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Risk of Maternal Death in Indonesia and Sweden

Patterns and Trend in 3D Display for Teaching

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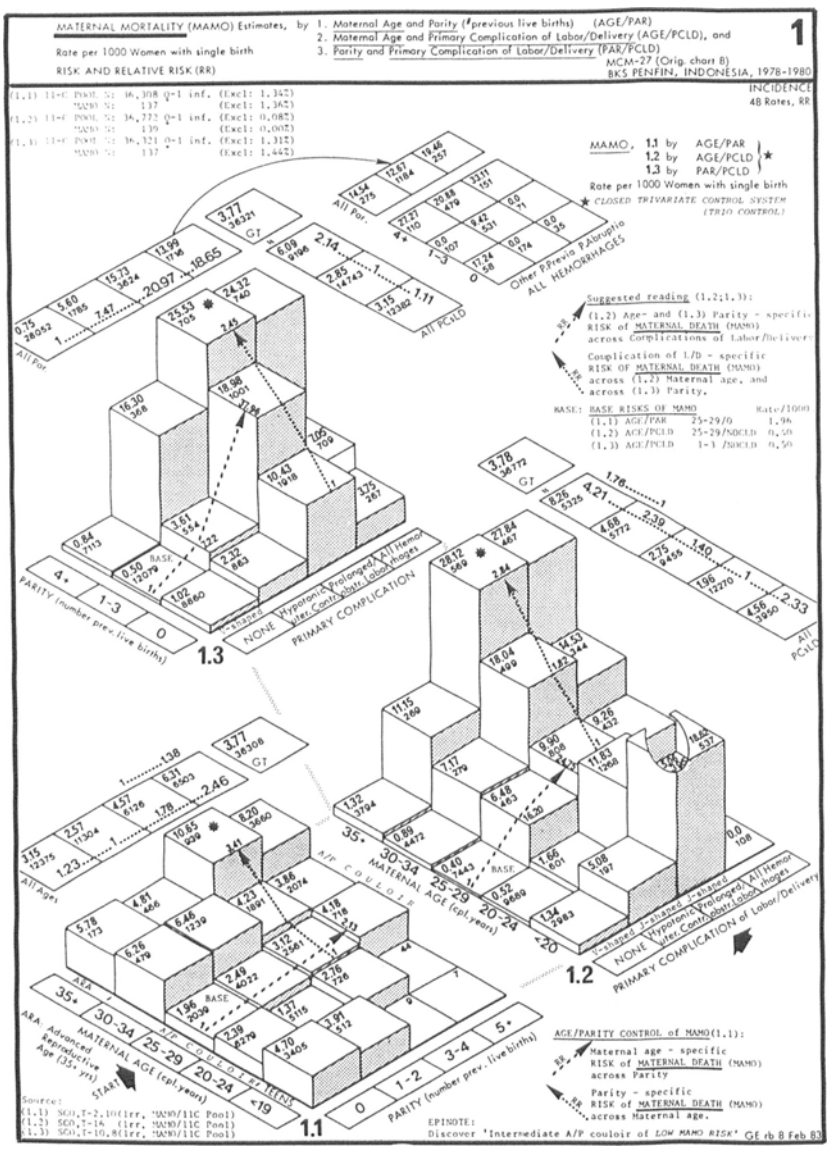
Introduction

Maternal death around birth has remained a key indicator of national development. Therefore, reference data sets are needed to measure progress in both less developed countries (LDCs) and developed countries (DCs). A unique opportunity to exhibit two contrasting data sets is the primary reason for this short publication. Documentation is provided for maternal death recorded in an 11-University center study in Indonesia from 1978 to 1980 and for national maternal death statistics for Sweden for the last 50 years, that is from "1930 to 1980".

Materials and Methods

The Indonesian data stem from standard computer outputs (SCOs) of the Maternity Care Monitoring (MCM-) library pertaining to deliveries from 1978-1980 (1,2). Fig. 1 was developed from secondary calculations. It is a perfectly *closed trivariate control system (TRIO)* of risks of maternal death for (1) maternal age, (2) parity and (3) complication of labor and/or delivery. Logical *spatial arrangement* of the three binary control combinations and drawing of the risks on *wide angle isometric paper* leads to transparency for fact conveyance. The Swedish data set is derived from various sources of official figures (3). Secondary calculations led to Fig. 2 which gives *age-specific secular trends* of maternal death again in 3D display. Caution should be applied to comparing between these two data sets from "South and North". On the other side, co-publication of the two sets gives insights in the evolutionary process of the decline of the global maternal mortality during the 20th century.



Results

Indonesian 2-year University Data Set.

