



A SURVEY OF ANTIFERTILITY AND ABORTIFACIENT AGENTS OF ZOOLOGICAL ORIGIN USED BY TRIBES OF RAJASTHAN

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ABSTRACT

Animals and plants have been employed as medicines in human civilization for millennia. Rajasthan is one of India's fauna and flora biodiversity hotspots. Rajasthan tribes account for roughly 13.48% of the population. Five districts viz. Banswara, Dungarpur, Jaipur, Swami, and Madhopur contribute 2/3 of Rajasthan state tribal population. Most tribal communities now prefer smaller families than in the past. Present study is intended to investigate the zooterapy used by tribes of Rajasthan for keeping space there in children and smaller families. This study was carried out from 2017 to 2018. The medico-ethnozoological records acquired in this research are acquired through personal communication and interview of various tribes of Rajasthan. In order to cumulate the details of indigenous knowledge and experiences we also interviewed Probation Officers, Block Panchayat and Tribal Communities of Rajasthan in regard to their site, population and social stratum. These data were gathered for the local name of animals, parts of animals used and the mode of administration that was deemed valuable. A total of 17 animal species used in an abortifacient and antifertility treatment. It has been found out that animals used by these tribes consist of 9 mammals, 4 aves, 2 reptiles, 1 insect, and 1 bivalvia. The consequences of this research reveal a handful of peculiar and useful information about the therapeutic utilisation of different bodily organs of various animals for preventing pregnancy which are safe, effective, and convenient with no side effects. Need for scientific evaluation and scrutiny has been emphasized.

KEYWORDS: Tribes, Abortion, Spermicidal, Ethnozoology, Rajasthan, Conservation

From the long-standing experiences, it is mentioned that the ancient people capitalized on variety of opportunities from the natural world for their continuity in steep and remote forest area since time immemorial, and their intimate relation with the animal community is noteworthy (Azmi and Sinha, 2012). Animals' parts and products have been utilised to inventory healing ingredients in numerous culture. The medico-ethnozoological system has some very valuable remedies for different diseases, successfully treated by the healers of tribal descent. Their claims and beliefs are highly fascinating. The overall impression is that they have remedies for a wide variety of ailments. Nonetheless, the system may suffer from some drawbacks, pitfalls, and ostentatiousness. It is therefore imperative to know what is useful and what is useless. If these statements were submitted to extensive inquiries and critical review, it would be highly worthwhile in the zooterapeutic field. This treasure of information is a virgin field.

Now most tribal communities want smaller families than they did in the past. Over the last 30 years the size of average families in many tribal communities

has fallen from roughly 6 children to about 3 due to some reasons such as poverty on a grand scale, women's ability to pursue their goals is severely limited by inequities between men and women, as well as early marriage. Throughout the tribal belts, the women want to delay or cease child bearing. To avoid pregnancy or inducing abortion they use contraceptives of animals origin which are safe, effective, convenient, spermicidal, and free from side-effects. Since the Mahawar and Jaroli (2006) are not hormonal, there is no possibilities of any after effects. It dissolves completely and routinely passes out. It does not intervene in the conjugal pleasure and couples derive full satisfaction as there is no artificial cover. Respectively, some significant initiatives have been taken in this area of study which promising valuable information of mammals, birds, reptiles, bivalvia, insects have been collected and reported by the authors. Hence the data accumulated are introduced in this paper.

MATERIALS AND METHODS

Study Area

The data used here for medico-ethnozoological study are purely based on the information accumulated

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through individuals and group interviews of the various tribes of Rajasthan. The segregation of the tribal people's distribution in different districts emanate from the tribal map of India (Gohain B.C., 1971). Rajasthan is India's largest state, with 344, 239 square kilometres (almost 11% of entire land area of the country) and located between 23°30' and 30°12' North latitude and 69°30' and 78°17' East longitude. Rajasthan has a vast range of climates and a diverse range of flora and fauna (Meena and Yadav, 2010). Rajasthan's climate is arid or semi-arid with four distinct seasons: summer (March-May) with

temperature ranging from 23°C to 30°C, winter (January-February) with temperature ranging from 2°C-25°C, monsoon (July-September) with temperature ranging from 35°C-40°C, post monsoon (October-December) with temperature ranging from 18°C-20°C. East Rajasthan receives 64.9cm yearly rainfall whereas west Rajasthan receives 32.7cm. The state's southern part get the most rainfall. Guzella and antelopes can be found in various parts of the state. The *Rucervus duvauceli* is a common sight in Jodhpur.

