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Research Article

USE OF MOSQUITO REPELLENT DEVICES- PROBLEMS AND PROSPECTS

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ABSTRACT

Mosquito repellents are substances that are designed to make surfaces unpleasant or unattractive to mosquitoes. They typically contain an active ingredient that repels mosquitoes as well as secondary ingredients, which aid in delivery and cosmetic appeal. They are available in many forms, from creams to lotions to oils, but are most often sold as aerosol products. Traditionally, various types of substances have been used to repel mosquitoes. These include such things as smoke, plant extracts, oils, tars, and muds. As insect repellent technology became more sophisticated, individual compounds were discovered and isolated. This allowed the formulation of new, more efficient forms of mosquito repellents. A survey conducted on 30 respondents to know about different kinds of mosquito repellents used by them and the efficiency of those mosquito repellents in repelling mosquitoes has proven that majority of the respondents use mosquito repellent liquid vaporizers as an effective way of repelling mosquitoes indoors both during day time and night time. Mosquito repellent lotions and creams, mosquito repellent patches/stickers, mosquito repellent gels like roll on that can be applied to garment and nets for doors and windows were rated as the best repellents by majority of respondents followed by mosquito repellent fast cards.

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INTRODUCTION

Mosquitoes are small, midge-like flies that constitute the family *Culicidae*. The word "mosquito" (formed by *mosco* and diminutive *-ito*) is Spanish for "little fly". Mosquito repellents are substances that are designed to make surfaces unpleasant or unattractive to mosquitoes. They typically contain an active ingredient that repels mosquitoes as well as secondary ingredients, which aid in delivery and cosmetic appeal. Different mosquito repellents work in different ways. While most of them do not kill mosquitoes and just help repel them, others kill them. How long repellents stay effective depends on the nature of the ingredients and the concentration of the ingredients. There are several kinds of repellents. Repellents could be *Chemical, Spatial, Natural repellents and Gadgets*. The present study was taken to elucidate information about the mosquito repellents used by the respondents of Hyderabad and the effectiveness of the mosquito repellents in

terms of usage, their advantages, disadvantages and health effects while using them.

MATERIALS AND METHODS

A survey was conducted in different places of Hyderabad. The device for collection of data consisted of a pre-tested questionnaire. Questionnaire was developed to illicit information from the users of mosquito repellents regarding their opinion on the mosquito repellents which they were using. It consisted of general information of the user, details about their type of family and occupation, details about the kind of mosquito repellent used, frequency of using mosquito repellents, efficiency of mosquito repellents, problems experienced with mosquito repellents and the other preventive measures taken by respondents for proofing of mosquitoes. Data was collected from 30 users from different places of Hyderabad through a pre-tested questionnaire.

Their perception with regard to mosquito repellent devices used

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on children, special attention towards children in repelling mosquitoes, efficiency of the mosquito repellents used on children along with the problems experienced by children with mosquito repellents were collected and evaluated. Frequency, percentages and overall mean scores were used to find out the user opinion on present mosquito repellent devices.

RESULTS AND DISCUSSION

Perception of respondents with regard to mosquito repellent devices were presented below. Few questions of the study were evaluated in pre-schools of Hyderabad comprising parents of 30 preschool children a part from the respondents selected for survey. Most of the respondents selected for the study were from different areas of Hyderabad.

The responses of the respondents regarding Mosquito repellents are as follows

Active periods of mosquitoes

Around 43 per cent of the respondents experienced the mosquito bites both at day time and night time whereas cent per cent of the respondents experienced mosquitoes only at night time.

Frequency of using mosquito repellents

More than ninety-three per cent of the respondents opined that they use mosquito repellents most often i.e daily, while more than six per cent use mosquito repellents sometimes when needed.

