Open Access Journal of Gynecology and Obstetrics

Volume 1, Issue 1, 2018, PP: 27-39

Can Ratings of Contraceptive Efficacy Provide an Impetus for Birth Control and Family Planning?

Kurt Kraetschmer, MD, PhD

Department of Reproductive Medicine, Austrian-American Medical Research Institute, Austria.

kurt.kraetschmer@aon.at

***Corresponding Author:** Kurt Kraetschmer, Department of Reproductive Medicine, Austrian-American Medical Research Institute, Vienna, Austria.*

Abstract

***Aim:** The aim of the paper is to determine as to whether or not the various tables, surveys, ratings, and rankings concerning contraceptive methods propounded by government agencies, professional organizations, and research institutes can be of value for women who are undecided about engaging into birth control and family planning. Attainment of this aim engenders information for the clinician who assists women in their quest for the personally most suitable method of contraception in accordance with the ethical principles of informed consent and nil nocere.*

***Method:** The method consists in an in-depth analysis and meta-analysis of presently available research publications provided by scholarshiop and by the most prominent government organizations on the national and international level.*

***Results and Conclusions:** The result of the analyses and meta-analyses performed is evidence of incompleteness and inaccuracy in numerous publications presently available and neglect of the ethical principle of informed consent. The conclusion suggests new approaches to ratings and rankings of contraceptive methods reflecting heightened sensitivity to the parameters safety and convenience.*

Keywords: *Contraception; Family planning; Birth control*

Introduction

According to statistical findings, 45 % of the pregnancies in the U.S. are unintended albeit amelioration of this figure had been expected: "However, the most recent U.S. data still indicate that 45% of all pregnancies in the United States are unintended, as compared with 34% in Western Europe."[1, p. 461] Since this percentage compares unfavorably not only with Western Europe, but represents the highest worldwide (40%), it is understandable that efforts are being made to intensify family planning and birth control. Such efforts include socioeconomic investigations that highlight incentives for family planning in the form of savings for the taxpayer: ". . . every $1 spent on public funding for family planning saves taxpayers $3.74 in pregnancy-related costs." [2, p.364]

For socioeconomic as well as public-health reasons, it seems legitimate to explore avenues for facilitating access to contraception and to motivate women to engage in pursuits of birth control. One way to enhance motivation is information on rankings and ratings of contraceptive methods, as they offer an instant and comprehensive overview of all available options including instructions on their implementation and data on their efficacy.

In the clinical practice, ratings and rankings of contraceptive methods can be valuable aids for health care providers who guide women in their quest for the personally most suitable method of contraception. Data provided by various ratings and rankings are of pivotal importance, because for most women two parameters have highest priority, ie, efficacy and safety. Regarding efficacy, there is considerable controversy, and the aim of the following discussion is to examine how reliable rankings can be identified and distinguished from unreliable ones; regarding safety, suggestions are made to include adverse events into a new and comprehensive approach to the problem of ranking contraceptive methods.

The discussion starts by presenting and analysing ratings emanating from the two most influential and most frequently consulted organizations, ie, the World Health Organization (WHO) and the U.S. Food and Drug Administration (FDA). After illuminating details and deficits in these ratings, the discussion focuses on the most authoritative ratings, ie, Contraceptive Technology research, and compares it to the WHO and FDA ratings. To examine whether the superiority of Contraceptive Technology ratings can be affirmed, inaccuracies and weaknesses of other frequently consulted ratings are illuminated. Finally, the need for new approaches is explicated by drawing attention to the ethical principles of informed consent and nil nocere.

Discussion

WHO and FDA

Although it is difficult to shed light on the historical dimension of rating contraceptive methods, it can be assumed that one of the first rankings appeared in 1982 in one of the world's leading medical journals and was entitled "Relative effectiveness of frequently used contraceptive methods."[3] This 1982 ranking did not distinguish between estimates for "common use" and "correct and consistent use," as does the contemporary table of the World Health Organization (WHO) [4] or between "typical use" and "perfect use" as do several other tables.[5] The WHO table entitled "Effectiveness to prevent pregnancy" lists the various methods without ranking them but presents other vital information, especially estimates for two forms of use, ie, "correct and consistent use" and "common use." If the methods listed in the WHO table were ranked according to estimates the following ranking would emerge. (Table 1 - Ranking based on the WHO Table of 2017).

