

Impact of Educational Intervention on Knowledge, Attitude and Practice among General Public Regarding Accidental Poisoning

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ABSTRACT

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The World Health Organization and Center for Disease Control and Prevention, USA has estimated that accidental poisoning is one of the major causes of morbidity and mortality around the world and in India it accounts for 18-19% of the total poisoning cases. This study was carried out with an objective to assess the impact of education on knowledge, attitude and practice (KAP) of general public about the storage, safe handling and usage of common household poisonous substances. This study was a retrospective and prospective study carried out at select geographical areas of Mysore district and two major hospitals in the city. General public from the areas of higher incidence of poisoning was included in the study to assess the impact of education on knowledge regarding prevention of accidental poisoning using KAP questionnaire. Retrospective analysis of incidence of accidental poisoning showed that the majority of cases were from three areas of Mysore city and general public from these areas were included in the study. The knowledge, attitude and practice of general public was assessed using KAP questionnaire and it was found that baseline KAP score (22.1 ± 5.5) of the respondents significantly improved ($p < 0.001$) after providing education at first follow up (40.5 ± 3.7) and second follow up (34.9 ± 4.3). Based on the assessment of KAP questionnaire it was observed that there was a significant improvement in knowledge regarding prevention of accidental poisoning among general public after providing education.

Keywords: KAP, accidental poisoning, education, household poisonous substance, prevention, India

INTRODUCTION

Poison is any substance which when introduced into the living body or brought into contact with any part thereof will produce ill effects or death, by its local or systemic action or both.¹ Poisoning can be defined as the condition or physical state produced by the ingestion of, injection of, inhalation of, or exposure to a poisonous substance.² Poisoning can be classified into three types mainly: a) Accidental b) Suicidal c) Homicidal.³ Accidental poisoning can be defined as an act by which a person, "accidentally (unintentionally or by chance) expose themselves to poison without wanting to cause harm to their body."⁴ According to WHO, accidental poisoning accounted for 31 deaths in high income countries, 173 deaths in middle income countries and 142 deaths in low income countries in the year 2004 respectively.⁵ In sixteen high-income and middle income countries poisoning is the fourth biggest cause of unintentional injury, fatal poisoning rates in low and middle income countries are four times higher than that of high income countries.⁶ In the year 2007, the total number of poisoning deaths in the United States was 40,059, out of which 29,846 deaths (74%) were due to accidental poisoning, and 3,770 (9%) were of undetermined intent. Accidental poisoning was the second major cause after motor vehicle crashes of unintentional injury death for all ages in the year 2007.⁷

Poisoning, though common has remained a largely neglected area of research in India. According to statistics available accidental poisoning was the 13th leading cause of death in India in the year 2001, 2002 and 2003 with numbers of accidental intake of pesticides ranging from 8695 (2001), 7777 (2002), 8064 (2003) respectively.^{8,9} In 2007, 25,447 deaths and 4,987 serious injuries were reported across the country due to accidental poisoning. The percentage of accidental poisoning was 18-19 % in the state of Karnataka respectively.³

Childhood poisoning scenario ranges from accidental ingestion of poisonous substances by toddlers and preschool children falling prey to their own curiosity; to intentional overdoses in adolescents. The peak incidence of accidental overdoses is in two year old children and 85 percent of accidental poisoning affect children five years of age. The reported incidence of childhood poisoning in India varies from 0.3 to 7.6 percent.¹⁰ Accidental poisoning accounts for 0.03 percent of mortality of infants; for 0.16 percent in the one to four years age group and for 0.37 percent of mortality in five to fourteen year's age group as per statistics projected by Government of India.¹⁰ Education plays a major role in prevention of accidental poisoning particularly in case of children.¹¹ Parents, grandparents and others who are entrusted with child care should be educated regarding the safe storage and handling of common household poisonous substances.¹² Accidental poisoning is still an understudied area of research in our country but still it is an important public health concern due to the mortality and healthcare costs associated with management of accidental poisoning. Also there are many

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common poisonous household substances which can be seen in every household which further aggravates this problem. However, this can be prevented by providing simple educational tips to the people regarding the safe handling and storage of common household poisons which can avert the problem to a major extent. Therefore, this study was conducted to view the impact of education on knowledge regarding prevention of accidental poisoning in general public.

MATERIALS AND METHODS

This study was conducted at select hospitals of Mysore district and select geographical areas of Mysore city. This study was a retrospective (Jan 2010-Dec2010) and prospective study carried out for a period of 9 months from June 2011 to February 2012. The study was approved by the Institutional Human Ethical Committee of JSS College of Pharmacy, Mysore. General public of age more than or equal to 18 years of both the genders of the selected geographical areas were included in the study.

Retrospective analysis of poisoning incidence and preparation of educational material:

Medical records from both the hospitals were analyzed to find the number of admissions due to accidental poisoning in Mysore district and to identify the geographical area where the incidence of accidental poisoning was higher. Data from Jan-2010 to Dec-2010 was collected. Education material (pamphlets) regarding prevention of accidental poisoning in children was prepared. The pamphlets contained information regarding the common household poisons, safety measures regarding storage of common household poisonous substances and instructions regarding their proper usage.