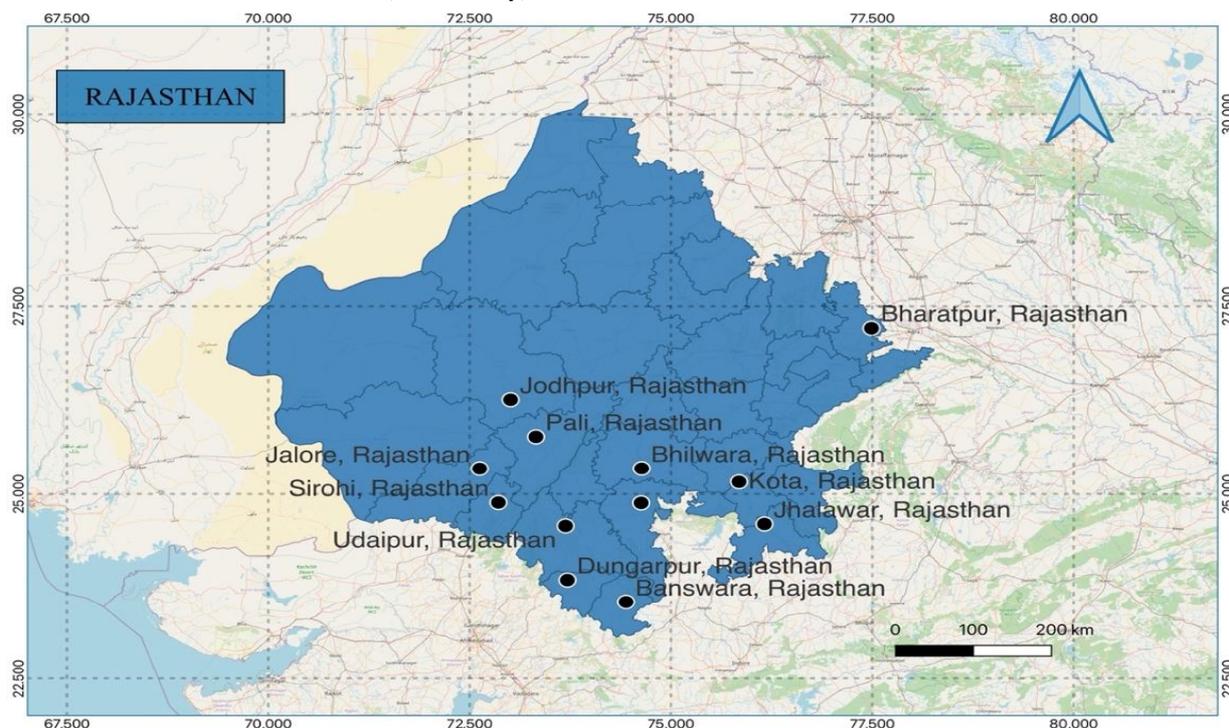


Figure 1: Map showing the locations of the ethnozoological research area

Tigers which have been designated as endangered can be seen at the Sariska and Ranthambore National parks (Mahawar and Jaroli, 2006). *Panthera pardus* is a threatened species, there are about 375 different bird species have been identified. This study was conducted in 12 districts (Banswara, Bharatpur, Bhilwara, Chittorgarh, Dungarpur, Jalore, Jhalawar, Jodhpur, Kota, Pali, Sirohi, and Udaipur), mostly in the southern part of Rajasthan were purposively chosen to inclusive of all such tribal communities in the study area along with the wide variety of flora and fauna., Figure 1.

DATA COLLECTION

A preliminary study was conducted in November 2017 to January 2018. Personal interviews and Focus Group discussions were performed among these informants to acquire information on the use of animals by seven tribes, mostly from Rajasthan. The interviews

were conducted in accordance with conventional ethnobiological data collection methods. The respondents' age ranged between 27 to 50 years old. The duration of the interviews ranged from fifty minutes to one and a half hours. All the interviews were placed in the informants' native tongue. While obtaining inputs, we adhered to the International Society of Ethnobiology's ethical criteria as well as concurrence affirmation on ethnopharmacological field of investigation (Heinrich *et al.*, 2018). The Grasia, Meena, and Bhil tribes were extremely cooperative and active participants in the session, and they were interviewed several times from different locations to a feasible extent in order to get error-free and detailed information about the contraceptive remedies derived from various animals. As a result, animal identification cards were utilised to aid memory recall and avoid the likelihood of discrepancies in species names when

grouping species as one species allocated to a number of closely related species.