Table 1. *Ranking based on the WHO Table of 2017.*

Method	Effective-ness: correct +consistent/common use	Adverse events and mechanism of action
Female sterilization (tubal ligation)	>99%	Surgical intervention
Implants	>99%	To be implanted by clinician. Irregular vaginal bleeding
Combined oral contraceptives (COCs) "the pill"	99/92%	Contains estrogen and progestogen.
Emergency Contraception (ulipristal acetate 30 mg or levonorgestrel 1.5 mg)	99%	Pills to be taken twice to prevent pregnancy up to 5 days after coitus.
Combined contraceptive patch and combined contraceptive vaginal ring (CVR)	Allegedly comparable to COCs both correct (consistent) and common use	Prevents ovulation. Releases both estrogen and progestin. Pharmacokinetic profile comparable to COCs .
Progestogen-only pills (POPs) or "the minipill"	99%/90-97%	To be taken daily at the same time. Thickens cervical mucus to block sperms.
Monthly injectables or combined injectable contraceptives (CIC)	99/97%	Irregular vaginal bleeding
Progestogen-only injectables	99/97%	Irregular vaginal bleeding; delayed return to fertility after use.
Intrauterine device (IUD) -- levonorgestrel Intrauterine device (IUD)-- copper-containing	>99%	Thickens cervical mucus. Amenorrhea. Copper component damages sperms.

Male sterilization (vasectomy)	>99% after 3-months semen evaluation; 97-98% without semen evaluation	Surgical intervention. Permanent contraception by cutting vas deferens tubes
Lactational Amenorrhea (LAM)	99/98%	Effective as long as monthly bleeding has not yet returned. Requires exclusive breastfeeding day and night of infant less than 6 months old.
Basal Body Temperature (BBT).	99/75%	Fertile phase has passed when body temperature has risen (0.2-0.5° C) and remained such for 3 days. Conception is unlikely from 4th day following rise of temperature until next menstruation.
Symptothermal	98/98%	Measuring of body temperature, observation of cervical mucus (clear texture), and palpation of cervix (soft consistency and opening).
Male condoms	98/85%	Protects against sexually transmitted diseases (STD) including HIV.
TwoDay	96/86%	Coitus is avoided during fertile days. Fertile phase is tracked by observing presence of cervical mucus (color and consistency). Unprotected coitus may resume after 2 consecutive dry days or absence of secretion.
Withdrawal	96/73%	Timing of withdrawal is difficult. Risk of ejaculation inside vagina.
Standard Days (SDM)	?/88%	Fertile period is tracked and coitus avoided (usually days 8-19 of each 26-32 day cycle).
Calendar (rhythm)	91/75%	Monitor pattern of menstrual cycle over at least 6 months. Subtract 18 from shortest cycle (this is the estimated first fertile day) and 11 from longest (this is the estimated last fertile day). Caution when drugs are used (anxiolytics, antidepressant, NSAID, or certain antibiotics).
Female condom	90/79%	Barrier to prevent contact between sperm and egg. Protects against sexually transmitted diseases (STD) including HIV.

In view of the worldwide presence of the WHO it can be assumed that a considerable number of women will base their choice of a contraceptive method on the information conveyed by the WHO table. From an ethical perspective, however, these women are not sufficiently informed according to the principle of informed consent because at least one important method of contraception, ie, the Ovulation (or cervical mucus) method is not mentioned. Consequently , these women are not in a position to make an intelligent choice as is stipulated by the ethical prinicple of informed consent. This principle considers completeness of information as a "conditio sine qua non" for making an intelligent choice: "The patient's right of self-decision can be effectively exercised only if the patient possesses enough information to enable an intelligent choice."[6,p.38] Obviously, women who rely exclusively on the WHO table do not possess sufficient information because they remain ignorant of one the most suitable methods for those patients who do not tolerate pills and devices containing hormones. The Ovulation method, classified customarily as one of the ferility awareness methods, has a noteworthy perfect use estimate of 3 according to one of the most

trustworthy rankings, namely the one proposed by Contraceptive Technology research.[7,8]

The flaw of omitting at least one important method of contraception in the WHO table is minor, however, compared to the deficiencies contained in a survey provided by the U.S. Food and Drug Administration (FDA)[9]. In 2013, the U.S. FDA published a ranking entitled "Food and Drug Administration (FDA) Approved Methods of Birth Control."[9] In this ranking, percentages are indicated for "number of women out of 100 who will not get pregnant," and the widely used distinction is made between "perfect" and "typical" use. In addition, comments are provided on specific requirements of each method, as can be seen from Table 2 (Table 2 Food and Drug Administration (FDA) Approved Methods of Birth Control (FDA Survey, 2013, original version).

