Original Article

Impact of Sodium and Potassium Ions in Identification of Second Generation of Offspring Gender in Rabbits

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ABSTRACT

Impacts of sodium and potassium in diet to determine offspring gender in rabbits have investigated. Sex determination has scientific basis for prevention of genetic diseases in addition to social backgrounds.20 healthy rabbits chosen from the second generation of the previous experimental rabbits, were divided in to two groups in the rabbits male to female 1:1. The first group was Na and K, the second group was control unit without Na and K. It found that the delivered offsprings male to female ratio were 1.95:1and 1:1, for the first and second groups respectively. In addition, it found that rabbits fed with (Na, K) food yields maximum numbers of male offspring 65, while rabbits fed with normal food yields lowest numbers of male offspring 35.

Keywords: Sodium, Potassium, Sex ratio, Rabbits, Offspring.

INTRODUCTION

Pregnancy is a state that allows a life form to develop with the support and protection from mother's body. The growth and development of the fetus in gestation is partially determined by the genome of the fetus, which produces its own growth factors as well as the majority of its hormones. However, this genetic influence is highly dependent upon interaction with environmental factors[1]. One environmental factor vital in the growth and development of the fetus is nutrition. A balanced, nutritious diet is an important aspect of a healthy pregnancy. Eating a healthy diet, balancing carbohydrates, fat, and proteins, and eating a variety of fruits and vegetables, usually ensures good nutrition. Those whose diets are affected by health issues, religious requirements, or ethical beliefs may choose to consult a health professional for specific advice. Adequate periconceptional folic acid (also called folate or Vitamin B_9) intake has been proven to limit fetal neural tube defects, preventing spina bifida, a very serious birth defect. The neural tube develops during the first 28 days of pregnancy, explaining the necessity to guarantee adequate periconceptional folate intake[2,3].Folates are abundant in spinach (fresh, frozen, or canned), and are found in green leafy vegetables e.g. salads, beets, broccoli, asparagus, citrus fruits and melons, chickpeas and eggs. In the United States and Canada, most wheat products (flour, noodles) fortified with folic acid[4].

DHA omega-3 is a major structural fatty acid in the brain and retina, and naturally found in breast milk. It is important for the woman to consume adequate amounts of DHA during pregnancy and while nursing to support her well-being and the health of her infant. Developing infants cannot produce DHA efficiently, and must receive this vital nutrient from the woman through the placenta during pregnancy and in breast milk after birth[5].

The fetus is solely dependent on the mother to supply its nutrients. It is also dependent on the placenta, an essential organ in pregnancy, to transfer these nutrients from the maternal system to its own. Thus the fetal nutrition is a reflection of that of the mother's. This interaction exists in a sensitive equilibrium; if disturbed, there are fetal developmental consequences[1].Preselection of the gender of offspring is a subject that has held man's attention since the beginning of recorded history. Although scientific studies on genes have conducted recently, sex selection and gender preference have considered since ancient time. Anaxagoras, a Greek scientist was the first person who related the sex of fetus to testis[6].

There are many Methods of sex selection such as: The consumption of particular foods, the use of various vaginal douches and the timing of intercourse in relation to ovulation, Sperm sorting, Pre-implantation genetic diagnosis (PGD), Selective abortion, Infanticide, Peri-conceptual methods, postconceptual methods.

There are also methods, which use different food combinations and especial diets to maximum the chance of having a baby with specific sex. The old believe is that eating salty, savory foods leads to delivering a male and sodium rich foods to a girl. Some believes that the ratios of the minerals sodium, potassium are important in determination of offspring gender. It showed that pregnant female house mice maintained on a consistent low-food diet give birth to a lower proportion of males than do control females fed ad libitum[7].

As a part of our ongoing research, we studied the Role of Sodium and Potassium ions in identification of offspring gender in mammals[8-22].

In this study, we study the effects of adding monovalent ions (sodium and potassium) to the drinking water of rabbits, offspring sexes investigated.

