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3D Display of Stillbirth in Indonesian Obstetrics Part 4: Contraception as Preventive Determinant?

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Introduction

The previous report (1) showed *antenatal visits* to be a key determinant of late fetal survival. A tenfold risk of stillbirth (SB) was noted for women with NOAV (94.0/1000) vs 7+ visits (9.4/1000). But within 4 education categories, *antenatal visits (AV)* increases with contraceptive use, leading to the current analytical step: to co-control for *contraceptive use (CONUSE = FP)*. This "3D feedback" gives patterns of risk of SB by FP & the five co-controls (a) antenatal visits, (b) registration status, (c) maternal morbidity, (d) complication of labor/delivery, and (e) birth weight.

Material and Method

The material and method remains unchanged. The five 3D figures are self-contained documents that serve as reference - current and future. Added to figures 1-10, figures 11-15 lead to a six-variate closed control system (*SEXTET*) of SB. The control scheme is detailed in figure 11. Access to the baseline is as usual (1).

Results

Risk of SB by FP & AV: As shown in figure 11, it is *antenatal visits (AV)* that is associated with a 10.44-fold risk of SB among "NOFP"-women (97.1/9.3) vs only a 1.34-fold risk of SB among "NOAV"-women for NOFP against pill use (97.1/72.6). Put to ratio, the two relative risks (RR) lead to a RRR of 7.79 *in favor of AV over FP* as summarized in the EPINOTE. Since FP increases with education (TABLE III), *the weak "Pill effect"* may in fact be one of mainly education. This was found in a previous analysis that gave the risk of hospital perinatal death in TRIO-control for education, family planning and antenatal visits (2). In that study, the order of importance of the beneficial effects on perinatal survival was (1) antenatal visits, (2) education and (3) FP.

For a summary structure, the contracted table in the upper left corner of figure 11 gives the risks of SB in a four-quadrant arrangement with two categories for both AV and FP. The ratio of the two relevant relative risks(RRR) is still 4.19 *in favor of AV over FP*, given in the EPINOTE. In sum, within specific FP-groups *antenatal visits* remains associated with a multifold decrease in the risk of SB and the residual FP effect is actually confounded with education. So far, family planning per se cannot be shown to favorably affect late fetal survival.

Measurable preventive benefits of family planning: However, aside from "promoting" *antenatal care*, as shown in TABLE II, family planning elongates the birth interval as shown in TABLE IV. For women breast feeding their live birth for 6-11 months, the mean duration in months of the last birth interval is 28.0 months for NOFP, 35.3 months for condom use, 41.0 months for pill use, and 44.8 months for IUD use, the latter being a 16.8 months elongation. In addition, as shown elsewhere (3), the rate of loss of the last live birth decreases strongly with increasing duration of birth interval, as does the rate of SB of the current birth among women with last live birth loss. These four benefits must be kept in mind to perceive the importance of adding contraception as a "spacing support" to breast feeding. FP-AV-BF come together.

