
SPECIAL ARTICLES

J. Sci. Soc. Thailand, 5 (1979) 4-10

A SURVEY OF RESEARCH IN REPRODUCTIVE SCIENCES IN THAILAND

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(Received 24 November 1978)

Introduction

In commemoration of the 30th year of Science Society of Thailand, this article is written as a survey, not as a review, of research in reproductive sciences in Thailand. It is intended to be a source of information for researchers working in or entering into this field. It may also be useful to decision-makers wishing to support the research or to utilize the findings. The research work done in Thailand on both basic and applied aspects of reproductive systems or reproduction of humans and animals have been surveyed. Work on the reproduction of invertebrates, plants and unicellular organisms, if exists in the country, is not covered. As expected, the studies in reproductive sciences in Thailand are carried out in several institutions of different scientific disciplines and orientations. So the survey may miss some of the studies despite the intensive search. For accuracy, only published work will be cited. Studies in progress or unpublished will be mentioned only when relevance and accuracy of the work have been ascertained. The studies will be grouped and presented under various headings with general comments at the end of the article.

Basic Research in the Male

The research in the male reproductive system usually lags behind that in the female. In Thailand, the major research effort in the male reproductive system has been initiated since 1971 at the Department of Biochemistry, Faculty of Science, Mahidol University. Using biochemical techniques and approaches, the Department has contributed new information in several aspects of the male reproductive system. This includes the studies on acidic protease¹⁻⁴ and carnitine⁵ in human semen; adenyl cyclase of human sperm⁶; lactic dehydrogenase-X of human testis^{7,8}; the influence of caffeine⁹; energy charge¹⁰ and acetyl carnitine¹¹ on human sperm motility; biochemical aspects of sperm maturation¹²⁻¹⁵; and histone-protamine components of

sperm chromatin^{16,18}. Effect of vitamin A-deficiency on the testicular cytology has been studied by others^{19,20}. Also studied is the immunology of the male reproductive tracts²¹. In the interest of vasectomy, a simple and quick identification of human vas deferens by Wright's stain has recently been developed²². Another line of basic research that is closely linked with applied aspect is the characterization of swamp buffalo semen^{23,24}. Although preliminary, the study aims at providing information much needed for further development of artificial breeding of the most useful animals in rice farming.

Towards Pills for Men

Interest in the development of pills for men has led to some applied research in the male. Recently, a clinical trial of a combination of medroxyprogesterone acetate and testosterone enanthate to suppress spermatogenesis in Thai volunteers has been carried out at WHO Collaborating Center for Clinical Research in Chulalongkorn Hospital. The result of the trial together with those from other countries has been valuable to WHO Task Force on Methods for the Regulation of Male Fertility in assessing the potential of the combination as male contraceptive. Another interesting exploratory study on the suppression of sperm number in human volunteers by "Koen-chai", a Chinese celery commonly consumed by Thais, has been carried out at the Siriraj Medical Faculty of Mahidol University. This as well as other indigenous plants may contain new active agents for future pills for men.

Vasectomy and Human Male Reproductive System

Although vasectomy is an effective and acceptable contraceptive method for Thai men²⁵, there has been little, if any, research done on basic aspect of this technique. Clinical examination and psychological study are the main follow-up studies on the vasectomized males²⁶. The emphasis has been placed on training and service systems that will make vasectomy more readily available to the public²⁷.

Clinical interest in the reproductive system of human males is very limited in Thailand. Besides male infertility due to poor quality of semen, chronic prostatitis problems have drawn some attention of urologists²⁸. An unusual finding of male sterility due to lack of vas deferens has been a result of careful clinical diagnosis of male reproductive system²⁹. Many more abnormalities of the male reproductive system may well await keen clinical investigators.

Basic Research in the Female

There are several laboratories working on reproduction in the female animals. The main interest has been on the influence of hormones or pharmacological agents on the female reproductive functions. This includes the effects of steroid hormones on female genital organs³⁰, on blastocyst implantation³¹, on nidation³², and on luteinizing hormone releasing hormone³³; effects of prostaglandins on pituitary hormones³⁴

and on parturition^{35, 36}. The actions of monoamines on pituitary function³⁷, pain-relieving drugs (paracetamol and indomethacin) on parturition³⁸, indomethacin on uterine contraction³⁹ and other factors on nidation⁴⁰ have also been reported. Studies on the female reproductive organs have been limited. The effect of protein deficiency on the reproductive organs⁴¹ and the enzymes related to uterine contraction⁴² are the two examples of such studies. Limited still is the study on peptide hormones in reproductive system: one report on the luteinizing hormone⁴³ should be mentioned. Investigations on the influence of sex steroids on the histology of other organs such as thymus⁴⁴ and lymphoid system⁴⁵ should be regarded as periphery to the female reproduction.

Other research activities in human have been confined to the immunology of the reproduction. Studies on the secretory immunoglobulins in the female reproductive tracts⁴⁶ and maternal cell-mediated immune response to placental antigen^{47, 48} are the representative contributions to the basic knowledge by Thai immunologists.