Table 1 Problems Faced by respondents while using mosquito Repellents

S.No	Factors	Problems	Multiple Responses	
			Frequency	Per centage (%)
1	Mosquito repellent incense coil (n=12)	Irritation	02	16.66
		Head ache	01	08.33
		Sneezing	01	08.33
		Chocking from fumes of coil	04	33.33
		Nose irritation	01	08.33
		Breathing problems	06	50.00
		No problem	03	25.00
		Skin irritation	-	-
2	Mosquito repellent lotions and creams (n=06)	Rashes on skin	-	-
		Skin burning sensation	-	-
		Skin allergies	-	-
		Dullness of skin/ tanning	05	83.33
		Eye irritation	-	-
		No problem	01	16.66
3	Mosquito repellent cards (n=20)	Chocking from fumes of coil	18	90.00
		Breathing Problems	20	100.00
		No problem	-	-
		Skin irritation at point of contact	-	-
4	Mosquito repellent stickers/patches (n=06)	Rashes on skin	-	-
		Skin burning sensation	-	-
		Skin allergies	-	-
		No problem	06	100.00
		Irritation	-	-
5	Mosquito repellent Liquid vaporizer (n=28)	Head ache	-	-
		Sneezing	-	-
		Nose irritation	05	8.62
		Breathing problems	14	50.00
		No problem	14	50.00
		Irritation	-	-
		Head ache	-	-
6	Mosquito repellent sticks (n=02)	Sneezing	-	-
		Chocking from fumes of coil	02	100.00
		Nose irritation	-	-
		Breathing problems	02	100.00
		No problem	-	-
		No problem	02	100.00
7	Mosquito repellent roll on that can be applied on garment. (n=02)	No problem	02	100.00
8	Mosquito repellent nets (n=06)	No problem	06	100.00
11	Mosquito repellent bats (n=10)	No problem	10	100.00
14	Mosquito repellent Aromatic Candle (n=01)	No problem	01	100.00
		Irritation	02	50.00
		Head ache	-	-
		Sneezing	02	50.00
15	Mosquito Repellent Spray (n=04)	Chocking from fumes of coil	-	-
		Nose irritation	-	-
		Breathing problems	-	-
		No problem	-	-
		No problem	24	100.00
17	Any other Indigenous methods for eg: <i>Burning of neem leaves</i> (n =08)	Breathing problems	08	100.00

*Values/per centage exceed 100, due to multiple responses

Kind of mosquito repellent used

Almost all the respondents use at least one kind of the mosquito repellent once in a day, when the respondents were asked about the type of repellent they were using to repel mosquitoes 93.33 per cent of the respondents were said to use mosquito repellent liquid vaporizer to repel the mosquitoes, followed by 80 per cent of the respondents have their doors and windows covered by mosquito repellent nets, more than half of the respondents i.e 66 per cent of the respondents use mosquito repellent fast cards, 26.66 per cent of the respondents follow indigenous methods especially burning of dried neem leaves at evening to get rid of mosquitoes, mosquito nets for beds and windows and mosquito repellent creams and lotions and patches were used by 20 per cent of the respondents. Around 13.33 per cent of the respondents use mosquito repellent sprays. Very few around 40 per cent of the respondents use mosquito repellent coils, around 6.66 per cent of the respondents use sticks and fabric rolls on to be applied on garments. Minute per cent of the respondents use mosquito repellent aromatic candles.

All most all the respondents used the mosquito repellent devices night time followed by only 20 per cent of the respondents using the repellents especially liquid vaporizer both day time and night time.

Efficiency of mosquito repellents on five-point rating scale

It was evident from the survey, that the efficiency of the mosquito repellent lotions and creams, mosquito repellent patches/stickers, mosquito repellent gels like roll-on that can be applied to garment and nets for doors and windows were rated (5.0) i.e as the best repellents by majority of respondents followed by mosquito repellent fast cards rated as (4.6) i.e as better repellents.

Mosquito repellent sprays were rewarded with 4.5 rating i.e; rated as good repellence, mosquito repellent nets for beds were rated as 4.2 i.e; good, Indigenous methods like burning of dried neem leaves and other methods like burning of incense /dhoop stick powder along with garlic skin and carom seeds (thymol), placing of neem oil along with chamfer powder were rated as 4.0 i.e good at repelling mosquitoes, followed by mosquito repellent liquid vaporizers rated as 3.8 i.e average to good repellence, mosquito repellent bats were rated as 3.5 i.e average to good, mosquito repellent incense coils and mats were rated as 3.0 i.e average at their efficiency at repelling mosquitoes. Mosquito repellent aromatic candles were rated as 2.0 i.e low in efficiency at repelling mosquitoes.