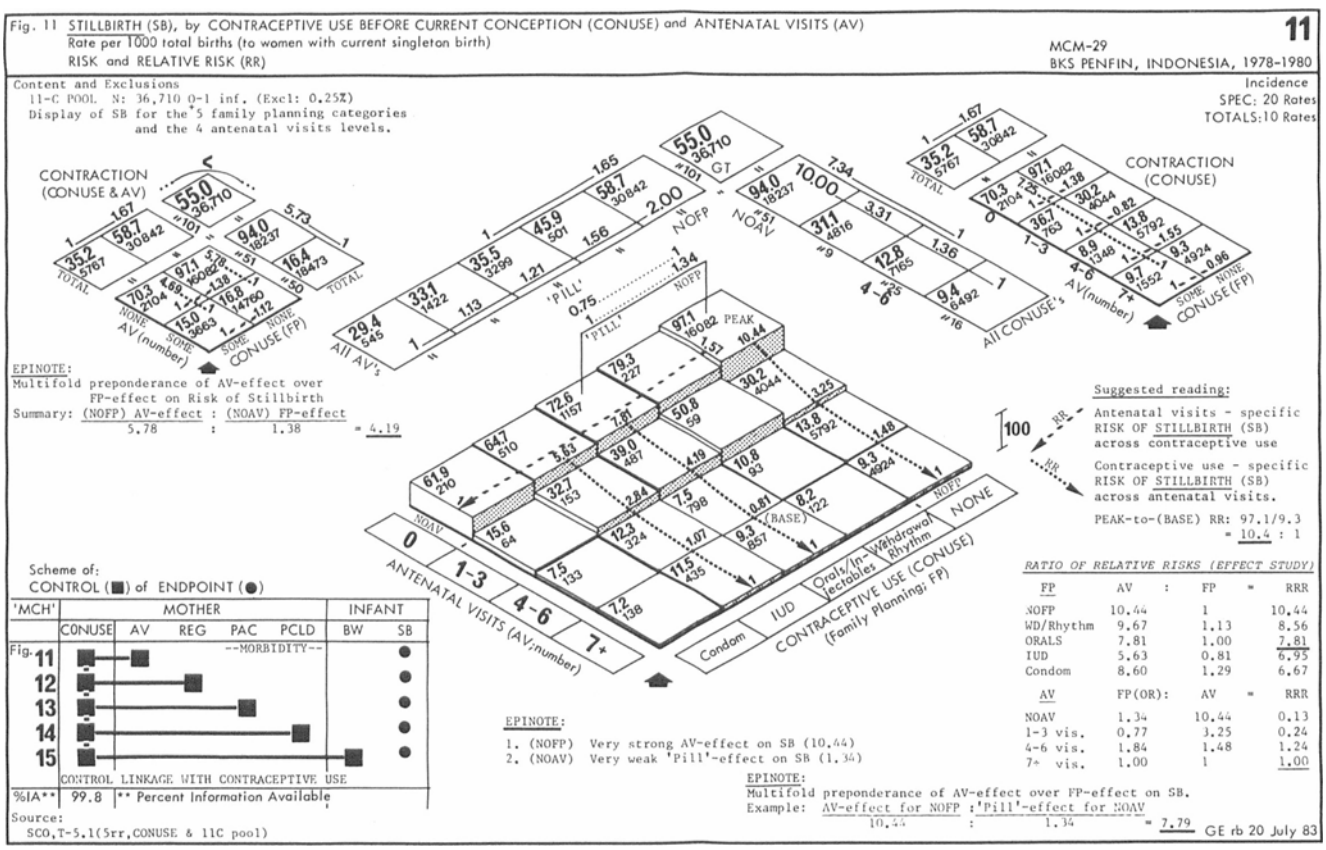


TABLE III. Percent women with some contraception (CONUSE), by Education and Maternal age. N = 36,736

AGE(yrs): ED(yrs)		-19	20-24	25-29	30-34	35+	TOTAL
0	%	0.4	2.9	10.5	13.8	16.1	10.5
	n	234	408	314	398	740	2094
1-6	%	1.1	6.6	17.6	22.8	21.4	13.0
	n	2533	5742	3657	2580	2964	17476
7-12	%	1.7	8.8	24.1	34.6	36.4	19.5
	n	1162	5709	4736	2350	1434	15391
13+	%	5.6	5.3	18.0	33.4	35.8	20.7
	n	18	395	735	434	193	1775
ALL ED's	%	1.3	7.4	20.6	27.8	25.2	15.9
	n	3947	12254	9442	5762	5331	36736

Source: SCO,T-28.1(5rr AGE & 11C Pool) Excl: 0.18%

AGE-specific prevalence of CONUSE across ED "+"
ED-specific prevalence of CONUSE across AGE "+"

TABLE IV. Mean months of last birth interval (BI), by Breast feeding & Contraceptive use. N=24,624