MATERIALS AND METHODS

20 Adult female second generation of rabbits* weighting 1100-1300 g (9 months old). And still in their reproductive phase, were kept in metabolic cages individually and separately and within 16-21 days, on the specified diets (Na, K and non Na, K) feeding and metabolism control .The first group (Na, K) was supplied with drinking water mixed with 1% sodium and potassium, the second group was chosen as a control group without Na, K, pure drinking water was supplied. After 16-21 days, on the specified diets, the rabbits at the stage of the reproductive cycle were caged with male rabbit for mating and gestational 10 minutes. When rabbit is pregnant that it may start rejecting advances made the male rabbit. The number of litters and the gender of pups were recorded. Pups sexed by means of the ano-genital distance, which is longer in males[23], this confirmed in

later examinations during pre weaning development. The data were entered and analyses by SPSS software using t.test and the p-value less than 0.05 were considered as significant.

RESULTS AND DISCUSSION

In the first group mothers (Na, K), all of the 10 rabbits became pregnant which delivered 65 offspring. Their gender was45 male 66.15% and 22 female 33.85%. In the second group non (Na, K) all 10 rabbits became pregnant and delivered 70 offspring that 35 male50% and 35 female 50% as shown in Table- 2, Figure-2.

The sex ratio of female to male in the first group of mothers (Na, K) was 1.95:1While this ratio in the second group, non (Na, K) was1:1 respectively as it was observed in Figure-1. The percentage of the male offspring of mothers (Na, K) 66.15% was higher than the male offspring in the control group 50% as shown in Figure-3.

The difference in the sex ratio between the first group mothers (Na, K) and the control group were statistically significant as shown in Table- 2.

The Total no of offspring in the first group mothers (Na, K) 65 was nearly equal to total no of offspring the second group non (Na, K) 70 as observed in Figure-4.

In societies with heavy preferences for male children, when couples are no longer able to have the number and gender mix of children they desire, they will use various kinds of human interventions to maximize the chances of realizing their fertility desires.

In addition, there are many reasons for sex determination that the strongest predictor of uneven sex ratio for a given parity is the sex composition of previous children. For families without a son, the higher the parity and the higher the probability of having a son is the next birth. The propensity to use sex selection increases with socio-economic status, especially education, and the proportion of males to females is larger in cities than in rural areas[24-26].

The first medical technique that can use to select for sex is that of pre-natal diagnosis [PND] and abortion. To utilize this method, the pregnant woman must undergo some sort of prenatal testing, such as an amniocentesis, chorionic villus sampling or an ultrasound, which will allow the doctor to determine the sex of the child, among other things. Once the woman has the information about the child's sex, she Nan obtains an abortion if the fetus is not of the desired sex. The use of PND and abortion in order to select for sex sounds extreme, and indeed, as Edgar Dahl points out, it is not common for Westerners to utilize such a technique. For example, a follow-up study of 578 patients having prenatal diagnosis at one Melbourne centre found that none of the women had a termination because of the sex of the fetus .Going through the traumatizing experience of an abortion is usually seen as too high a price to pay for a child of a particular sex[27].

The second medical technique that can use to select for sex is that of pre-implantation genetic diagnosis [PGD] with in vitro fertilization [IVF]. With this technique, the embryos are screened for sex prior to being implanted into the woman's uterus, thereby eliminating the need to later decide to terminate a pregnancy. PGD and IVF, however, are very invasive and potentially physically harmful, requiring the woman to go through at least one IVF cycle, which includes taking potent drugs to induce super-ovulation, extraction, fertilization and then testing and subsequent implantation of the embryos. Given the expense of IVF treatment cycles (according to IVF Canada in 2005 it cost $5,500 for one cycle of IVF, not including drugs. and, according to the same source, the drugs themselves Nan cost approximately $3,000 for one cycle[28], it would be highly unlikely that it would be used as a technique for sex selection alone.

More likely, it could be used as a sex selection technique for those who are already undergoing IVF for other medical reasons.