Thai Women

Thai women with smaller body size, under different nutrition and exposed to more infections and tropical diseases than the Caucasians may well have different hormonal profiles or respond differently to steroid contraceptives. Thus, Thai clinicians are concerned over the obstetric and gynecological status of Thai women and have carried out several studies. Although these studies are not scientifically or technically innovative, they have provided useful information on the Thai women of reproductive age.

By and large, the levels of luteinizing hormone, estradiol, progesterone, human growth hormone, thyroid stimulating hormone and cortisol in the serum of menstruating Thai women^{49, 50} have been found to be similar to those of the Caucasians. On the other hand, the incidence of postpartum thromboembolism⁵¹ and postoperative deep-vein thrombosis⁵² is much lower in Thai women. Also established are the lipids patterns⁵³, estriol/creatinine⁵⁴ and estrogen/creatinine⁵⁵ ratios in pregnant Thai women. Even clinical profiles on abortion in Thai women have been carefully described^{56, 57}. Survey of hospital records has also revealed interesting facts about Thai women on the reproductive performance of elderly primigravidae⁵⁸ and on the rupture of the gravid uterus⁵⁹. Some rather investigative studies on the glucose tolerance test during pregnancy⁶⁰ and on the detection of ovulation by serum hormones⁶¹ have been performed on normal Thai women.

Steroid Contraceptives for Women

Since both oral and injectable steroid contraceptives have been used by Thai Women, clinicians are quite anxious to establish the efficacy and the side effects in these women. Due to a smaller body size, low-dose pills have been tested in Thai women^{62, 63}. The possible effects of the contraceptives on liver function⁶⁴, glucose tolerance^{65, 66}, breast size⁶⁷, serum lipids⁶⁸ and lactation^{69, 70} have been widely in-

vestigated. Long-term side effects of the contraceptives⁷¹ as well as the efficacy and side effects of contraceptives in users with liver fluke infection⁷² have also received a fair clinical attention. The injectable contraceptive⁷³ which offers certain convenience has gained relatively more acceptance by the Thai women than by the Caucasians.

Intrauterine devices

The popular use of intrauterine devices or IUD's of various forms among Thai women has called for several studies on some practical problems, such as perforation of the device through uterine wall⁷⁴, pregnancy in the presence of IUD^{75, 76} and the rate of discontinuation of the usage⁷⁷. Although such clinical observations are abundant, the basic study in animal models has been rare. A comparative study on the influence of the devices with and without copper on the endometrial enzymes in rat⁷⁸ is noteworthy.

Female Sterilization

Permanent sterilization as a mean to regulate family size is performed in hospitals all over Thailand. Clinical investigations have focused mainly on the advantages and disadvantages of various surgical techniques. Sterilization by culdoscopic and laparoscopic techniques has been compared^{79, 80}. The tubal occlusion by electrocoagulation has been contrasted with the use of tubal rings or springloaded clips^{81, 82}. The invention of a uterus elevating device has led to the development of the minilaparotomic technique at Ramathibodi Hospital. This has proved to be more economical than the previous techniques and it is, therefore, more suitable to the developing countries.

Artificial Insemination

As a remedy to infertility, artificial insemination in humans is done in some major hospitals with limited success. However, artificial insemination to improve breeding of farm animals such as bovines and porcines has been better noted in Thailand. With concern over the shortage of high quality swamp buffalo, research on the artificial insemination in the animals has been initiated at both Chulalongkorn and Kasetsart Universities. Detection of heat period in the buffalo cows, is a major obstacle. Estrous synchronization by prostaglandins⁸³ appears promising. However, more research is needed to develop the technique to an acceptable and practical level.

General Comments

Obviously, the survey covers in breadth, but not in depth, various aspects of reproductive sciences in Thailand, from the basic to the applied investigations. No evaluation on the quality of these studies has been attempted. Naturally, both the

objectives and the quality of the studies vary widely and depend on the interest and the expertise of the investigators concerned. Apart from the on-going and unpublished work, the number of the references cited alone can testify that Thailand has significant interest and achievement in the reproductive sciences. The relevance of the reproductive sciences in population growth and economic development of the country is quite apparent. If future studies can be more interrelated and concerted, the impact of the findings will be much more pronounced. To achieve this, a knowledge of the past studies, should, at least, facilitate the planning of future projects. It is hoped that this article serves such purpose.

Although Thailand has expertise in several areas of reproductive research, she lacks in many others. To mention a few, endocrinology of the male reproductive system, sequelae of vasectomy, prostatic cancer, cervical cancer, infertility, fertilization and embryonic development have hardly been investigated. It is hoped that some up-coming investigators can fulfill these needs. Moreover, past experience has proved that long-term investment of funds and efforts is essential to the growth and fruitage of sciences. Therefore, it is hoped that research in reproduction in Thailand continues to receive increasing participation from doers as well as from supporters.

Acknowledgements

I thank Drs. Nikorn Dusitsin, M.R. Puttipongse Varavudhi, Udom Chantharak Sri, Prasert Sobhon, Pramuan Virutamasen, Stitiya Sirisinha, Suporn Koetsawang and Prakong Chobsieng for kindly providing information about their work. Skillful typing of the manuscript by Mrs Thitika Vadjarodaya is much appreciated.

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