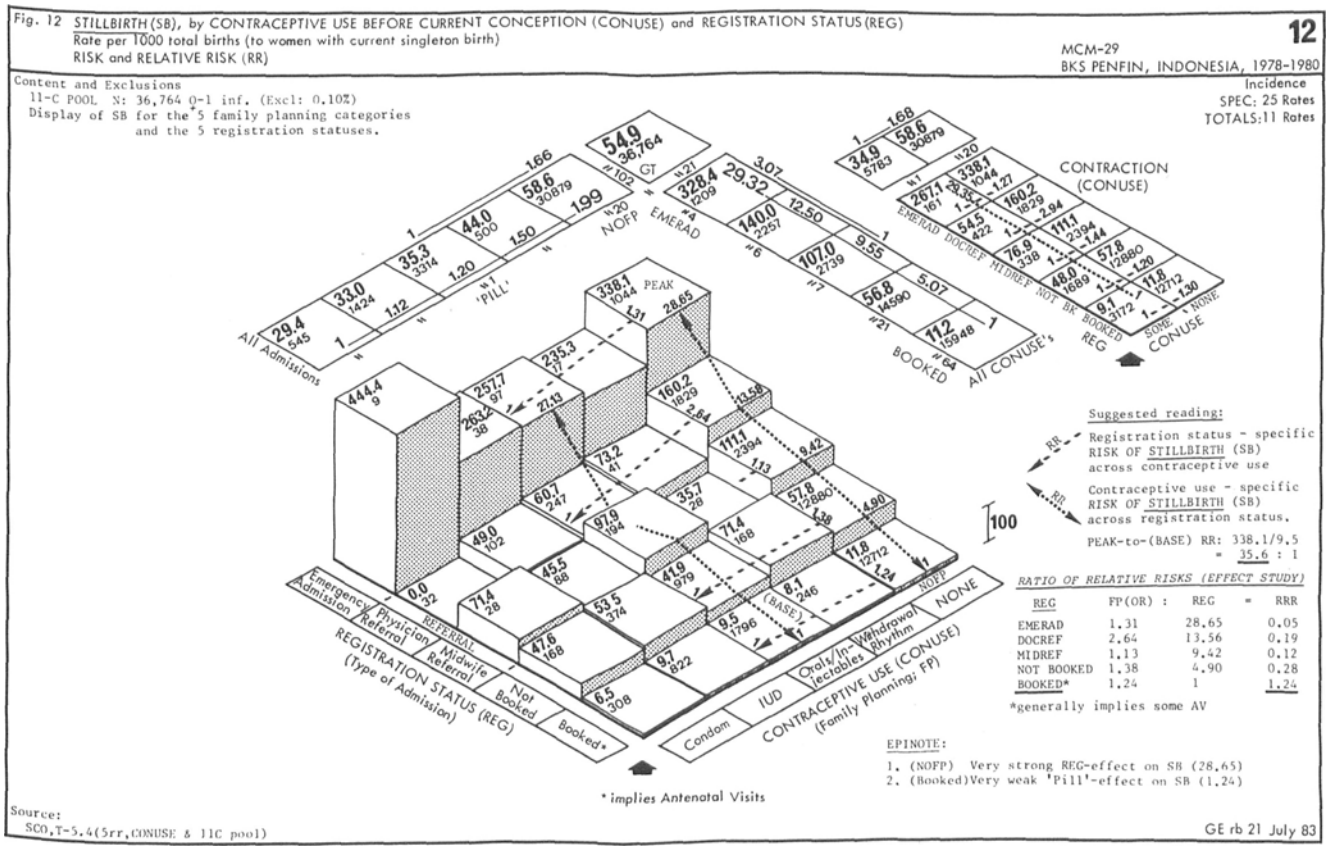
CONUSE: BF(ms)		NONE	CONDOM	ORALS	IUD	Other	TOTAL
0	mean	23.9	32.3	37.0	41.4		26.5
	n	1534	28	192	81	30	1865
1-5	mean	23.5	34.7	36.5	40.9		26.2
	n	2940	61	392	154	81	3628
6-11	mean	28.0	35.3	41.0	44.8		31.4
	n	7802	247	1513	654	276	10492
12+	mean	34.8	41.3	45.2	46.3		37.6
	n	5772	205	1157	523	173	7830
ALL BF's	mean	28.7	37.6	41.6	44.7	4	31.8
	n	18827	542	3278	1413	564	24624

Source: SCO,T-27 (4rr BF(PLB) & 11C Pool) Excl: 33.09%

CONUSE-specific BI-LENGTH(ms) across BF(PLB) "+"
BF(PLB)-specific BI-LENGTH(ms) across CONUSE "+"

Risk of SB for "NOFP"-women (NOCONUSE): The "risk chains" among women with no family planning before current conception are important baselines. The *low extreme* of the risk gradients across the five co-control factors is 9.3/1000 for 7+ AV's, 11.8/1000 for booked patients, 19.7/1000 for no maternal morbidity (non-hemorrhage anemia is included), 28.8/1000 for women with no complications of labor/delivery, and 30.1/1000 for infant birth weights of 3000-3499g)...right most blocks in Figs. 11-14, etc. This is the same *lowest risk profile* as delineated in part 3 with maximal likelihood of late fetal survival. Obviously, *antenatal visits* and *booking* are the two key interventions to maximize late fetal survival; and *in combination* "their" risk of SB was 7.6/1000 (part 3, Fig.7) applying in 1978-1980 to 16.4% of all singleton deliveries 6032/36710). Conversely, the *high extreme* of the risk gradients is 97.1/1000 for NOAV, 338.1/1000 for emergency admissions, 297.1/1000 for hemorrhage per vagina, 728.9/1000 for placenta abruptio, & 489.8/1000 for infant birth weight below 1500 g. Again, this is the *highest risk profile*, i.e. highest SB risk. Fortunately, "only" 2.39% (737/30,899;Fig.15), for example, of the infants weighed less then 1500 g with an associated SB risk of 489.8/1000 among women with NOFP. There is illimited "access" for other such measurements.