Table 2. *Food and Drug Administration (FDA) Approved Methods of Birth Control (FDA Survey, 2013, original version).*

Methods	*Number of women out of 100 who will not get pregnant: "perfect use"	*With typical use, number of women out of 100 who will not get pregnant	How to Use It
Sterilization Surgery for Women	>99%	>99%	One-time procedure; nothing to do or remember.
Surgical Sterilization Implant for Women	>99%	>99%	One-time procedure; nothing to do or remember.
Sterilization Surgery for Men	>99%	>99%	One-time procedure; nothing to do or remember; condoms should be used for at least 3 months until stored sperm are cleared from the reproductive tract.
Implantable Rod**	>99%	>99%	Nothing to do or remember, lasts up to 3 years, inserted by clinician.
IUD**	>99%	>99%	Nothing to do or remember, lasts 3-10 years, inserted by clinician.
Shot/Injection	>99%	94%	Need a shot every 3 months, prescription needed.
Oral Contraceptives (Combined pill) "The Pill"	>99%	91%	Must swallow pill every day, prescription needed.
Oral Contraceptives (Progestin-only) "The Pill"	>99%	91%	Must swallow pill everyday. Must be taken at the same time each day. Prescription needed.
Oral Contraceptives Extended/Continuous Use: "The Pill"	>99%	91%	Must swallow pill everyday. Prescription needed.
Patch	>99%	91%	Put on a new patch each week for three weeks (21 total days). Don't put on patch during the fourth week. Prescription needed.
Vaginal Contraceptive Ring	>99%	91%	Put the ring into the vagina yourself. Keep the ring in vagina for three weeks and remove for one week. Prescription needed.

Male Condom	98%	82%	Must use every time you have sex; requires partner's cooperation. Except for abstinence, latex condoms are the best protection against HIV/AIDS and other STIs.
Diaphragm with Spermicide	94%	88%	Must use every time you have sex.
Sponge with Spermicide	80-91%	76-88%	Must use every time you have sex.
Cervical Cap with Spermicide	74%	60%	Must use every time you have sex.
Female Condom	95%	79%	Must use every time you have sex. May give some protection against STIs.
Spermicide	82%	72%	Must use every time you have sex. Associated with risk of STI and HIV due to vaginal irritation with frequent use.
Emergency Contraception – If your primary method of birth control fails			
Emergency Contraceptives, "Plan B," "Plan B One Step," "Ella"	85%	7 out of 8 women would not get pregnant after using Emergency Contraceptives	Must use within 72-120 hours of unprotected sex. It is most effective taken as soon as possible after the unprotected act. It should not be used as a regular form of birth control.

*Effectiveness rates are listed for "perfect use" and "typical use."

**Implantable rod and IUD considered Long-Acting Reversible Contraceptives (LARC) and are highly recommended for young women who do not wish to become pregnant, but may want to have children later. Source: Contraceptive Technology 20th, 2011

Source:

http://www.fad.gov/ForConsumers/ByAudience/ForWomen/FreePublications/ucm313215.htm.) (Accessed January 16, 2017).

According to this FDA survey, several methods achieve more than 99 percent for both perfect and typical use, namely:

Sterilization Surgery for Women	>99%
Surgical Sterilization Implant for Women	>99%
Sterilization Surgery for Men	>99%
Implantable Rod	>99%
IUD	>99%

As can be seen, the above listed methods are rated as equally effective in both perfect and typical use and are ranked higher than those whose typical use estimates are inferior to their perfect use estimates, namely:

Shot/Injection >99% perfect (91% typical use)

Oral Contraceptives (Combined pill: "The Pill") >99% perfect (91% typical use)

Oral Contraceptives (Progestin-only: "The Pill") >99% perfect (91% typical use)

Oral Contraceptives (Extended/Continuous use: "The Pill") >99% perfect (91% typical use)

Patch >99 perfect (91% typical use)

Vaginal Contraceptive Ring >99 perfect (91% typical use)

Among the less effective methods, according to the FDA, are Male Condom (98% perfect use and 82% typical use); Diaphragm with Spermicide (94% perfect use and 88% typical use); Sponge with Spermicide (80-91% perfect use and 76-88% typical use); Cervical Cap

with Spermicide (74% perfect use and 60% typical use); Female Condom (95% perfect use and 79% typical use); Spermicide (82% perfect use and 72% typical use). The FDA survey appropriately comments on two primary aspects of Emergency Contraception (85%), namely first, warning to use it as a regular form of birth control and second, administration of the pills within 70 to 120 hours of unprotected coitus -- a requirement that has been affirmed by one of the latest studies on Emergency Contraception (EC).[10]

This approach to ranking methods chosen by the FDA is unduly simplified and superficial. It does not allow to unambiguously identify the most effective methods, as might be desired by a great number of consumers. More specifically, according to the FDA ranking, implantable rod and IUDs belong to the most effective methods with >99%. A more precise ranking, however, such as the one propounded by Contraceptive Technology research,[5] shows that implants and IUDs are not equally effective. In fact, implants are by far more effective than IUDs. [7,8] Implants are considered as the most effective contraceptive measures due to an estimate of 0.05 for both perfect and typical use. Concerning IUDs on the other hand, the estimates for typical and perfect use are 0.8 and 0.6 (ParaGard-copper T) respectively or 0.2 and 0.2 (Mirena-levonorgestrel).

