

REPRODUCTION RESEARCH AND HEALTH

PART I MATERNAL HEALTH

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INTRODUCTION

Some 30 years ago in 1948, when the World Health Organisation was inaugurated in Geneva, Switzerland, a broad concept of "HEALTH" was innu-
nated as follows:

"Health is a state of physical, mental and social well-being, and not merely the absence of disease and infirmity". Whilst the "physical" aspects of health are overtly apparent to all of us, the "men-
tal" aspects of health are less, and the "social" aspects to a still lesser extent appreciated by many of us. However, in the present day context of health care, the latter two aspects have assumed as im-
portant a role in human well being and human wel-
fare, as the "physical" aspects of health or ill-
health. When reviewed from an evolutionary view-
point, the health care trends in the 20th century display distinct patterns, in that the first two quarters of this century have been directed at at-
taining optimal levels of the "physical" aspects of human health; and in the third quarter of this century has emerged the awareness of "mental", and more recently "social" aspects of health and well-being. As we now enter the last quarter of this century, tremendous strides are being directed to-
wards achieving total health and well-being.

If we now apply these broad changing concepts of HEALTH to the special field of human repro-
duction, the changes witnessed in the 20th century, thus far, are phenomenal.

Exactly two decades ago, in 1959, an eminent reproductive scientist, Dr. Zuckerman, summed up the deliberations of the first large-scale inter-
national conference on Human Reproductive Physiology and Fertility Regulation in these words:
"Vast areas of the subject are still cloaked in an ig-

norance which prevents a national and scientific approach to the problem of population control ... The subject.... is still littered with legends (p. 1263)". However, the ensuing two decades (1959-1979) have witnessed considerable strides in all aspects of RESEARCH in the fundamental sciences of human reproduction and contraceptive technology, which have been primarily stimulated by the mounting concern over rapid population growth, in most countries of the world, particularly in the developing countries of South America, Africa and in our context, Asia, of which Malaysia and its Asean members are typical examples. Re-
searchers and research institutions, in both the developed and developing nations have, each in their own ways, contributed to an extensive wealth of basic knowledge in the biochemistry, physiology, pharmacology, pathology and bacteriology of human reproduction. Further, epidemiological and sociological studies in the field of human re-
production of communities in different parts of the world have led to a better understanding of MAN and WOMAN in their reproductive roles, and such studies have laid to rest many of the mis-conceived traditional legends and practices; thus helping to elucidate many of the longstand-
ing problems in the field of human reproduction. The currently ongoing world-wide researches in the field of human reproduction give considerable hope and encouragement towards the realisation of developing, on an international and scientific basis, improved means of regulating human reproduction in this last quarter of the 20th century, and into the foreseeable future. These are, in fact, the principal conclusions of the intensive "Review of the Reproductive Sciences and Contraceptive Development", initiated in 1974 by the Ford Foundation, with the participa-
tion of the Rockefeller Foundation of New York, U.S.A. and the International Development Re-
search Centre (I.D.R.C.) of Ottawa, Canada (Greep *et al.*, 1976).

The fundamental difference between the "health care" provided by the obstetrician to his patient and that by other medical practitioners to their patients is that the obstetrician has always to keep in consideration the health and well-being of

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* Inaugural Lecture (part) that was delivered on the 2nd March 1979 at the Faculty of Medicine, University of Malaya, Pantai Valley, Kuala Lumpur, MALAYSIA, under the Chairmanship of the Royal Professor Ungku. A. Aziz, Vice-Chancellor of University of Malaya.

at least TWO LIVES in every one of his obstetric patients — the mother and the unborn child. (In the case of multiple pregnancies, there are obviously more than 2 lives in each patient!). It is, therefore, all the more important that the obstetrician should always temper the management of his patient by rigidly adhering to the concept of "Primum Non-Nocere" for both the mother as well as for the unborn child.