Still among "NOFP"-women, the SB risk relative (RR) to that associated with 7+ AV's (Fig.11; 9.3/1000) is 1.48 for 4-6 AV's, 3.25 for 1-3 AV's, and 10.44 for NOAV. The latter is a 944% excess risk of SB for NOAV over 7+ AV (97.1/9.3 - 1) that unfortunately applies to 52.1% of all NOFP-women (16082/30842). The excess risk is still 604% for NOAV over 4-6 AV's (97.1/13.8 - 1) - *an interesting level of antenatal care for programmatic consideration*. But even 1-3 visits would have a notable impact: the excess risk of NOAV over 1-3 AV's is still 222% (97.1/30.2 - 1). Similar quantitated considerations are at hand in figures 12-15. Epidemiology is being applied to the monitored "reproductive health care" process with the findings having implications for all care levels. In sum, the *risk-reducing power of antenatal visits* withstands all controls so far applied. The "FP-effect" may be confounded with those of AV & ED : need for new inquiries.



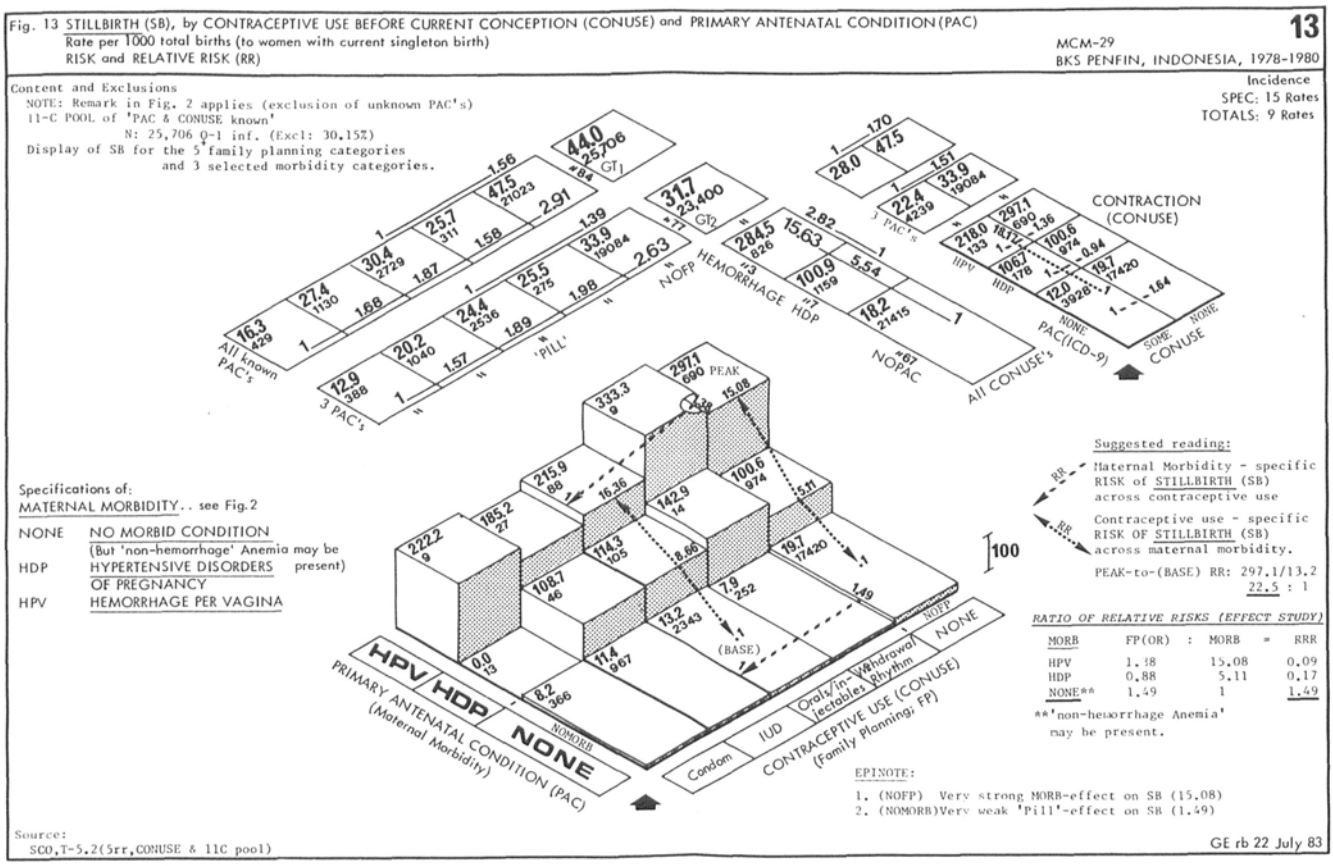


Fig. 13 STILLBIRTH (SB), by CONTRACEPTIVE USE BEFORE CURRENT CONCEPTION (CONUSE) and PRIMARY ANTENATAL CONDITION (PAC)
Rate per 1000 total births (to women with current singleton birth)
RISK and RELATIVE RISK (RR)
13
MCM-29
BKS PENFIN, INDONESIA, 1978-1980
Incidence
SPEC: 15 Rates
TOTALS: 9 Rates
Content and Exclusions
NOTE: Remark in Fig. 2 applies (exclusion of unknown PAC's)
11-C POOL of 'PAC & CONUSE known'
N: 25,706 0-1 inf. (Excl: 30.15%)
Display of SB for the 5 family planning categories
and 3 selected morbidity categories.
CONTRACTION (CONUSE)
NOFP
HEMORRHAGE
HDP
'PILL'
HPV
NOPAC
All known PAC's
3 PAC's
All CONUSE's
PAC(ICD-9)
CONUSE
PEAK
Specifications of:
MATERNAL MORBIDITY.. see Fig.2
NONE NO MORBID CONDITION
(But 'non-hemorrhage' Anemia may be present)
HDP HYPERTENSIVE DISORDERS OF PREGNANCY
HPV HEMORRHAGE PER VAGINA
HPV/HDP
NONE
PRIMARY ANTENATAL CONDITION (PAC)
(Maternal Morbidity)
(BASE)
Condom
IUD
Orals/Inj.-Withdrawal/Jectables/Rhythm
CONTRACEPTIVE USE (CONUSE)
(Family Planning, FP)
Suggested reading:
Maternal Morbidity - specific RISK of STILLBIRTH (SB) across contraceptive use
Contraceptive use - specific RISK OF STILLBIRTH (SB) across maternal morbidity.
PEAK-to-(BASE) RR: 297.1/13.2 = 22.5 : 1
RATIO OF RELATIVE RISKS (EFFECT STUDY)
MORB FP(OR) : MORB = RRR
HPV 1.38 15.08 0.09
HDP 0.88 5.11 0.17
NONE** 1.49 1 1.49
**'non-hemorrhage Anemia' may be present.
EPINOTE:
1. (NOFP) Very strong MORB-effect on SB (15.08)
2. (NOMORB)Very weak 'Pill'-effect on SB (1.49)
Source:
SCO,T-5.2(5rr,CONUSE & 11C pool)
GE rb 22 July 83