RESULTS

Ethnozoological Exploration

In the present study, we have analysed four animal species out of 17, which are presented in Table 1, as highly concerned species on the IUCN red list. Species as being of conservation concern, *Elephas maximus* was designated as an endangered (EN) species, while *Leptoptilo sdubius* and *Rucervus duvauceli* were listed as vulnerable (UV) species, and *Panthera pardus* was listed as regionally extinct (RE). The investigator identified 17 animal species that were utilised to prevent or induce conception (Table 2). This group of 17 species includes both vertebrates (60%) and invertebrates (40%) species, with mammals accounting for the majority (53%) followed by aves (23%), reptiles (12%), bivalvia and insects (6% each). Figure 2

The study recorded, mammalian animals are the highest zootherapeutic creatures that can be used. However, according to other sources, mammals and reptiles are among the most commonly animals in folk medicine (Borah and Prasad, 2017). Mammals are also employed in traditional treatments in other parts of India, as it is mentioned in some reports (Borah and Prasad, 2017; Kim

and Song, 2013). According to Alves and Rosa, the type of zootherapeutic resource used in a specific place is influenced by the fauna composition, accessibility, and availability (Kim and Song, 2013). Indigenous peoples' traditional medicinal knowledge has been crucial in identifying living organisms with therapeutic properties that can be used to address human health concerns. Wild and domestic animals, as well as their products including bones, skin, blood, and internal organs are used to make therapeutic, protective, and preventive medicine.

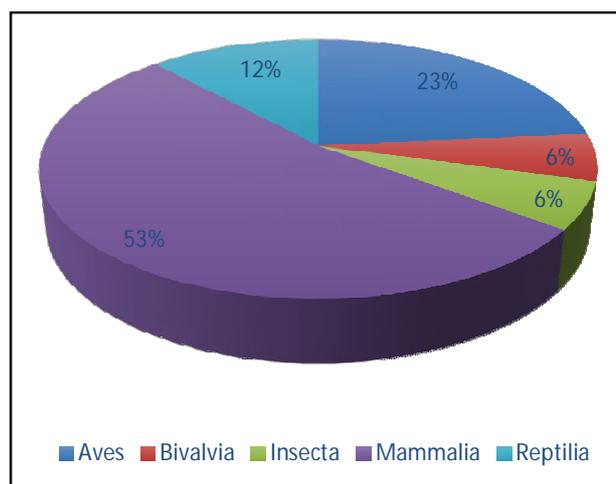


Figure 2: Segmental portrayal of sum-total of species and percentage of contribution amongst each class

Table 1: Endangered species of threatened animals concern conservation (according to IUCN report) that were used for Ethnomedicinal purposes by the tribal inhabitants of Rajasthan.

Species	Common Name	IUCN Category	Population trend
<i>Canis lupus</i>	Wolf	LC	Stable
<i>Columba livia</i>	Pigeon	LC	Decreasing
<i>Elephas maximus</i>	Elephant	EN	Decreasing
<i>E. africanus asinus</i> ♂ × <i>E. ferus caballus</i> ♀	Mule	US*	US*
<i>Falco perigrinus</i>	Falcon	LC	Stable
<i>Felis lybica</i>	Cat	LC	Unknown
<i>Gallus gallus</i>	Hen	LC	Decreasing
<i>Homo sapiens</i>	Human	US*	US*
<i>Leptoptilos dubius</i>	Adjutant stork	VU	Decreasing
<i>Lepus nigricollis</i>	Hare	LC	Unknown
<i>Naja naja</i>	Cobra	US*	US*
<i>Panthera pardus</i>	Leopard	RE	Unspecified
<i>Periplaneta americana</i>	Cockroach	US*	US*
<i>Pinctada vulgaris</i>	Pear oyster	US*	US*
<i>Rucervus duvaucelii</i>	Antelope	VU	Decreasing
<i>Uromastix</i>	Spiny tailed lizard	LC	US*
<i>Viverricula indica</i>	Civet cat	US*	Stable

* US: Species not specified in IUCN red data list (Version-3; 2017).