Having crystallised the inter-relationships between Reproduction, Research and Health, it is my intention to present to you, what I consider to be, the four important and major areas of Human Reproduction and Health, and to show to you the health benefits attained by research. The four areas are:-

- 1) Maternal (Mother) Health (Part I)
- 2) Fetal (Child) Health (Part II) (To be published in the next issue)
- 3) Fertility Regulation (Family Planning) (Part III) (To be published in issue after next)
- 4) Fertility Augmentation (Infertility Management)

MATERNAL HEALTH

Looking back some 50 years ago, in the late 1920s, in the maternity hospitals of the Asian regions, some 3% (1 in 35) of women admitted in labour, died from childbirths; and, of course, numerically much more maternal deaths occurred amongst mothers delivering outside the hospital precincts! Such a pattern also prevailed, at that time, in the more developed western countries. Thus, Emeritus Professor Sir Dugald Baird of Aberdeen University, in his Ingleby Address to Birmingham University in 1960 entitled "The Evolution of Modern Obstetrics" (Baird, 1960), stated as follows: "Out of 19,000 women admitted to the Glasgow Maternity Hospital between 1925 and 1929, 542 died, (maternal case-mortality of 2.9%). Eclampsia occurred in 395 cases, with a maternal case-mortality of 18%. There were 226 deliveries following craniotomy, and 11% of the mothers died". It was, thus, apparent that childbirth in those days was a dangerous and wasteful process!

The three major sociological reasons for the excessive maternal mortality in the past (50 years ago) were: (1) Poverty, resulting in the mother having to weather her entire pregnancy status in a sub-optimal state of health, with reference to nutrition, physical rest and inter-current infections; (2) Ignorance (on the part of the mother and medical attendant) of the causes of many of the serious complications of pregnancy and labour, and the inadequacy of the methods of treatment available;

and (3) The lack of well-organised maternity services, staffed by well-trained medical personnel, which includes not only the doctor but also a host of other health personnel, such as nurses, midwives, laboratory technologists, medical social workers, dieticians, health visitors, radiographers and includes even the provision of an efficiently manned ambulance service to cover the "Flying Squad" service. This last service has been shown to play a significant role in salvaging many maternal deaths, by providing on-the-spot emergency treatment to critically ill and moribund mothers at their bedside, in their homes or in maternity clinics.

It is now pertinent to consider the five major causes of maternal mortality, and to review the impact that research and evolution of modern obstetric practice has had on them. The five major causes are: (1) infection (puerperal sepsis); (2) haemorrhage; (3) hypertensive disease of pregnancy (toxaemia of pregnancy); (4) difficult labour (dystocia); and (5) illegal abortion (criminal abortion).

1. Infection (Puerperal Sepsis)

Some 50 years ago, the most important cause of maternal deaths was puerperal sepsis. The situation as it prevailed then, was aptly described by Sir Dugald Baird (1960) as follows: "Even after a labour that had been entirely normal, a rigor on the second or third day, accompanied by a sudden rise of temperature and pulse, could mean death within a week from septicaemia and peritonitis. The clinical features were well known to the women themselves and to the handymen in attendance. The medical profession was very reluctant to admit that the doctor or midwife was often the carrier of the streptococcus and indeed sometimes the primary source of infection".

Prior to 1935, bacteriological research on the identification and typing of streptococci had made it possible to identify without doubt the source and mode of spread of the organism responsible for most causes of puerperal sepsis. This had led to the identification, control and treatment of the bacterial carriers amongst nurses, doctors, medical students, visitors and others. It also led to the use of masks, and the immediate isolation of infected cases. This was also the explicit reason for the siting of maternity hospitals and units, and, in particular, the postnatal (lying-in) wards, well away from other hospital units. Although these measures led to some decrease in the incidence of streptococcal sepsis, it was difficult to get them carried out really effectively (Baird, 1960).

The advent of the sulphonamides in the late 1930s, the penicillins in the 1940s, and large host

of bacteriostatic and bactericidal chemotherapeutic agents in the past 25 years, have all helped, in one way or another, to provide an effective spectrum of armamentaria in the prevention and treatment of not only puerperal sepsis, but also other infections in the pregnant and puerperal mother.

“The rise in the incidence of drug-resistant organisms in most maternity hospitals in recent years has not, so far, increased the maternal death-rate from sepsis; but it has underlined the need to practise the principles of isolation and barrier nursing if maternity hospitals are to be kept safe for the mother and more especially for the newborn child. In the overcrowded and under-staffed hospitals of today we have come to rely too much, (and I repeat “too much”), on chemotherapy. The need to design hospitals so that the risk of sepsis is reduced to a minimum is as important as ever it was. It would be most unfortunate if outbreaks of sepsis should curb the work of our maternity hospitals at a time when they are capable of doing so much for the safety and comfort of the mother and baby” (Baird, 1960).