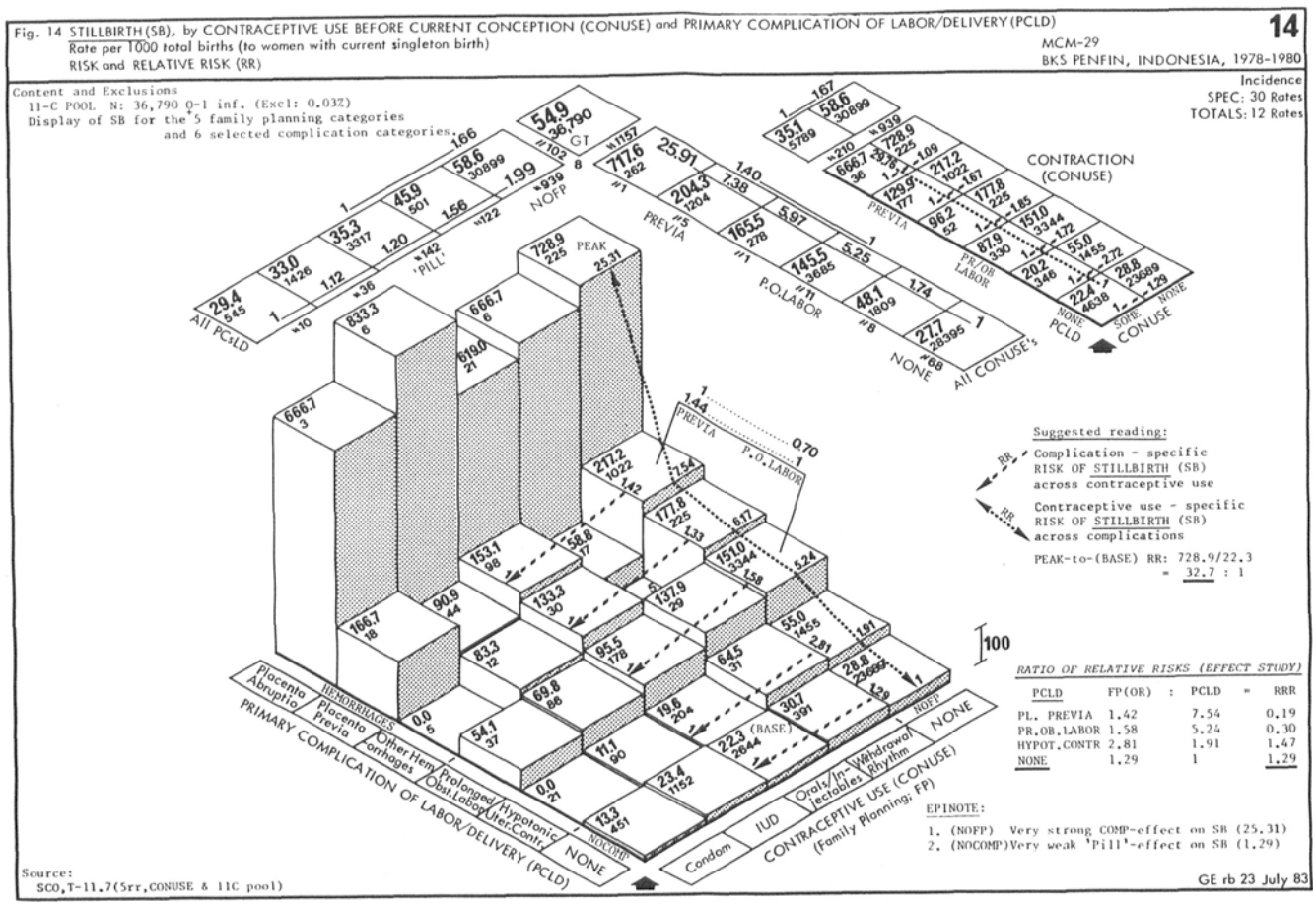