Fig. 1.1 shows the *lowest risks* of maternal death to delineate an *"intermediate age/parity couloir"*. Late reproduction is associated with an increased risk, as is teenage reproduction. This is a strong epidemiological health argument for confining human reproduction to intermediate age and parity and to prevent teenage birth and reproduction in advanced reproductive age.

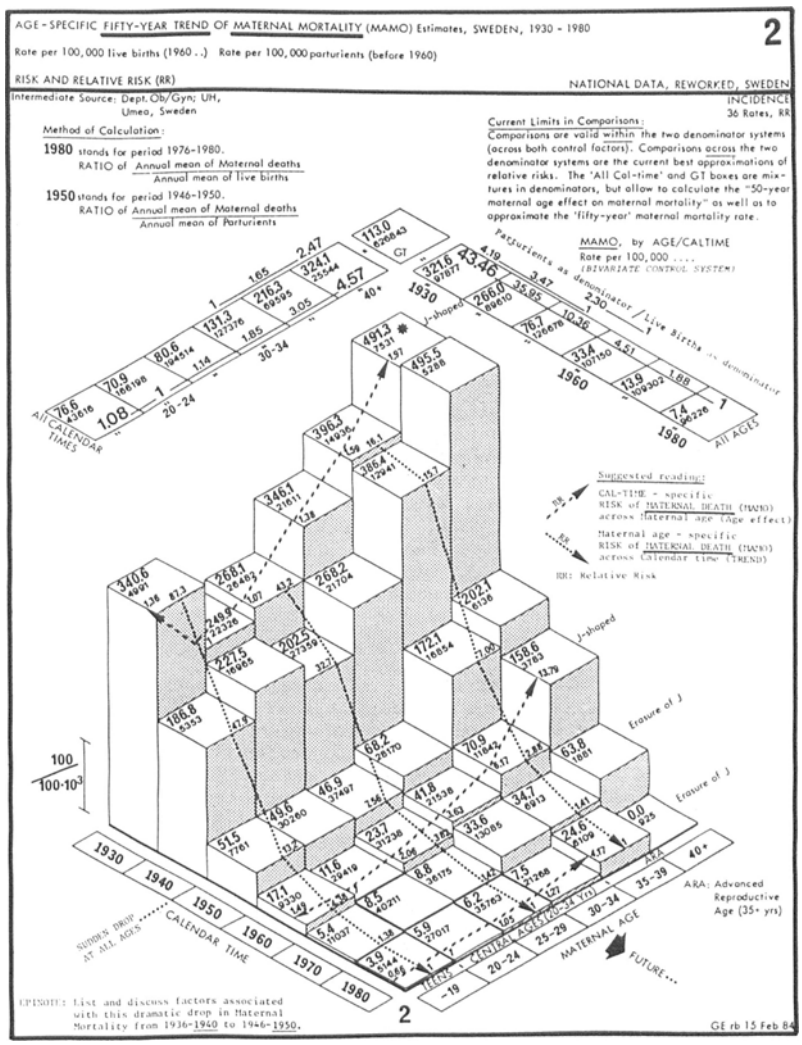
Fig. 1.2 keeps the control for age but replaces parity with the control for complications of labor and/or delivery. *Lowest risks* of maternal death are now linked with *NO COMPLICATIONS* of labor/delivery. Hypotonic uterine contraction and, more so, *prolonged/obstructed labor* show a multifold risk of maternal death vs women with no complications. For instance, for women aged 25-29 years, a 25-fold risk of maternal death links with prolonged/obstructed labor vs women with no complications (9.90/0.40=24.75). But this high risk is dependent on maternal age: a marked *J-shaped pattern* shows an additional rise by a factor of 2.84 (28.12/9.90=2.84). Teenage and 35+ years among women with *prolonged/obstructed labor* are associated with the *highest risks* of maternal death (18.62 and 28.12/1000). The largest relative risk (RR) is thus 70.30 (28.12/0.40=70.30), an extraordinary variation within one bivariate control system. Prolonged/obstructed labor is thus a prime killer around birth.

Fig. 1.3 keeps the control for complication but parity is substituted for age. A 38-fold risk of maternal death emerges among women with 1-3 previous live births if labor was prolonged/obstructed vs absence of complications (18.98/0.50=37.96). And *grandmultiparity* (4+) further accentuates the differential to an over 50-fold risk of maternal death (25.53/0.50=51.06). *Prolonged/obstructed labor in combination with high age/parity* emerges thus not only as the greatest late fetal killer (1) but also as the main maternal killer at birth.

Three-tiered Fig. 1 merits reflective contemplation, since it gives access to 3 key factors affecting maternal mortality.