ANIMAL CONSTITUENTS AS REMEDY

The medication for abortifacient and contraceptive was processed based on the findings of the medico-ethnozoological study. Excreta was found to be the most commonly used method to prevent pregnancy and cause abortion (26.3%), followed by rennet and bile (10.5%), and brain, civet, ear secretion, egg, hair, scale, urine, uterine secretion, and whole body/extract (5.26

percent each). Figure 3 Excreta of animal species used as most common remedy for conception prevention as excreta of animal species like *Leptoptilos dubius*, *Elephas maximus*, *Falco perigrinus*, *Gallus gallus*, and *Columba livia* used as a pessary, whereas inhaling the vapours of dried, burnt excreta causes abortion. Faecal medications were commonly used to treat disorders of the gastrointestinal tract, neurological system, skin, and gynaecology.

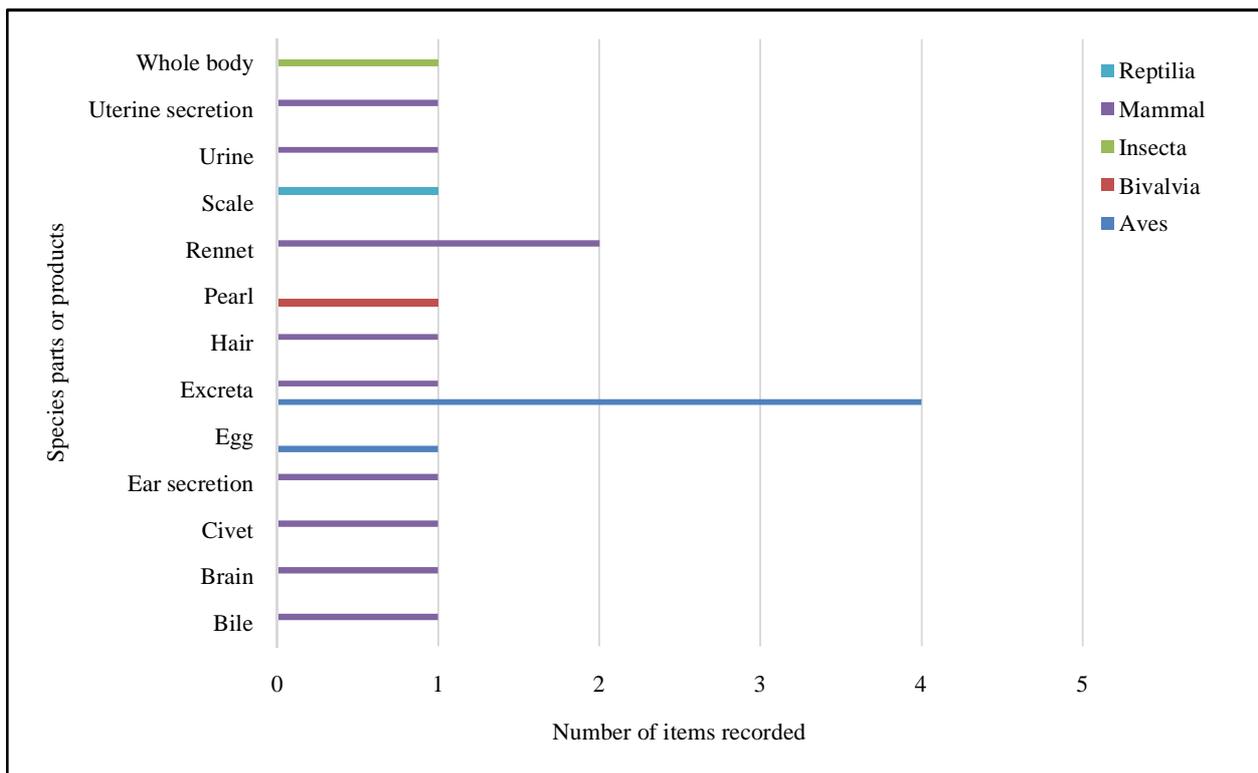


Figure 3: Bar graph showing the species parts and products used by tribes of Rajasthan as antifertility and abortifacient agents.