In summary, the major factors that have, in recent years, contributed towards the reduction of maternal deaths from infection in pregnancy, including puerperal sepsis, are: (a) the practice of asepsis and antisepsis; (b) research advances in the bacteriology of puerperal infections; (c) the advent of broad spectrum of chemotherapy; (d) improved maternal nutritional status; (e) the avoidance of prolonged and difficult labours; and (f) the improved designing of hospitals (Baird, 1960)

2. Haemorrhage

Haemorrhage is still a major cause of maternal deaths, especially when the delivery takes place outside the precincts of well-equipped maternity units. Such a situation is more likely to arise in developing countries and more so in a rural than in an urban set-up. It is thus immediately apparent (to all of you) that the Malaysian mother runs a very much higher risk of maternal death from haemorrhage than does her counterpart in Stockholm, Sweden or even in neighbouring Singapore.

Reductions of maternal deaths from haemorrhage in the past 25 years have been phenomenal, and have been attained by an interplay of multiple health-benefit measures, both of preventive and of curative nature, and these are: (a) the reduction of grande-multiparity by effective family planning and health education; (b) the improved maternal nutritional status by socio-economic enhancement and health education of the community; (c) the reduction of severity of pregnancy toxæmia by improved obstetric care; (d) the institution of blood transfusion service; (e)

hospital delivery for the high-risk mother; (f) the avoidance of prolonged and difficult labours; (g) the institution of “Flying-Squad” service; (h) the availability of potent oxytocics in the prevention and treatment of atonic post-partum haemorrhage; and (i) the recognition and treatment of blood coagulation disorders in pregnancy.

3. Hypertensive Disease of Pregnancy (Toxaemia of Pregnancy)

This condition is peculiar to pregnancy status and is often referred to as “toxaemia of pregnancy”. Although a common complication of pregnancy, afflicting some 10 to 20% of all pregnant women at some stage of their pregnancy, it is still a disease condition, whose aetiology is unclear and enshrouded with numerous theories.

This disease condition continues to be a major cause of both maternal and fetal mortality and morbidity, especially in the developing countries of the world. In its severest form, it causes maternal death from eclampsia (fits), accidental haemorrhage, and less frequently from renal failure, intracranial (cerebral) haemorrhage and acute heart failure.

Although the onset of the disease cannot be prevented in view of its still obscure aetiology, the progress of the disease condition, from its relatively innocuous mild pre-eclampsia to the hazardous severe pre-eclampsia and eclampsia, can usually be contained by a number of innovative preventive and curative health measures, and these are :- (a) the early case-finding—role of health education, use of nurse-midwives and other medical auxiliaries in ante-natal care; (b) comprehensive ante-natal care—both outpatient and inpatient services are important; (c) bed rest—at home or hospital; (d) the use of sedation—to achieve ideal bed rest; (e) the use of hypotensive agents; (f) the planned induction of labour and conduction of delivery; and (g) the intensive care in eclampsia.

Of all the measures that have been detailed, the single most valuable measure in reducing the risks of maternal deaths from hypertensive disease of pregnancy is early case-finding by comprehensive ante-natal care. Presently, I serve as a member of a World Health Organisation Steering Committee (of 6) on Pregnancy Toxaemia, and we are engaged in the task of planning operational research programmes to evaluate the prevalent rates of this disease condition in developing countries, as well as to determine how best the medical personnel of the non-doctor grade, i.e. the nurse-midwives and even the traditional

birth attendants, could be enrolled to help in early case-finding of this condition, and thereby hope to minimise the occurrence of the disease condition in its fatal forms (W.H.O. MCH/78.2 and Sinnathuray, 1977, WHO MCH/TP/77.11).

4. Difficult Labour (Dystocia)

Until some 40 years ago, maternal deaths from difficult and prolonged labours were relatively frequent occurrences, especially in the less developed countries of the world. As a result of the difficult and prolonged labours, the mothers died from a multiplicity of causes, and these were the sequelae of haemorrhage and shock from ruptured uterus, infection in the form of septicaemia or peritonitis, or a combination of haemorrhage, dehydration and septicaemia. The difficult labours were most frequently due to cephalo-pelvic disproportion (disproportion between the small maternal pelvic cavity and relatively large fetal head); less frequently this was due to obstructed labour from neglected fetal malpresentation; and least frequently to uterine dysfunction in labour.