In a comparison of this FDA survey with the WHO table noteworthy differences appear. While the WHO table considers combined patch and vaginal ring as more effective than combined oral contraceptives, the FDA survey does not mention this combined method but provides data on each one of them separately, namely

Patch >99 perfect (91% typical use)

Vaginal Contraceptive Ring >99 perfect (91% typical use).

Another noteworthy disparity pertains to Emergency Contraception(EC). While the WHO Table considers it as one of the most effective methods with a perfect use estimate of 99%, the FDA survey considers it as one of the least effective, with an estimate of 85%. The WHO estimate of 99% has been affirmed as early as 1990 in the most authoritative German medical reference book for the insertion of an IUD as emergency contraception. [11,p.797] The use of an IUD as EC is not mentioned either in the WHO table or in the FDA survey, although it is extensively delineated in publications on EC and in medical reference books. As can be seen from the 1990 edition of the German reference book, IUDs are essential for distinguishing contraception by way of interception from abortion. More specifically, the prevention of pregnancy subsequent to sexual intercourse by means of an IUD is not considered an abortive measure since it takes place prior to nidation. Another specification concerning estimates for EC appeared in the year 2000, when German research specified that the estimate of 99% for EC can be achieved only in case of perfect use, ie, administration of the morning-after pill as early as possible.[12,p.82]

The most striking feature in the FDA survey is the omission of several methods, ie, the so-called fertiliy awareness-based methods (or natural family planning, or periodic abstinence). These methods are included not only in the WHO table but also in most international publications. Although one could argue that these methods do not contain drugs and devices and are therefore not within the domaine of the WHO‘s responsibility, the ethical principle of informed consent requires completeness of information for the patient. Whoever embarks on surveying contraceptive methods is ethically bound to providing comprehensive information. What is particularly perplexing with respect to the FDA‘s neglect of these methods is the statement on the source of its survey. The FDA acknowledges as its source Contraceptive Technology, ie, a source that explicitly mentions these methods. In fact, the perfect use estimates indicated for these methods by Contraceptive Technology research are superior to some of the methods listed in the FDA survey, as can be seen from a convenient summary in form of a table, ie, the Contraceptive Technology‘s CT Failure Table of 2011. [5]

The CT Failure Table as a Source of Reliable Information

Research on Contraceptive Technology has provided information in several publications and has presented its finding in form of a contraceptive failure table (CTFailure Table) in a 2011 publication.[7] This table, based on sound statistical principles, has become a source of information for some of the most authoritative ratings and rankings, including the one by the WHO[4] and the FDA.[9] Contraceptive Technology rates the different methods according to estimates for women experiencing an unintended pregnancy during the first year of “typical use“ and the first year of “perfect use;“ an additional distinction is made between “frist year of use“ and “continuing use at one year.“

According to this table, the Long-Acting Reversible Contraceptive methods (LARC), i.e., implants and intrauterine devices, are the most effective, especially

the implant Implanon (precursor of Nexplanon) with a failure rate of 0.05 for both perfect and typical use. Among intrauterine contraceptives, Mirena (Levonorgestrel=LNg) with a perfect and typical use failure rate of 0.2 is superior to ParaGard (copper T) with a perfect use failure rate of 0.6 and a typical use failure rate of 0.8. Almost equally effective in perfect use are Depo-Provera with 0.2 perfect use (6 typical use), NuvaRing with 0.3 perfect use (9 typical use), Evra patch with 0.3 perfect use (9 typical use), as well as combined pill and progestin-only pill with 0.3 perfect use (9 typical use). What is lacking in the CTFailure Table are estimates for the Basal Body Temperature method, combined contraceptive patch and combined contraceptive vaginal ring (CVR), monthly injectables or combined injectable contraceptives (CIC), Progestogen-only injectables, and calendar (rhythm) method.

If methods are ranked according to perfect use based on the CTFailure Table the following table emerges (Table 3: Ranking based on Contraceptive Technology (2011):

Table 3. *Ranking based on Contraceptive Technology (2011)*

Method	*Perfect/ typical use*
Implanon	0.05/0.05
Male sterilization	0.10/0.15
Mirena (LNg)	0.2/0.2
Depo-Provera	0.2/6
NuvaRing	0.3/9
Evra Patch	0.3/9
Combined pill and Progestin-only pill	0.3/9
Symptothermal method	0.4/24
Female sterilisation	0.5/0.5
Para Gard (copper T)	0.6/0.8
Male condom	2/18
Ovulation method	3/24
TwoDay method	4/24
Withdrawal	4/22
Standard Days method	5/24
Femal condom	5/21
Diaphragm	6/12
Sponge – nulliparous women	9/12
Spermicides	18/28
Sponge- parous women	20/24
No method	85/85

In order to appreciate the distinction beetween typical and perfect use upheld in the CTFailure Table, it is important to keep in mind that perfect use estimates can be accomplished only if there is strict adherence to the requirements of a specific method.

