401 treatment cycles [16].

Data show a continuous increase in cycles performed, with a mean of 1410 cycles per million inhabitants (range 82–3088 per million inhabitants). This increased utilization led, at least in Europe, to overuse, as shown by an investigation from Ireland, published in 2010, where 14% of the women who had submitted to ART subsequently had a spontaneous pregnancy [17].

An important consequence of this trend to wider utilization of ART has been the application of these techniques to couples who are per se fertile, but who carry a genetically high risk of having offspring affected by serious pathological conditions. The methodology, known as preimplantation genetic diagnosis, was utilized for the first time some 30 years ago [18].

Recently, another technological advance has allowed the elimination of the consequences of maternally inherited mutations in mitochondrial DNA (mtDNA) that can cause fatal or debilitating mitochondrial disorders in offspring. The new technique, called mitochondrial replacement therapy, aims at preventing mtDNA transmission from oocytes to preimplantation embryos [19]. This technique produces what are commonly known as “three parent babies,” because they are conceived using genetic material from two women (one providing the oocyte cytoplasm, the other the nucleus) and one man.

These scientific advances are progressively replacing the classic picture of sex for reproduction and bonding between partners, with reproduction totally separated from sexual activity. It should be obvious that these seemingly never-ending revolutions in human reproduction will continue, although the most important among them, human cloning, has been rejected by almost everyone [20] and unanimously condemned by the World Health Assembly [21].

1.4 New Family Paradigms

In parallel with these revolutions in reproduction, there have been several profound changes in the way of envisaging families. Concepts of traditional family and structure, traditional couples, and traditional unions are today challenged in the Western industrialized world, whereas they are still held valid in a majority of developing countries. In the West, same-sex unions and marriages are gradually becoming an accepted reality, whereas in Africa and Asia traditional unions are still strongly defended. One issue worthy of mention, as pointed out by Francesco Remotti, an Italian cultural anthropologist at the University of Turin, is that of the “irreducible multiplicity of solutions” proposed by humans in terms of families [22]. He mentions several examples of “traditional families” that do not conform to our classically accepted scheme.

Within the context of the United Nations (UN), support for family formation received an important endorsement during the 2011 UN General Assembly, when its Human Rights Council passed by majority vote a resolution stressing “the important role of family, community, society and educational institutions in upholding and transmitting these values, which contributes to promoting respect for human rights and increasing their acceptance at the grass roots, and calls upon all States to strengthen this role through appropriate positive measures.” This text has been interpreted as an endorsement of traditional family structures, and it is likely that this is the reason why most of the votes against the resolution came from industrialized countries [23]. The problem with this resolution is that it implies a definition of “family” and therefore the existence of forms (one or more?) of “natural unions”: The definition prevailing today around the

world is that between one man and one woman, but possibly also between one man and several women, since among the countries voting in favor, some sanction polygamous unions.

1.5 Anthropological Aspects

The rapidly evolving relationship between sexuality and reproduction has created new needs and has inevitably met, and fought, cultural/religious objections. To understand the evolving scenario between reproduction and sexuality it is important to go beyond biology. Thus, anthropological facts, philosophical reflections, ethical norms, and religious dictates must be taken into consideration when looking at sexuality.

In humans, contrary to the vast majority of mammals, including primates, sexuality always had multiple meanings, first and foremost the need to reproduce and the creation of a bond within a couple. The fairly unique features of human sexuality and its important role in the life of most individuals has not only facilitated the evolution of *Homo sapiens*, but has also had a profound influence on human history, cultures, and societies everywhere.

The complex features involved in the evolution of the meaning of sexual intercourse in the human have been debated and summarized in the proceedings of an international conference published 25 years ago [24]. This contains an interesting historical overview of differences due to various cultural contexts, including the meaning of the sexual act in early Christianity and the subsequent Protestant reform, Buddhism, Judaism, and Islam.