Relative Frequency of Citation (RFC)

The common affiliation of each species is designated by the Relative Frequency of Citation Index. The RFC standard was calculated using the formula $RFC = FC/N$, where FC denotes the number of respondents who notified the utilisation of species and N denotes the total number of respondents who participated in the survey. The RFC index varied from 0 to 1, with a value of 0 representing the profitability of the species. If the RFC value is 1 indicates all survey participants refer to the animals as appropriate. The relative frequency of citation was produced to establish the common connection of each species. The most cited animal species were *Gallus gallus* (RFC = 0.66), *Periplaneta americana* (RFC = 0.56), *E. africanus asinus* × *E. ferguscabillus* (RFC = 0.53), *Elephas maximum* (RFC = 0.44), *Rucervus*

duvaucelii (RFC = 0.43), *Canis lupus* (RFC=0.39), *Leptoptilo sdubius* (RFC= 0.35), *Falco perigrinus* (RF=0.34), *Najanaja* (0.32), *Viverricula indica* (0.29), *Panthera pardus* (0.27), *Homo sapiens* (0.23) *Uromastyx* (0.22) while, *Columba livia*, *Felis lybica*, *Lepus nigricollis*, and *Pinctada vulgaris* had the lowest RFC values (0.08, 0.06, 0.04, and 0.03, respectively). *Gallus gallus* received the highest RFC index score, demonstrating the use of these species in the examined site of Rajasthan, India, as informed by informants. Species with least Citation Relative Frequency values, such as *Columba livia* (RFC = 0.08), *Felis lybica* (0.06), *Lepus nigricollis* (0.04), and *Pinctada indica* (0.03), do not beside the point that they are not beneficial locally; rather, it is possible that the majority of tribes are not aware of their therapeutic properties.

Table 2: The list of the Ethnomedicinal animals used by the aboriginals of Rajasthani tribes in contraception and abortion.

Name of Animals	Scientific Name	Part(s) used	Mode of administration	Name of Tribe(s)	Name of District (s)
Adjutant stork	<i>Lepoptilos dubius</i>	Excreta	Used as intravaginal pessary - prevent pregnancy. Dried, burnt and the resultant fume are inhaled for 2-3 minutes, twice a day for 3-4 days, after menstruation - induces abortion.	Bhil, Domar, Gameti, Mina	Bundi, Pali, Sirohi, Bharatpur
Antelope	<i>Rucervus duvaucelii</i>	Rennet	Dried, powdered and taken with honey 2-3 time a day, for a week, 3-4 days after menstruation - induces abortion Used as intravaginal pessary. Burnt and emerging fume are inhaled deeply, twice a day for one week, 3-4 days after menstruation.	Domar, Bhil, Garasia, Bhil	Kota, Jhalaawar, Udaipur, Bhilwara
Cat	<i>Felis lybica</i>	Brain	Burnt in a closed vessel, the resultant fumes inhaled which causes abortion, once a day for one week.	Mina	Bundi, Udaipur, Pali
Civet Cat	<i>Viverricula indica</i>	Civet	Locally applied on male organ before intercourse. It is spermicidal in nature.	Korwa, Bhil	Pali, Kota, Jodhpur
Cobra	<i>Naja naja</i>	Scale	Incinerated, mixed with honey, and given it to the ladies in the first term of the pregnancy, twice a day for one week. It induced abortion.	Mina, Saharia, Bhil, Korwa	Chittoorgarh, Udaipur, Sirohi, Banswara
Elephant	<i>Elephas maximus</i>	Excreta	Extract applied intravaginal cause antifertility. The extract taken with milk once a week - prevents pregnancy. Burnt, emerging fumes inhaled deeply - induced abortion.	Bans, Korwa, Bhil	Banswara, Dungarpur, Jalore, Bhilwara
Cockroach	<i>Periplaneta americana</i>	Whole body (Extract)	Burnt, ash mixed with honey and orally taken for 3 days after menstruation - prevents pregnancy. Applied as pessary 4-5 minutes before intercourse.	Gameti, Domar, Bhil, Mina	Jhalawara, Kota, Pali, Jalbre.
Falcon	<i>Falco peregrinus</i>	Excreta	Used as pessary - causes antifertility. Burnt fumes inhaled deeply 3-4 times a day, for 4-5 days - prevents pregnancy.	Mina, Korwa, Saharia	Pali, Kota, Bharatpur
Human	<i>Homo sapiens</i>	Hair	Burnt in a closed vessel emerging fume inhaled deeply 2-3 times a day for about 1 week.	Bhil, Korwa	Kota, Jodhpur

Table 3: The list of the Ethnomedicinal animals used by the aboriginals of Rajasthani tribes in contraception and abortion.