In a comparison of this table propounded by Contraceptive Technology with the FDA survey,[9] it becomes obvious that the FDA survey lacks the precision inherent in the CTFailure Table. Thus, the latter shows clearly that the implant Implanon with a 0.05 failure rate for both perfect and typical use is by far more effective than Evra patch (0.3 perfect and 9 typical use). The FDA survey on the other hand does not reflect this superiority as it indicates percentage for perfect use as >99%. Therefore, if a woman follows the FDA survey and chooses a copper-containing intrauterine device she ignores all those methods that are significantly more effective according to Contraceptive Technology and have fewer side effects than the copper-containing IUD, namely implants (0.05 perfect and typical use), Depo-Provera (0.2 perfect use and 6 typical use), NuvaRing (0.3 perfect use and 9 typical use), Evra patch (0.3 perfect use and 9 typical use), as well as combined pill and progestin-only pill (0.3 perfect use and 9 typical use).

Besides loss of precision in the FDA survey compared to the CT Failure Table, there is the above mentioned omission of several non-hormonal methods whose perfect use failure rates range from 0.4 (symptothermal) to 5 (Standard Days method). Thus, women interested in natural family planning who rely solely on the FDA survey are unable to obtain information on those methods that would be the most adequate for them personally.

Deficits and Inaccuracies in Contemporary Rankings

As can be seen from a comparative analysis of the WHO table, the CTFailure Table, and the FDA survey, the latter lacks precision and omits several internationally recognized methods. Other rankings presented in various publications, exhibit different deficits and inaccuracies.[13] Thus, the Centers for Disease Control and Prevention (CDC) presents information on contraception in a 2016 "U.S. Medical Eligibility Criteria for Contraceptive Use."[14] A ranking of methods according to effectiveness, which is adapted from the World Health Organization (WHO), shows implants (0.05%) and intrauterine

devices -- Copper T (0.08%) and LNG (0.2%) -- as the most effective, followed by permanent procedures, ie, male sterilization (vasectomy) with 0.15% and female sterilization (abdominal, laparoscopic, hysteroscopic) with 0.5%. Among the least effective methods, fertility awareness-based methods (24%) are ranked as next to the last, ie, spermicides (28%). In contrast to the CTFailure Table, which establishes a distinction between typical use and perfect use as well as between "first year of use" and "continuing use at one year," the CDC ranking does not mention these distinctions. Therefore, women who rely on the CDC might conclude that such differentiations are not available or are immaterial.

The claim to use WHO data -- made by the CDC for its ranking of contraceptive methods -- can be found also in publications by other government agencies, as for example the U.S. Department of Health and Human Services (Office on Women's Health)[15] and the Office of Population Affairs.[16] Both institutions, among others, fail to indicate estimates for perfect use. Instead, only typical use estimates are indicated, but not for each single method but erroneously for a heterogeneous group of methods, similar to the first primitive ranking of 1982[3] that introduced the misleading terminus "rhythm."

In contrast to several government agencies that still persevere on error-prone data, it should be noted that another authoritative organization, ie, the American Congress of Obstetricians and Gynecologists (ACOG) has rectified earlier statements and acknowledged the advantages of fertility awareness methods in terms of efficacy (" . . . fewer than 1-5 women out of 100" will get pregnant), cost, and adverse events. "They cost very little . . . Many women like the fact that fertility awareness is a form of birth control that does not involve the use of medications or devices."[17]

Given the importance of ratings and rankings and their wide-spread use, it is not surprising that not only government agencies but also academic institutions and research institutes are disseminating their own creations. Among them are soundly accurate ones, such as the one emanating from the Mayo Clinic[18] and rather inaccurate ones, such as the one presented by Georgetown University which uses at its source a Planned Parenthood chart.[19] This chart, however, is no longer endorsed by the office of Planned Parenthood and is considered as "out-of-date." In fact, the obsolete chart includes only a limited number of methods, refrains from distinguishing between perfect and typical use, and omits all the fertility awareness methods. The percentages indicated are similar to those presented in the FDA survey, which might have served as a source. If the methods listed in the Planned Parenthood chart are ranked, the following table emerges. (Table 4-Efficacy-ranking based on data from Planned Parenthood):

Table 4. *Efficacy-ranking based on data from Planned Parenthood*

Hormonal Methods	
Implant	99%
Vaginal Ring	91-99%.
The Pill	91-99%
Patch	91-99%
Shot	94-99%
Intrauterine Device	99%
Non-hormonal Methods	
Diaphragm	94%
Sponge	84-91%
Male condom	82-98%
Female condom	79-95%
Spermicide	72-82%
Symptothermal method	Not mentioned
TwoDay and Ovulation method	Not mentioned
Standard Days method	Not mentioned

The chart of Planned Parenthood, although out-of-date, deserves mention since the activites of Planned Parenthood in matters of birth control, contraception, and abortion are not restricted to the U.S. but have world-wide dimensions. Among international tables and surveys on contraceptive efficacy, it is particularly German research that deserves attention. German research has assessed all available methods based on a strong commitment to historical facticity.[12] In 2000, German authors proposed a ranking of the effectiveness of 15 methods by using the Pearl-Index. (Cf. Table 5 - Rating based on Pearl Index, 2000) This index is defined as the number of unwanted pregnancies per 100 woman years or 1200 months of application[12, p. 60]. It is no longer used by contemporary rankings based on redefined statistical

principles.