The last medical technique that can be used to select for sex is sperm sorting. New technologies allow sperm to be sorted into those carrying X or Y chromosomes with varying degrees of accuracy. To date, the most successful way in which to sort sperm is flow cytometry, which has branded as the Micro Sort technique[29]. Sex selection using flow cytometry results from distinguishing between the identifiable differences between the X and Y chromosomes, as the X chromosome is larger than the Y. The sorted sperm is then used to artificially inseminate the woman. Studies have shown that the Micro Sort technique is more effective in selecting for girls, a success rate of 91%, than for boys, with a success rate of only 76%.12 Sperm sorting appears, then, to be the least invasive and least expensive (at about $2,300US per cycle13) method of selecting for sex.

There are also methods that use different food combinations and especial diets to maximum the chance of having a baby with specific sex. The old believe is that eating salty, savory foods leads to delivering a male and sodium rich foods to a female. Some believes that the ratios of the minerals sodium, potassium are important in determination of baby gender. It showed that pregnant female house mice maintained on a consistent low-food diet give birth to a lower proportion of males than do control females fed ad labium[30].

CONCLUSION

Today one of good known methods on sex constitution is the preconception diet method. This method claims 80% accuracy and the theory is that by altering your diet to include and exclude certain food, the condition in the reproductive tract will be directly affected; increasing the odds of conceiving a particular sex it is also recommended that both mother and father go on the diet. This is also consistent with the oriental philosophy that everything has a yin or yang quality and the foods supplied in the female diet, female and acid are all yin. The female diet is high in sodium but low in salt and potassium, containing acid forming foods. The diets nutritional content is questionable and contains multiple warnings. The diet may influence the conditions within the reproductive tract and the outer barrier surrounding the ovum. Enabling only one of the two types of sperm to penetrate the depending on which diet is adhered to. Langendon and Proctor first published ‘the preconception Gender Diet `based on results reported. The theory is that by altering your diet to include and exclude certain foods, the conditions in the reproductive tract will be directly affected, increasing the odds of conceiving a particular sex. This method under scrutiny claims of 80% accuracy based on one clinical trial of only 260 women, the results were published in the international journal of Gynecology and Obstetrics in 1980. The female diet is high in sodium but low in salt and potassium, containing acid forming foods. The diets nutritional content is questionable and contains multiple warnings[31].

It recommended seeking the advice of medical practitioner before going on such a restrictive diet, and staying on the diet for no longer than three months. The diet may influence the condition of the cervical mucus and within the reproductive tract and follicular fluid. Enabling only one of the two types of sperm to penetrate the egg depending on which diet is adhered to. The aim of this study was to elevate relationship between minerals and sex ratio in rabbits.

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Table 1. Estimated Minerals Requirements

Mouse Minerals ** (g/Kg)	Amount diet(Kg)	Human *(mg-ug/day)
Calcium	5.0	1000
Chloride	0.5	750
Magnesium	0.5	2-5
Phosphorus	3.0	700
Sodium	0.5	500
Potassium	2.0	2000
Iron	35.0	8
Manganese	10.0	2-5
Zinc	150.0	10-12
Iodine	150.0	150-150
Molybdenum	150.0	75-250(ug)

**adapted from Nutrient Requirements of Nonhuman Primates.
*Adapted from Lanus Micronutrient information Center, Oregon State Unit.

Table 2. Sex ratio in different groups of rabbits

Group	Total no of offspring	No. of male offspring	% age of male offspring	No. of female offspring	% age female offspring	Sex ratio
(Na, K)	65	43	66.15	22	33.85	1.95
non (Na, K)	70	35	50	35	50	1