The health measures that have contributed towards the significant reduction of maternal mortality in difficult labours in recent decades are:- (a) the improved health and physique of mothers and would-be mothers — due essentially to socio-economic upliftment of the community (Baird, 1960); (b) the avoidance of difficult vaginal deliveries (Baird, 1960); (c) the liberal use of caesarean sections — and here we have seen the evolution from classical caesarean section of the Julius Caesar era to extraperitoneal lower segment caesarean section, to the present practice of transperitoneal lower segment caesarean section; (d) the advent of blood transfusion services; (e) the advent of antibiotics; and (f) the better understanding of fluid and electrolyte imbalance in labour.

5. Illegal Abortions (Criminal Abortions)

Pregnancy is an interesting sociological situation that human beings can find themselves in. A planned pregnancy is always jubilantly looked forward to. Whilst most women accept their pregnancy situations philosophically once they have occurred; there are always some women at some stage of their reproductive life, who are unhappy and distressed on finding themselves to be pregnant. In this latter group, there are many who may still, reluctantly, go through with their pregnancies, especially if there are strong religious or socio-cultural deterrents towards resorting to induced abortions; but, there will always be some women at some stage of their life in every community, who will be determined to procure an induced abortion to rid themselves of an unwanted pregnancy.

The practise of illegal (criminal) abortion, either for the regulation of human fertility or for other social reasons, has been in existence since time immemorial. As we now enter the fourth quarter of the 20th century, the common preventable causes of maternal mortality and morbidity, such as maternal infections (puerperal sepsis), haemorrhage, hypertensive disease of pregnancy (toxaemia of pregnancy) and difficult labour (dystocia) are being effectively reduced by rapidly improving standards of obstetric care. In contrast, abortions, in particular, illegal abortions, also referred to as criminal or clandestine abortions, are emerging as a major cause of maternal ill-health, contributing to both maternal mortality and morbidity. As I have always stated to my professional colleagues, the extent of the health hazards of illegal abortion to the mother can best be portrayed by the "iceberg" analogy. In any given environment, the maternal mortality hazards of illegal abortion are invariably represented by the more apparent "tip of the iceberg" above the water level; in contrast, the much larger problem of maternal ill-health (morbidity) arising from illegal abortion, comes to be represented by the larger "hidden component of the iceberg" below the water level. Put in another way, for every maternal death, arising from an illegal abortion, there must be a relatively large number of other women going through life with varying degrees of ill-health, from which they never fully recover.

The health hazards to the mother from illegal abortion have reached such proportions recently, throughout the world, that the World Health Organisation (W.H.O.) has initiated a W.H.O. Task Force (1974) and a W.H.O. Scientific Group (1978) to study the problem. It has been my privilege to serve as a member of the W.H.O. Task Force on Illegal Abortion, since its inauguration five years ago in 1974. Through the activities of the W.H.O. Task Force, my department is collaborating with three other world centres, namely Ankhra in Turkey, Lagos in Nigeria and Caracas in Venezuela, to evaluate the health hazards and cost-implications, sustained by women admitted to hospitals with induced abortions. The first phase of our collaborative study is due for completion very soon. Prior to the present W.H.O. Study, between 1973-1977, I was privileged to direct a major socio-medical field survey on the problem of illegal induced abortion in Peninsular Malaysia. This latter study was financed by the International Development Research Centre (I.D.R.C.) of Ottawa, Canada to a generous sum of Canadian \$92,000/-, and the project was locally sponsored by the Fede-

ration of Family Planning Associations (F.F.P.A.) of Malaysia. My research team consisted of an inter-disciplinary group of scientists in the fields of obstetrics and gynaecology, social and preventive medicine and demography, drawn from different sectors of the nation's public services.

The study group undertook a well-planned, retrospective, community-based, interview-type of study on 9,506 eligible respondents (ever married females, aged 15-44 years) that were found on screening 13,704 households in selected three urban and five rural areas. This study yielded, for the first time, extensive and intimate data on the reproductive, contraceptive and abortion, in particular illegal abortion, behaviour patterns of both urban and rural Malaysians of the three major community groups, i.e. Malays, Chinese and Indians. It is quite impossible for me to give you extensive details of our findings. Suffice it to say, that the highlights of our survey findings have been published in a 166 paged joint FFPA-IDRC document, entitled, "Report on Maternal Health and Early Pregnancy Wastage in Peninsular Malaysia" (Sinnathuray *et al.*, 1977); and further, a major Guest Lecture, incorporating some of the findings, was presented by me at the Triennial International Union for the Scientific Study of Population (I.U.S.S.P.) and at the VIIth Asian Congress of Obstetrics & Gynaecology in Bangkok in November 1977 (Sinnathuray, 1977). However, much of the data is still unpublished.