Table 5. *Rating based on Pearl Index, 2000.[12]*

Hormonal Methods	Pearl Index
Tubal sterilization	0.09-0.4
Depot-gestagens	0.03-0.9
Monophasic combined pill	0.1-1.0
Oral hormonal sequential pill	0.2-1.4
Minipill	1
Intrauterine pessary	0.14-2
Symptothermal	0.8
Basal Body Temperature	1-3
Diaphragm and Spermicide	2-4
Condom	4-5
Portio cap	7
Chemical spermicides	12-20
Cervical mucus	15-32
Coitus interrptus	8-38
Calendar	15-40
No contraception	>80

In comparing these Pearl indices to the estimates presented in the CTFailure Table[5] noteworthy discrepancies appear. For instance, the poor Pearl Index for the Billings ovulation (cervical mucus) method (15-32) differs substantially from the estimate provided by Contraceptive Technology research (perfect use estimate of 3, and typical uses estimate of 24) and cannot be verified by evidence-based research. In addition, Contraceptive Technology of 2011 has rectified not only the Pearl Index of the Billings ovulation method but has also indicated a perfect use estimate of 4 for the TwoDay method[5] which is also based on the evaluation of cevical mucus.

In illuminating the international dimension of the topic, the contributions of renowned research institutes have to be taken into account too, such as a publication of 2016 by an institute focusing on reproductive health world-wide. A study of 2016 investigated failure rates in case of typical use, based on demographic as well as health survey data from 43 countries outside the U.S.[20] In discussing the data collected, the authors explain that their estimates regarding periodic abstinence were significantly lower for the developing world (ie, 13.9) than for the U.S. (ie, 24). Although the authors have no explanation for such an unexpected disparity, one might speculate that it is not superior compliance in the developing world that leads to lower estimates but rather inaccurate figures for the U.S. (ie, 24). In fact, similar to Contraceptive Technology [7,Table 3-2, note 1], the authors concede that the estimates for the U.S. are not based on their own investigations but taken " . . . from 1995 and 2002 National Surveys of Family Growth . . ."[20, p. 35]

The Need for Comprehensive Approaches to Rankings of Contraceptive Methods

As the above discussion demonstrates, in a comparison of presently available ratings and rankings by the most influential organizations and institutions, numerous disparities become patent. Consequently, women who plan to embark on family planning and birth control are faced with the dilemma of distinguishing reliable from unreliable information in the plethora of pertinent publications.

On the basis of a comparative analysis the data presented by Contraceptive Technology[5] appear as the most accurate and trustworthy. However, even the CTFailure Table disseminated by Contraceptive Technology Research does not fully comply with the requirements of the ethical principle of informed consent[6] because it lacks vital information on safety. Yet, such information is indispensable for enabelling women to make an intelligent choice, especially those women who are interested not only in efficacy but also in safety in the sense of no harm ("nil nocere").

Regarding the concept of "safety" one has to bear in mind the numerous semantic connotations of this term. Some women understand safety in the sense of protection against sexually transmitted diseases, and these can embrace the recommendation of the FDA: "Except for abstinence, latex condoms are the best protection against HIV/AIDS and other STIs."[9] For those women who interpret "safe" as "truly effective," the ratings and rankings according to efficacy contain the relevant information. The majority of women understand "safe" as meaning "not harmful," and for them a host of questions arises. In fact, almost all influential rankings presently available dwell on efficacy without paying particular attention to the aspect of safety. An exception is the table presented by the WHO, which sporadically refers to adverse events. These sporadic comments on safety, however, are not sufficient for those women whose primary interest is adverse events, risks, and complications. These women are definitely not satisfied with the assertion that no death or serious complication can be causally linked to a certain pill, as authors of Emergency Contraception affirm: "No deaths or serious complications have been causally linked . . . " to Emergency Contraception pills (ECPs)[10, p. 8] In order to meet the needs of those women who desire precise information on adverse

events, risks, complications and contraindications greater emphasis must be placed on the aspect of safety in future approaches to ranking contraceptive methods.[21] In addition, the aspect of convenience should be introduced in future rankings, because convenience seems to have an influence on compliance with a certain method and thus influences the perfect use estimate. Finally, information on cost is also important for a great number of women. A rating of contraceptive methods which takes into account the aspects of safety and convenience could be structured as exemplified in Table 6 (Safety-Efficacy-Convenience Rating):

Table 6. *Safety – Efficacy - Convenience Rating, 2018.*

(Based on WHO, 2018, and CTFailure table, 2011. Efficacy is indicated as percentage of women experiencing an unintended pregnancy within the first year of use).