Name of Animals	Scientific Name	Part(s) used	Mode of administration	Name of Tribe(s)	Name of District (s)
Hen	<i>Gallus gallus</i>	Egg& Excreta	2-3 raw eggs, mixed with a glass of country liquor given during 3-4 months of pregnancy for abortion. Little excreta dissolved in curd and consumed by the ladies for 4-5 days twice a day, 3-4 days after menstruation - induced abortion. A globule of excreta mixed with the little jaggery and consumed by the ladies for 1-2 days - induced abortion. 2-3 raw eggs mixed in a glass of cow's urine and given in pregnancy between 3rd and 4th month - induced abortion. A hole is made in the shell of egg, some quantity of opium and half teaspoon full powder of dried powder of paddy roots is pushed into the yolk then the cell is completely covered with cow dung and roasted on fire and consumed by the ladies in first term of pregnancy, once daily for about one week - induced abortion.	Bhil, Domra, Korwa Mina, Saharia,	Chittoorgarh, Sirohi, Jodhpur, Bharatpur Kota, Jhalaawar, Jallor
Hare	<i>Lepus nigricollis</i>	Rennet	Taken orally 3 days after menstruation - prevents pregnancy.	Bhil	Bharatpur
Leopard	<i>Panthera pardus</i>	Uterine secretion	Orally taken with milk once twice daily for 1 week, 3- 4 days after menstruation. Used as pessary 4-5 minutes before intercourse. Locally applied on male organ before intercourse.	Mina, Korwa Bhil	Kota, Jodhpur, Bharatpur
Pigeon	<i>Columba livia</i>	Excreta	Taken orally - causes sterility in women.	Saharia, Mina, Korwa	Kota, Bharatpur, Udaipur
Pearl Oyster	<i>Pinctada vulgaris</i>	Pearl	Used as pessary - prevents pregnancy.	Mina	Jodhpur
Mule	<i>E. africanus asinus</i> ♂ × <i>E. ferus caballus</i> ♀	Ear section Urine	Taken orally twice daily causes even for 3 months of pregnancy. Used as pessary - prevent pregnancy. If taken in large doses - cause abortion. Used as pessary prevents pregnancy.	Bhil, Mina, Mina	Kota, Jodhpur, Kota
Spiny tailed lizard	<i>Uromastyx hardwickii</i>	Bile	Applied intravaginal or used as pessary before intercourse - act as spermicidal	Mina, Saharia	Bharatpur, Udaipur
Wolf	<i>Canis lupus</i>	Bile	Used as pessary - induces abortion. Locally applied on male organs before intercourse - prevent pregnancy.	Korwa, Domar, Mina, Bhil	Pal, Sirohi, Bhilwara, Jhaalwara

DISCUSSION

The medico-ethnozoological data presented in this paper reveals peculiar and useful information about the curative application of different body parts/organs of distinct animals by Rajasthan's tribes. Only few sanctions found place in earlier text while greater number of these advocations are unconventional. Perusal of literatures did not indicate antifertility and abortifacient activity of some parts namely: excreta, bile, hair, urine, uterine secretion, brain, and scale are placed under cover this report. None the less, the therapeutic application of some collated in prior research. The use of pessaries from the excreta of adjutant stork and elephant, civet of civet cat, urine of mule and leopard, ear section of mule, bile of uromastix and wolf are recommended for preventing the pregnancy (Kim and Song, 2013). These pessaries are safe, effective, convenient and spermicidal. These pessaries are not harmful and have no side effects and do not cause any sort of bleeding or pain associated with its uses within the body. It dissolves completely and routinely passes out (Vohra and Khan 1978). Similarly the rennet, civet, excreta, eggs are also orally recommended for antifertility and abortion. Bile of wolf and uromastix are considered as spermicidal and used intravaginal or applied on phallus and fumes of hairs, excreta also recommended for abortion (Nadkarni and Nadkarni, 1976). This report may excite biomedical scientists a curiosity that may ultimately lead to momentous undertakings to explore the potentialities, effectiveness and proper utilization of such drugs in our current struggle against increasing rate of population.

CONCLUSION

This is the first study to document tribal people's traditional Zootherapeutic understanding of contraception and inducing abortion. In this study, it was discovered that the zoological method of contraception has no side effects, no bleeding, and no pain, however the modern method of abortion and contraception has certain adverse effects, breakthrough bleeding, and pain linked with its use within the body, according to resources. This report may pique the interest of biomedical scientists, leading to a significant initiative to investigate the potential, effectiveness, and suitable application of such pharmaceuticals in our current battle against population growth. This research will also serve as a foundation for future functional bioactivity screening of indigenous species and the conservation of vulnerable animals with medicinal potential.

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