Problems with mosquito repellents

Majority of the respondents complain about the problems faced by them in using mosquito repellents. The problems faced by the respondents was compiled in table 1

Mosquito repellent incense coils: Only 40 per cent of the respondents use mosquito repellent incense coils, out of which 50 per cent experienced breathing problems, 33 per cent experienced chocking from fumes, 16 per cent felt irritation with coils, 08 per cent experienced head ache, nose irritation and sneezing. Whereas 48 per cent of the respondents experienced multiple problems like breathing problems and

chocking from fumes where as 25 per cent of the respondents were not experienced with any kind of problem in using coil as repellents.

Mosquito repellent fast cards: Half of the respondents selected for the study use fast cards as the best way to repel mosquitoes, All the respondents who use fast cards have reported that they have experienced problem in breathing when the card is burning, among which 90 per cent of the respondents experienced chocking problem along with breathing problems with fumes of cards.

Mosquito repellent liquid vaporizers: Majority of the respondent's relay on mosquito repellent liquid vaporizers for repelling mosquitoes out of which fifty per cent of the respondents experienced breathing problems when the refill is newly filled, eighteen per cent of the respondents experienced nose irritation along with breathing problems whereas fifty per cent of the users had not experienced any problem in using liquid vaporizers.

Mosquito repellent sticks: Very minute per cent of the respondents use mosquito repellent incense sticks, out of which cent per cent of the respondents experienced breathing problems due to chocking from fumes of incense sticks.

Mosquito repellent lotions and creams: six respondents selected for the study use mosquito repellent creams and lotions in which 83 per cent of the respondents experienced skin tanning and dullness in skin as the major problem, around 17 per cent of the respondents have not experienced with any problems and they felt happy with the performance of the products

Mosquito repellent stickers and patches: very minute amount of the respondents use mosquito repellent stickers and patches for repelling mosquitoes when in outdoors. All the users of stickers and patches have not experienced with any problem while using them

Mosquito repellent that can be applied on garments: only very minute around seven per cent use mosquito repellents that can be applied on fabrics, they have not experienced with any kind of problem with mosquito repellent fabric roll on.

Mosquito repellent nets for beds: only twenty per cent respondents use mosquito repellent nets for beds. The only problem experienced by them in using nets for beds is, if one or two mosquito's entre into the net while opening the net, for people entry, these will be trapped inside and these will irritate host.

Mosquito repellent bats: Thirty per cent of the respondents use bats for mosquito repellence, for the bat to be effective it should come in contact with the mosquito. They have experienced no pain in using them.

Mosquito repellent aromatic candles: Only three per cent of the persons selected for the survey use mosquito repellent aromatic candles for repelling mosquitoes and they have not experience any problem in using them for repellence.

Mosquito repellent sprays: Only thirteen per cent of the respondents use mosquito repellent sprays to be used in closed rooms out of which all of them experienced nose irritation and sneezing while using mosquito repellent sprays.

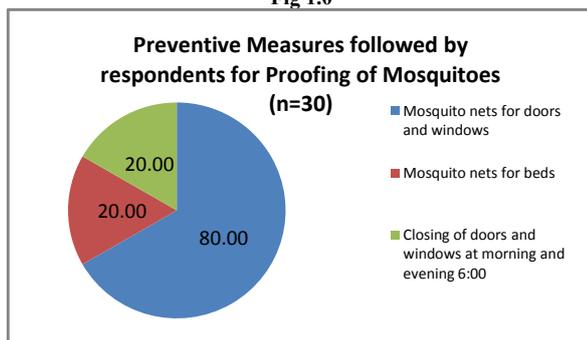
Nets for doors and windows: Eighty per cent of the respondents use nets for doors and windows for preventing the mosquitoes from entering inside the house for many years; they have not experienced any problem in using them.

Any other indigenous methods: More than fifty per cent of the respondents use different types of traditional methods in repelling mosquitoes where all of them experienced choking from fumes and breathing problems of burnt neem leaves while burning.