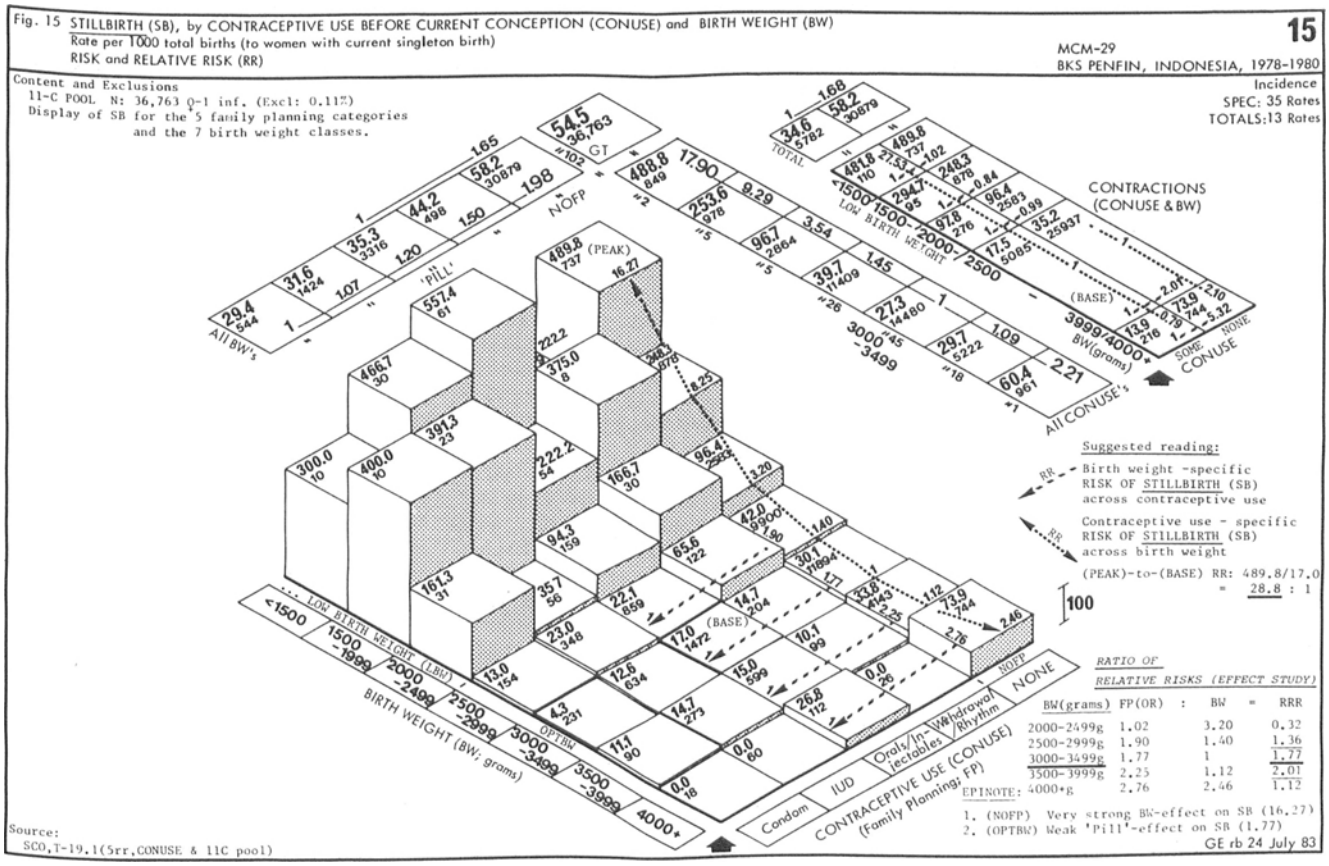