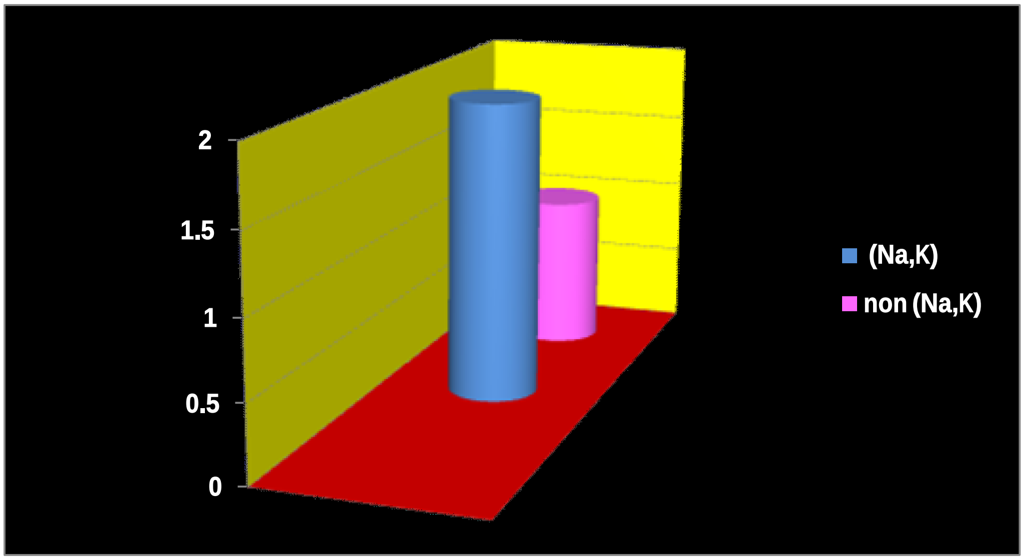

Figure 1. Sex ratio of male to female in different groups of rabbits

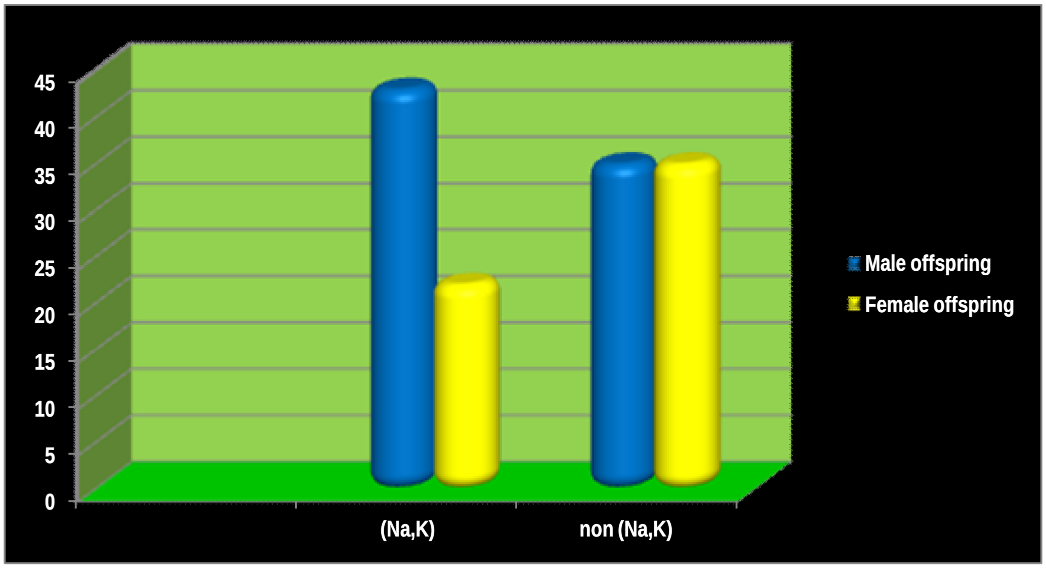

Figure 2. Number of Male and female in different groups rabbits