Preventive measures taken by respondents for proofing of mosquitoes

The preventive measures taken by the respondents in proofing mosquitoes is compiled below in the figure 1.0

Fig 1.0



Majority around 80 per cent of the respondents use nets for doors and windows for proofing the mosquitoes from entering. Whereas 20 per cent of the respondents use nets for beds along with net for doors and windows, around 20 per cent of the respondents close their doors and windows at morning and evening at 6:00pm as a part of proofing mosquitoes.

Aid of Mosquito repellents in prevention of mosquito transmitted diseases

Majority of the respondents around 80 per cent of the respondents opined that there is a major role played by mosquito repellents in preventing mosquito transmitted diseases like Dengue and Malaria, whereas 10 per cent is of opinion that repellents have no role in preventing mosquito transmitted diseases and another 10 per cent is of opinion that they have role in preventing diseases to some extent.

Special attention towards children in repelling mosquitoes

76 per cent of the respondents take special kind of attention towards children in repelling mosquitoes, while sending their children to school and out doors for play. Whereas 24 percent does not take any kind of personal attention towards their children while sending them for school and outdoor play.

Special Kinds of Mosquito repellents used for children

Seventy six per cent of the respondents use different types of mosquito repellents for children while taking them to school or out doors for play. Out of which 69.56 per cent use mosquito repellent stickers/patches, followed by fabric roll on to be applied on garments, and only 4.34 per cent of the respondents use mosquito repellent creams and lotions, 4.34 per cent use wrist bands, where as other 13.04 per cent of the respondents search for availability of natural products in the market to be used on children.

Problem faced by children with the kind of repellent used on them

Only sixty seven per cent i.e only 23 respondents use special kind of mosquito repellents to be used on children for repelling mosquitoes. Majority of the respondents were fully satisfied with the type of repellents like bands, creams and lotions, stickers and patches that are applied externally to skin/garment of children and the children have not faced any problem while using them

Problems faced by children due to mosquito repellent devices used at home are around 67 per cent of the children suffered due to choking from the fumes when respondents used coils and cards indoor for repelling mosquitoes, 16.66 per cent of the children had experienced problem in breathing when they were in the same room where mosquito repellents were burning. Whereas 6.66 per cent of the children experienced irritation of nose for the first day when the mosquito repellent vaporizers were refilled due to their pungent smell released on the very first day of refilling the vaporizers as reported by their parents. Ten per cent of the children have not experienced any problem with the mosquito repellent devices that are used at home, as reported by their parents

Major causes of increased mosquito population

Cent per cent of the respondents opined that the real cause for increase in the no of mosquito population is due to the reasons like stagnant water after rain fall and dumped garbage's, where as 16.66 per cent of the respondents is of opinion that the major reason for increase in mosquito population is due to open or over floating drainage system, too many bushes and trees near residential surroundings along with the above-mentioned reasons.

CONCLUSION

Mosquito repellents protect the human beings from the sting of mosquitoes and thereby promising safety from the mosquito-carried diseases. Many mosquito repellents are available in the market to protect people from mosquitoes and give the length of protection one needed. All most everyone use different kinds of mosquito repellents for repelling mosquitoes. Repellents do not kill mosquitoes. They just make human unattractive to mosquitoes. The type of mosquito repellent used and concentration of active ingredient decides the number of hours a person can be protected from mosquito bites.

The conclusion for the present study

- Majority of the respondents use mosquito repellent liquid vaporizers as an effective way of repelling mosquitoes indoors both during day time and night time.
- Mosquito repellent lotions and creams, mosquito repellent patches/stickers, mosquito repellent gels like roll on that can be applied to garment and nets for doors and windows were rated as the best repellents by majority of respondents followed by mosquito repellent fast cards.
- Mosquito repellent fast cards stood as the best of its kind in terms of low cost and effectiveness but it too had its own cons like breathing and choking problems.

- Ample number of respondents/ users of mosquito repellents experienced one or the other problems while using them in terms of health.
- Cent per cent of the parents pay a special attention towards their children while sending them to school and for outdoor play.
- Majority of the parents use mosquito repellent patches/stickers, mosquito repellent lotions and creams, mosquito repellent fabric roll on for protecting their children from mosquito bites. These are the type of repellents that are applied to children externally, and are proven to cause no harm to the children.

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