Fig. 14 STILLBIRTH (SB), by CONTRACEPTIVE USE BEFORE CURRENT CONCEPTION (CONUSE) and PRIMARY COMPLICATION OF LABOR/DELIVERY (PCLD)
Rate per 1000 total births (to women with current singleton birth)
RISK and RELATIVE RISK (RR)
14
MCM-29
BKS PENFIN, INDONESIA, 1978-1980
Incidence
SPEC: 30 Rates
TOTALS: 12 Rates
Content and Exclusions
11-C POOL N: 36,790 0-1 inf. (Excl: 0.03%)
Display of SB for the 5 family planning categories
and 6 selected complication categories.
CONTRACTION (CONUSE)
NOFP
'PILL'
PREVIA
P.O.LABOR
PR/OB LABOR
HYPOT.CONTR
All PCLD
All CONUSE's
PCLD
CONUSE
PEAK
Placenta Abruptio
Placenta Previa
Other Hem/orrhages
Prolonged/Obst.Labor
Hypotonic/Uter.Contr.
NONE
HEMORRHAGES
PRIMARY COMPLICATION OF LABOR/DELIVERY (PCLD)
(BASE)
Condom
IUD
Orals/Inj.-Withdrawal/Jectables/Rhythm
CONTRACEPTIVE USE (CONUSE)
(Family Planning, FP)
Suggested reading:
Complication - specific RISK OF STILLBIRTH (SB) across contraceptive use
Contraceptive use - specific RISK OF STILLBIRTH (SB) across complications
PEAK-to-(BASE) RR: 728.9/22.3 = 32.7 : 1
RATIO OF RELATIVE RISKS (EFFECT STUDY)
PCLD FP(OR) : PCLD = RRR
PL. PREVIA 1.42 7.54 0.19
PR.OB.LABOR 1.58 5.24 0.30
HYPOT.CONTR 2.81 1.91 1.47
NONE 1.29 1 1.29
EPINOTE:
1. (NOFP) Very strong COMP-effect on SB (25.31)
2. (NOCOMP)Very weak 'Pill'-effect on SB (1.29)
Source:
SCO,T-11.7(5rr,CONUSE & 11C pool)
GE rb 23 July 83