Method	Safety (no harm in the sense of "nil nocere")	Efficacy Perfect-Typical use	Convenience	Cost Specifcations
Symptothermal	High	0.4-24	High	No cost. Body temperature must be measured, cevical mucus must be observed (clear texture), cervix must be palpated (soft consistency and open)
Ovulation (based on cevical mucus)	High	3-24	High	No cost. Cervical mucus must be observed ("spinnbarkeit")
TwoDay (based on cervical mucus)	High	4-24	High	No cost. Coitus must be avoided during fertile days. Fertile days determined by presence of cervical mucus (color and consistency). Coitus may be resumed after 2 consecutive dry days (or absence of secretion).
Standard Days (SDM) – based on calendar	High	5-24	High	No cost. Fertile period is tracked and coitus avoided (usually days 8-19 of each 26-32 day cycle)
Basal Body Temperature (BBT)	High	1-25	High	No cost. Fertile phase has passed when body temperature has risen (0.2-0.5° C) and remained such for 3 days. Conception is unlikely from 4th day following rise of temperature until next menstruation.
Calendar (rhythm) method	High	9-25	High	No cost. Menstrual cycle is monitored for at least 6 months. 18 is subtracted from shortest cycle (this is the estimated first day). 11 is subtracted from the shortest cycle (this is the estimated last fertile day. Caution when drugs are used (NSAID, certain aintibiotics, anxiolytics, antidepressants, etc.)
Male condoms	Moderate	2-15 .	High	Low cost. Protects against sexually transmitted diseases (STD) including HIV.

Female condom	Moderate	10-21	Moderate	Moderate cost. Menstrual Barrier to prevent contact between sperm and egg. Protects against sexually transmitted diseases (STD) including HIV (according to WHO).
Implant	Moderate	0.05-0.05	High	High cost. To be implanted by clinician. Irregular vaginal bleeding.
Mirena (LNG) IUD	Moderate	0.2-0.2	Moderate	High cost. Thickens cervical mucus. Amenorrhea.
ParaGard (copper IUD)	Moderate	0.6-0.8	Moderate	High cost. Copper component damages sperms.
Depo-Provera	Moderate	0.2-6	Moderate	High cost. Irregular vaginal bleeding.
Combined pill & progestin-only pill	Moderate	0.3-9	Moderate	Moderate cost. Contains estrogen and progestogen.
Evra patch	Moderate	0.3-9	Moderate	High cost.
NuvaRing	Moderate	0.3-9	Moderate	High cost.
Combined oral contraceptives (COCs) “the pill“	Moderate	1-8	Moderate	Moderate cost. Contains estrogen and progestogen.
Combined contraceptive patch and combined contraceptive vaginal ring (CVR)	Moderate	1-8(?)	Low	High cost. Prevents ovulation. Releases both estrogen and progestin. Pharmacokinetic profile comparable to COCs.
Monthly injectables or combined injectable contraceptives (CIC)	Moderate	1-3		High cost. Irregular vaginal bleeding.
Progestogen-only injectables	Moderate	1-3	High	High cost. Irregular vaginal bleeding; delayed return to fertility after use.
Diaphragms	Moderate	6-12	Low	High cost.
Emergency Contraception	Moderate - Low	15-15	Moderate	Moderate cost. Pills (ulipristal acetate 30 mg or levonorgestrel 1.5 mg) must taken twice to prevent pregnancy up to 5 days after coitus. Alternatively IUD (copper or levonorgestrel) to be inserted.

Lactational Amenorrhea (LAM)	High	1-2	Moderate	No cost. Effective as long as monthly bleeding has not yet returned. Requires exclusive breastfeeding day and night of infant less than 6 months old.
Male sterilization (vasectomy)	Moderate	<1 after 3-months semen evaluation; 2-3 without semen evaluation.	High	High cost. Surgical intervention. Permanent contraception by cutting vas deferens tubes.
Female sterilization (tubal ligation)	Low	0.5	Moderate-Low	High cost. Surgical intervention
Sponge	Moderate	20-24 - parous women 9-12- nulliparous women	Moderate	Moderate cost.
Spermicides	Moderate	12-30	High	Moderate cost.

Results

As the foregoing discussion proves, notable discrepancies come to light in a comparison of the various tables and surveys offered by international organizations, government agencies and research publications. On the basis of an in-depth analysis of these sources of information, the CTFailure Table presented by Contraceptive Technology, although incomplete, appears as one of the most accurate and comprehensive because it includes most of the internationally recognized methods and propounds estimates based on sound statistical principles.