In brief, our survey showed that 10.78% of all women interviewed (9,506) reported having experience one or more induced abortion during their life time, and induced abortions occurred to the extent of 3.9 per 100 pregnancies or 4.3 per 100 live-births. The practice of induced abortions were more frequent by the urban residents and Chinese community group and least by rural residents and Malay community group. The major reasons given for undergoing an induced abortion were *firstly* "family planning" (both family spacing and family limitation) and *secondly* "socio-economic" (financial difficulties). Those of us, who would wish further data on this important topic can readily obtain a copy of the Report from the Federation of Family Planning Associations, Malaysia.

It is, therefore, now accepted that the whole question of illegal abortion with its risks to maternal health is not a straight-forward medical (gynaecological) ailment, but is a more extensive social disease. Hence, any health programme aimed at alleviating the health hazards of illegal abortion to the mother should take into consideration the provision of not only health education against the practice of illegal abortion, prompt curative medical care and psycho-social rehabilitation; but also

offer alternative and effective non-abortive family planning methods, and there may even have to be considered the question of safe early legal abortion services, in some situations (W.H.O. Technical Report Series 623 omit 1978).

THE FUTURE

What does the future hold for mankind in the sphere of human reproduction? The future in the field of human reproduction seems to be promising and exciting. Although I will not wish to be presumptuous to forecast the likely developments in this field in the remote future of the 21st century, I think it is permissible for me to share with you my thoughts on the way in which advances in the field of human reproduction are likely to develop in the rest of the 20th century, namely in the 1980s and 1990s. If one is permitted to gaze into the crystal ball, exciting areas of development can be visualised.

In the area of maternal health, there will be considerable developments in the field of social obstetrics & gynaecology, particularly in the context of the developing countries; and in this region, it is hoped that Malaysia will take the lead by the establishment of a division of social obstetrics & gynaecology in the Department to strengthen the ongoing teaching and research programmes in this field for medical undergraduates and postgraduates of this Faculty. The socio-economic upliftment of the Malaysian mothers will, in turn, lead to improvements to their general health and nutrition, which will subsequently be reflected in their better fetal growth and in the birth of better babies. The improvements in the extent and quality of available obstetrics services will ensure that pregnant mothers receive maximal safety and comfort in child-bearing.

CONCLUSIONS

In my inaugural address, I have attempted to comprehensively cover the extensive benefits accruing to human health and human welfare from research in human reproduction in this 20th century. The ultimate objectives of research in human reproduction are firstly, to ensure that the society in general, the family as a unit, or the woman as an individual, is assisted in her or its endeavour to successfully have the desired number of children, at the desired pregnancy intervals, and further to ensure that every pregnancy progresses from conception to child-birth, as uneventfully as possible, with the minimal of health hazards to mother and child.

It is, thus, apparent to all of you that those of us, practising in field of obstetrics & gynaecology, are intimately concerned not only with the quantity of life at conception, but also with the quality and

quantity of both maternal and fetal life throughout pregnancy, childbirth, and thereafter!

SUMMARY

The five major causes of maternal mortality in the developing countries of the world, namely infection (puerperal sepsis), haemorrhage, hypertensive disease of pregnancy (toxaemia of pregnancy), difficult labour (dystocia) and illegal abortion (criminal abortion), have been presented and discussed. The beneficial impact that research and evolution of modern obstetric practice have had on these five major causes has been reviewed. The manner in which the future trends towards betterment of maternal health in developing countries are likely to develop has been briefly stated.

ACKNOWLEDGEMENTS

To the Honourable Vice-Chancellor, Royal Professor Ungku A. Aziz, I wish to extend my very sincere gratitude for having graciously presided at the meeting of my inaugural address, and for having introduced me with such laudable and kind remarks about my department and myself to a large audience, consisting of staff and students of the University of Malaya and University Hospital, the members of the medical profession and the public. I also wish to thank the Honourable Vice-Chancellor for giving me the honour and distinction of delivering the first inaugural address in this Medical Faculty, in its current resumed series, after a long lapse of over 12 years.

My very sincere appreciation and thanks to Mrs. Ivy Phang of my department for her excellent secretarial assistance rendered in the preparations for the manuscript of my inaugural address, for the presentation and the subsequent publications.

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