Sweden's 50-year National Data Set.

Fig. 2 is an extremely informative plot, since it shows the 50-year evolution of the risk of maternal death by maternal age in one developed country. At all maternal ages, the risk of maternal death falls *cascade-like*; for instance for women aged 25-29 years from $268.1/10^5$ down to $6.2/10^5$ – a 43-fold decline. The single steepest fall is noted from *before WW2 to after WW2*, from $202.5/10^5$ to $46.9/10^5$ – an over 4-fold improvement. Associated factors are currently under review (3). While vanishing for the last two time segments (1970;1980) the *J-shaped risk pattern* of maternal death across maternal age was most pronounced for the *most distant time segment* (1930). One may hypothesize that a major cause of Swedish maternal death fifty years back was prolonged/obstructed labor – currently under scrutiny (3). If confirmed, there would be a "parental link" between Fig. 1 and Fig. 2, that is between Sweden's national profile *fifty years ago* and Indonesia's *recent* profile stemming from the university data set, since a *similar J-shaped risk pattern* of maternal death across maternal age is noted for *prolonged/obstructed labor*.



Deduction and Analytical Implications

Concomitant study of maternal mortality (among others) in the SOUTH and the NORTH, with control for maternal age and other factors, may lead to a consistent South-North continuum of mortality decline as documented by epidemiological assembly. *Historical documentation* of "reproductive death risks" in developed countries ('North') may thus portray current and future mortality declines in developing countries ('South'). Understanding the *intervention factors* that led to risk declines in the North will benefit programmatic risk decline in the South. The historical promotion of midwives, and training of traditional birth attendants, in Sweden many decades ago, merits careful documentation with respect to the associated decline in maternal and perinatal mortality. This example may be used for promotive teaching in developing countries. Professional treatment and referral of prolonged/obstructed labor by paramedical personnel of birth attendance in Sweden may have been the single most important concerted intervention to reduce maternal (and perinatal) mortality.

Summary and Outlook

Epidemiological study of maternal death in Indonesia and Sweden suggests a link between two unrelated data sets. Fifty years ago ('1930'), the Swedish maternal death risk exhibited a pronounced *J-shaped pattern* by maternal age; and a similar pronounced *J-shaped pattern* is observed 50 years later in Indonesia for women with prolonged/obstructed labor attended at the top referral and teaching institutions. Epidemiological documentation of 'North data sets' may possibly be used for teaching on factors affecting 'South mortality transition'. The documentation of a 'North-South transition' could accelerate the current dynamics of needed mortality decline by pointed programmatic intervention. The two figures are *self-contained reference baselines*.

Zusammenfassung und Ausblick

Die epidemiologische Studie der Müttersterblichkeit in Indonesien und Schweden weist auf eine Verbindung zwischen zwei verschiedenartigen Datenbeständen. Vor einem halben Jahrhundert zeichneten sich in Schweden die Risiken der Müttersterblichkeit nach Alter der gebärenden Mütter durch ein *markantes J-Profil* aus; 50 Jahre später wurde ein ähnliches *J-Profil* nach Alter der gebärenden Mütter in Indonesiens Universitätskliniken beobachtet, und zwar für die Frauen mit Komplikationen bei der Geburt. Epidemiologische Dokumentation von "Nord Daten" könnte möglicherweise zur Kenntnissaneignung über Faktoren des "Süd Sterblichkeitsübergangs" gebraucht werden. Die Dokumentation einer "Nord-Süd Transition" könnte die jetzige Dynamik der Sterblichkeitsverminderung beschleunigen – mit gezielter Förderung von Projekten. Fachliche Betreuung und Weiterleitung von Geburtskomplikationen war in Schweden wahrscheinlich der wichtigste Schritt zur Senkung der Mütter-(& perinatalen) Sterblichkeit.

Résumé et Perspective

L'étude épidémiologique de la mortalité maternelle en Indonésie et Suède, suggère l'existence d'un lien pour deux sources de données indépendantes. Il y a un demi siècle, le risque de mortalité maternelle en Suède emprunta, en fonction de l'âge maternel, *le profil d'un J*; 50 ans plus tard, un *profil en J* similaire est observé en Indonésie parmi les femmes au travail prolongé et obstrué dans les services universitaires d'obstétrique. Une documentation épidémiologique de données provenant du 'Nord' pourrait servir à l'enseignement au 'Sud'. La documentation d'une 'transition nord – sud' pourrait mener à une accélération de la dynamique actuelle dans la réduction de la mortalité moyenant des prestations visées. Une revalorisation du métier des sages-femmes et des matrones semble constituer la clé pour une baisse rapide de la mortalité maternelle.

Références

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