Conclusion

In view of the neglect of the ethical principles of informed consent and nil nocere evidenced in some of the most widely used ratings and ranking of contraceptive methods it is vital that health care providers assist women in their search for the personally most suitable method. They should take into account their patients' interest in safety and be aware of studies on the impact of contraception on the quality of life.[22]

References

[1] Curtis KM, Peipert JF. Long-Acting Reversible Contraception. NEJM.2017: 461-468.

[2] Cleland K, Peipert J, Westhoff C, Spear S, Trussell J. Family planning as a cost-saving preventive health service. NEJM 2011; 364 (18).e37. Doi:10.10561 NEJM p.1104373.

[3] Vessey M, Lawless M, Yeates D. Efficacy of different contraceptive methods. Lancet 1982;1:841.

[4] World Health Organization (WHO) Available at: www.who.int/mediacentre/re/factsheets/fs35/en (Accessed Dec 15, 2017).

[5] CT Failure Table. pdf. Available at: www.contraceptivetechnology.org/the-book/take-a-peek/contraceptive-efficacy.). Accessed August 27, 2016).

[6] Code of Ethics. Current Opinions. Chicago, Illinois: American Medical Association, 1992.

[7] Trussell J. Contraceptive efficacy. Table 3-2. In: Hatcher RA, Trussell J, Nelson AL, Cates W, Kowal D, Policar M. Contraceptive Technology:

Twentieth Revised Edition. New York, NY: Ardent Media, 2011. CTFailure Table.pdf. Available at: www.contraceptivetechnology.org/the-book/take-a-peek/contraceptive-efficacy.). Accessed August 27, 2016).

[8] Trussell, J. Contraceptive Failure in the United States. Contraception. 2011;83(5):397-404.

[9] Food and Drug Administration. Available at: http://www.fad.gov/ForConsumers/ByAudience/ForWomen/FreePublications/ucm313215.htm.) (Accessed January 16, 2017).

[10] Trussell J, Raymond EG, Cleland K. Emergency Contraception: A Last Chance to Prevent Unintended Pregnancy. Office of Population Research (OPR). Princeton University. April 2017.

[11] Pschyrembel. Klinisches Wörterbuch. Berlin & New York: Walter de Gruyter, 1990.

[12] Gröger S, Grüne B. Kontrazeption. In: K. Diedrich (Ed.) Gynäkologie und Geburtshilfe. Berlin: Springer, 2000: 60-87.

[13] Kraetschmer K. Are women denied the right of self-decision in matters of family planning and birth control? Saarbücken: Scholars' Press, 2017.

[14] Centers for Disease Control and Prevention. U.S. Medical Eligibility Criteria for Contraceptive Use, 2016. Available at: https://www.cdc.gov/mmwr/volumes/65/rr/rr650301.htm. (Accessed March 26, 2017).

[15] U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. Available at:https://www.cdc.gov./reproductivehealth/.../contraceptive_methods... (Accessed August 8, 2017).

[16] Office of Population Affairs. Available at: http://www.hhs.gov/opa/pregnancy-prevention/non-hormonal-methods/natural-family-planning/index).(Accessed January 24, 2017).

[17] American Congress of Obstetricians and Gynecologists (ACOG). Availabe at: www.acog.org/Patients/FAQs/Fertility-Awareness-Based-Methods-of-Family-Planning.(Accessed Feb 14, 2017).

[18] Mayo Clinic. Available at:http://www.mayoclinic.org/tests-procedures/cervical-mucus-method/basics/definition.(Accessed Febr 14, 2017).

[19] Georgetown University. Available at: www.thehoya.com/contraception-restricted. (Accessed April 24, 2017).

[20] Polis CB, Bradley SE, Bankole A, Onda T, Croft TN, Sing S. Contraceptive Failure Rates in the Developing World: An Analysis of Demographic and Health Survey data in 43 Countries. New York: Guttmacher Institute, 2016. Available at: http://www.guttmacher.org/report/contraceptive-failure-rates-in-developing-world.).(Accessed Jan 9,2017).

[21] Kraetschmer K. The pharmacology of contraception. Journal of Pharmacology Research. 2018 (forthcoming).

[22] Zethraeus N, Dreber A, Ranehill E, Blomberg L, Labrie F, Schoultz B, Johnnesson M, Lindén Hirschberg A. A first choice combined oral contraceptive influences general well-being in healthy women. Fertility and Sterility, online 18 April 2017. doi 10.1016/j.fertnstert.2017.02.120. Available at: ki.se/.../oral-contraceptives-reduce-general-well-being-in healthy-women.(Accessed June 21, 2017).

Citation: **Kurt Kraetschmer**. *Can Ratings of Contraceptive Efficacy Provide an Impetus for Birth Control and Family Planning?. Open Access Journal of Gynecology and Obstetrics. 2018; 1(1): 27-39.*

Copyright: © *2018* **Kurt Kraetschmer.** *This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.*