Deductions and Analytical Implications

The dual control of the risk of SB for AV and FP strengthened the evidence of part 3 (1): AV emerges so far as the main determinant of late fetal survival (Fig. 11). FP per se favors AV (TABLE II, part 3) and FP in turn increases with both maternal age and education (TABLE III). Since parity is biologically in strong association with age, the next analytical modules are to introduce as co-controls parity (part 5?) and education (part 6?). Particularly developing countries need to learn about the "parity effects" in order to identify a biological need for spacing and preventing excess fertility - and so reducing various risks. Finally, since both FP and AV increase with education, a provocative TRIO-control of SB will be for (ED/FP/AV), part of a complete eight-factor control model (OCTET). In a previous analysis of the risk of hospital perinatal death, AV and ED were confronted as controls, but in co-control for parity, hemoglobin level, type of labor, type of presentation, type of delivery, type of complication or attendant at delivery: AV emerged the "winner" (4).

Summary and Outlook

The addition of *contraception* to five controls (1) of the risk of SB did not alter the previous finding: antenatal visits to emerge apparently as the main determinant of late fetal survival in Indonesian university obstetrics. Parts 1-4 are the basis for inquiring into the effects of parity and education, completing thus an OCTET control model of SB. The inquiry may also be expanded by computerized multivariate analysis; but the strongest determinants should then be used in a control system for 3D display of the SB risk for medical/paramedical education. The professional providers of both "SERVICE AND DATA"(PSD) need early access to their data in order to apply implications to their service job (5).

Zusammenfassung und Ausblick

Die Aufnahme der *Kontrazeption* in das empirische Kontrollmodell der Totgeburt änderte kaum die frühere Beobachtung: über das Gesamtrisiko der Totgeburt entscheided primär die Schwangerschaftsbetreuung. Eingliederung der Parität und der Schulbildung sollten das Modell abrunden (Erweiterung des *SEXTETTs* zum *OKTETT*).

Falls ein faktoranalytisches Komputerprogramm eingesetzt würde, müssen die wichtigsten Resultate die Ärzte frühzeitig und in verständlicher Sprache erreichen. Man kann zum Beispiel die wichtigsten Determinanten der Totgeburt in die "Basis" (=Kontrolle) der 3D Darstellung einbauen. Die Ärzte brauchen "ihre Daten" zur "Selbststeuerung"(5).

Résumé et Perspective

L'adjonction de la *contraception* au modèle complet de cinq contrôles du risque de mortinatalité (1) n'a pas changé l'observation antérieure: à ce point d'analyse, ce sont les consultations prénatales qui influent très fortement sur la survie fétale tardive. Or, la parité ainsi que le niveau d'instruction devraient compléter ce contrôle, ainsi transformant le *SEXTUOR an OCTUOR*. Ce travail nécessaire se conçoit aussi par analyse multivariate programmée - à condition de ne pas déconnecter la profession obstétricale. Pour pallier ce risque réel, on peut envisager une présentation 3D en fonction des déterminants les plus importants. Les médecins ont besoin de leurs données en vue d'adopter une stratégie (5).

References

(1) BERNARD RP, SASTRAWINATA S.: 3D Display of stillbirth in Indonesian obstetrics; Part 3: Antenatal visits as preventive determinant. Sozial- und Präventivmedizin *29, in press* (1984)

(2) BERNARD RP, SASTRAWINATA S.: Issue de la grossesse pour la mère et l'enfant: le risque biologique et les soins prénatals (SSM-13). In: Chelli M, Kharouf M, Daly RM, eds. Le contrôle de la fertilité: progrès récents. Tunis: STGO/ONPFP, 1983: 101-130

(3) BERNARD RP, SASTRAWINATA S.: Social obstetrics and birth interval: medical education with MCM feedback (MCM-32). In: Proceedings, Internat. Conf. on med. education in the field of primary maternal child health care. Cairo, Egypt 5-7 Dec. 1983, *in press*

(4) BERNARD RP, SASTRAWINATA S.: Maternity care and perinatal mortality in Indonesia (MCM-20). In: Del Mundo F, Ines-Cuyegkeng E, Aviado DM, eds. Primary maternal and neonatal health: a global concern. New York, Plenum Press, 1983: 265-305

(5) SASTRAWINATA S.: Analysis of data and its impact on strategies for maternal and neonatal care. In: *ref 4*, 1983: 307-321