Given that moral norms have always focused on sexuality and its regulation, the previously mentioned rapid evolution, after millennia of relative stability, drew the attention of ethicists, whether religious or secular, yielding conflicting outcomes. Catholic ethicists have been at the forefront of the battle against “dehumanizing” the reproductive process, whereas Judaism took a more open position. Early Christian teaching on sexuality focused on the practice of abstinence; this is because Christ himself defined celibacy as a better life choice for selected individuals striving for excellence. Drawing on this concept, early Christian Church fathers developed the concept, upheld by the Roman Catholic Church until the twentieth century, that intercourse is totally justifiable only in order to procreate [25]. This position was strongly opposed by Protestant reformers; in particular, Jean Calvin in his major book opposed celibacy with strong words [26]. Nowadays, some cautious overtures are being made within the Roman Catholic Church with the recognition that sexuality can also be an expression of love independent from procreation [27].

In the face of the new paradigms represented by these “revolutions,” the positions of the major religions are fairly articulate. At present, the three monotheistic religions hold different positions toward ART, with no consensus on its potential advantages. Roman Catholicism, Orthodox churches, and some Protestant denominations (especially Evangelical churches) have staunchly defended the sexual act in its pristine naturalness as the only ethical means to reproduce. In contradistinction to this position, some Islamic and Jewish scholars have affirmed the supremacy of childbearing over sex, to the point of opening a discussion even on reproductive cloning as a last attempt to give a child to a couple [12].

In anthropological terms, sexuality and reproduction have had a profound significance in determining the role of, and consideration for, women in a couple and in society. In many parts of the world, women are still vulnerable to gender-based violations

of human and reproductive rights, limiting their role and potential [28]. In many social contexts, childlessness represents a real curse, and infertile women can be divorced simply on the grounds that they cannot provide an heir. Tragically, this curse is much more serious in the developing world, where access to ART is more limited [29]. In addition to the personal grief and the moral suffering it causes, the inability of an infertile woman to have children, especially in poor communities in the developing world, leads to shaming by her own family. This condition creates social stigma, economic hardship, social isolation, and violence, which may drive a woman to suicide or expose her to the risk of being killed [30,31]. A study conducted in Andhra Pradesh in India reported that approximately 70% of infertile women are being punished for their “disability” through physical violence [30]. To stress the existence of this problem and to search for technical innovations that can be used in the developing world, the European Society for Human Reproduction and Embryology (ESHRE) established the Task Force on Infertility and Developing Countries; the new attitude toward ART in developing countries is represented by a more constructive approach consisting of exploring new possibilities and innovative ways of ART that take into account the needs and the particular situations of low-resource settings [32].

A phenomenon that has accompanied the development of ART since the early days has been labeled “cross-border reproductive care” or “reproductive tourism”; it is the consequence of country-based legislation in ART, availability and quality of services, and economic issues [33].

1.6 Conclusions

Today the relative independence of sexuality from reproduction is well established, although the close relationship between the sexual act and having a child remains a cornerstone of every culture, especially among the more traditional societies. In other words, the intimate connection between the two aspects remains and the vast majority of pregnancies are, even today, achieved through sexual intercourse, a situation that is likely to remain for the foreseeable future.

Accordingly, what is important about “reproduction without sex” is not that it brings about complete separation between the two, but that it opens up new possibilities for achieving conception in infertile couples. According to Baldwin, ART, though a well-established option, does not – and for now will not – replace traditional sexual reproduction, given that most couples have no problem conceiving [34]. Others, like Suter, have predicted the potential end of sexual intercourse as a way of conceiving, arguing that emerging technologies may lead us down a path where sex as a means to conceive children will largely disappear, or at least decrease markedly [29]. Moreover, Greely has predicted that within the next 20–40 years, most people with access to good healthcare will no longer have sex to conceive their children [35].

Intriguingly, the most controversial encyclical letter of modern times, the *Humanae Vitae* by Pope Paul VI [36], has been called “prophetic” in light of its prediction of contraception as a tool for dismantling human sexuality, breaking of relationships, lowering of sexual standards, and increasing infidelity [37,38].

In this respect, it is a fact that the fear that women would become objects, mere instruments for the satisfaction of the desires of men, not only failed to materialize, but contraception brought about a “social revolution” that empowered women [39].

Finally, modern societies will have to deal with the emergence of new and different family structures brought about by the new technological advances that have made parenthood possible for people who in the past were excluded from achieving it [40].

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