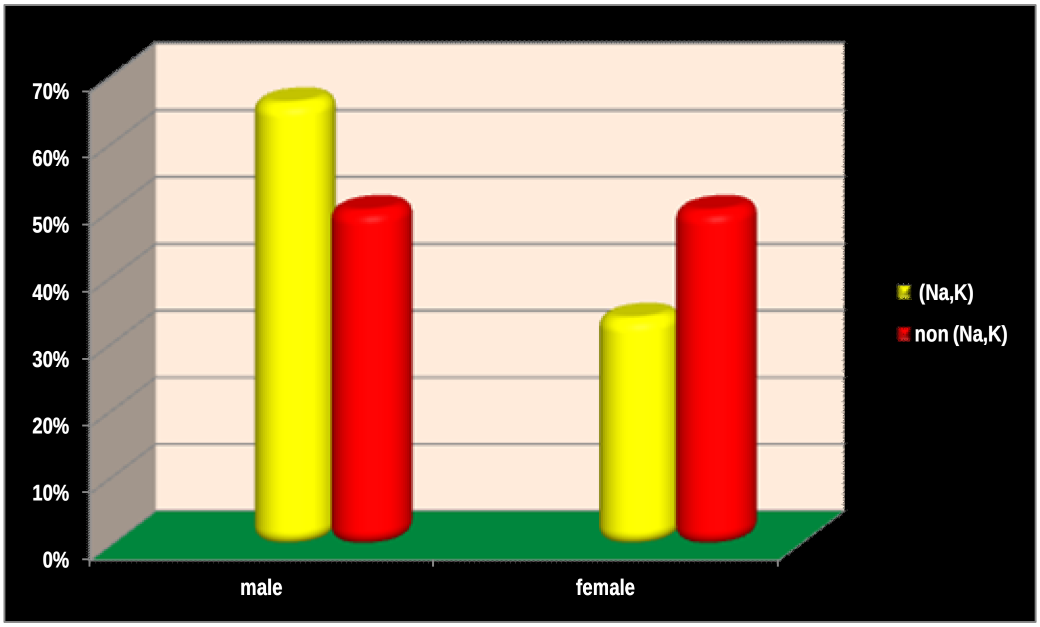

Figure 3. Percentage of offspring sex in different groups of rabbits

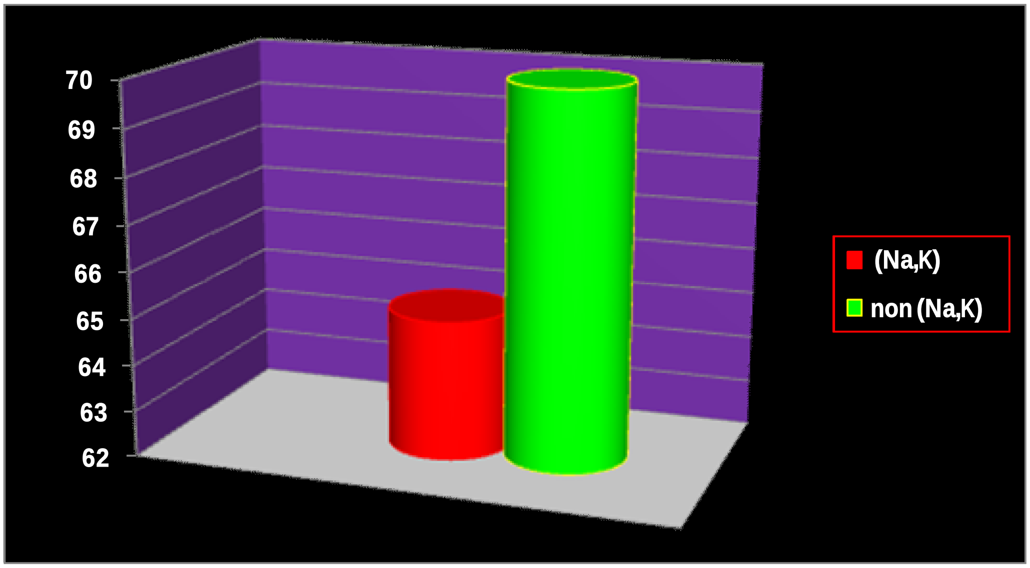

Figure 4. Number of offspring in different groups of rabbits