Preparation, translation and validation of KAP questionnaire:

KAP questionnaire was prepared by referring to various sources. The questionnaire consisted of total 23 questions, 10 questions regarding knowledge about common household poisons, 5 questions regarding attitude and remaining 8 questions regarding practice. The KAP questionnaire was translated into local language Kannada by the experts at the Central Institute of Indian Languages, Mysore. The questionnaire was then again back translated into English, to check whether there was any change in the meaning of the questionnaire. The KAP questionnaire both Kannada and English were validated by giving it to a group of 20 people who were randomly selected. The same questionnaires were given to the same group of people after 2 weeks. It was seen that they answered the questions in the same way as they had done initially and there was no change in the meaning in which these people understood the questions.

Providing educational intervention and assessment of impact of educational intervention using KAP questionnaire:

The retrospective analysis of medical records of the selected hospitals showed that three major areas of Mysore city (Vidyaranyaapuram, NR Mohalla and Udayagiri) had the major incidence of accidental poisoning in the district. General public from these three areas was included in the study. Education was imparted to general public in local language Kannada by the interviewer on one to one basis. KAP questionnaire was provided at baseline and people were asked to fill in the questionnaire. After they filled in the questionnaire education was provided to them using pamphlets on tips to prevent accidental poisoning. The education was provided over a period of 10-15 minutes wherein people were explained about the common household poisons, routes of poisoning, safe usage, storage, handling and first aid measures in case of oral exposure, skin exposure and poisoning of eyes. The questionnaire was administered after 10 minutes after the education (First follow-up) to assess the effect of education. The same questionnaire was administered after a period of one month to check how much of knowledge the people had retained from the educational program (Second follow-up). The KAP questionnaire obtained at different intervals were assessed to check the impact of education. Scoring was done for the questionnaire. The scores for all questions in the questionnaire ranged from 0-2. If a person answered all the correct options in a question he/she was awarded 2 marks for that particular question. For partially correct answer to a question, 1 mark was awarded. For a wrong answer a score of zero was awarded. A question was not considered for scoring if a person has ticked all the options in a question that is the correct and the wrong ones simultaneously.

Statistical Analysis:

Analysis of the questionnaire was carried out using statistical methods such as Kruskal-Wallis and Friedman's test to see whether education had any significant effect on the knowledge, attitude and practice of the general public on knowledge regarding prevention of accidental poisoning.

RESULTS

Assessment of incidence of accidental poisoning and spotting the geographical areas with higher incidence of accidental poisoning:

The retrospective study carried out for a period of 1 year (Jan-Dec 2010) at the two hospitals in Mysore district showed that 486 poisoning cases were admitted during this period, out of which 54 cases were accidental or unintentional poisoning. Among these 54 cases, 29 were male and 25 were female. The most common poisoning agents found were hydrocarbons

like kerosene, paint thinners in 20 cases (37.03%), medicines 18 (33.33%) cases, insecticides and pesticides 8 (14.81 %) cases, cleaning acid cases 6 (11.11%), Camphor and unknown fruits were responsible for 1 admission each. According to the age groups, accidental poisoning was seen more in the age group of ≤ 12 years [27 cases (50%)] followed by 13-24 years [14 cases (25.92%)], 25-36 years [8 cases (14.81%)], 37-48 years [2 cases (3.70%)] and above 61 years [3 cases (5.55%)].

Provision of education and assessment of impact of education:

A total of 109 respondents who were from the selected three geographical areas and were willing to be a part of the study were included in the study. Among these 109 respondents, 80 (73.39%) were male and 29 (26.60%) were female. The maximum number of participants belonged to the age group 20-30 years [(n=39) 35.77%] followed by 31-40 years [(n=38), 34.86%] and more than 40 years [(n=32 years), 29.35%]. Based on the literary status of the respondents, 34 (31.09%) respondents had got education to the secondary level followed by 21 (19.26%) up to undergraduate level, 20 (18.3%) respondents had received education up to primary level, 19 (17.4 %) respondents were illiterate and 15 (13.8%) respondents had received education till graduate level. Based on the socio-economic status of the respondents, 7 (6.4%) respondents were of poor socioeconomic status, 28 (25.7%) respondents belonged to the lower middle class, 67 (61.5 %) respondents belonged to the middle class and 7 (7%) respondents belonged to the upper middle class. Among the 109 respondents, 72 (66.1%) respondents were married and 37 (33.9%) were unmarried. A total of 39 respondents were without children and 70 respondents had children at their home. The assessment of KAP questionnaire showed that there was a significant change after providing educational interventions. The mean \pm sd baseline KAP score for all the respondents was 22.1 ± 5.5 , mean \pm sd first follow-up score was 40.5 ± 3.7 and the mean second follow-up was 34.9 ± 4.3 (Table 2). A significant statistical ($p < 0.001$) difference was noted between the mean \pm sd scores at baseline, first follow-up and second follow-up. There was significant decrease in KAP scores from first follow-up scores (40.5 ± 3.7) to second follow-up scores (40.5 ± 3.7). This outcome strongly suggests that there was a decrease in the retention of knowledge as time elapses.

The mean \pm sd baseline knowledge score for all the respondents was 7.9 ± 1.9 , mean \pm sd first follow-up and second follow-up score were 16.8 ± 2.6 and 14.6 ± 2.7 respectively (see Table 2). The mean \pm sd baseline attitude score for the respondents was 5.6 ± 2.4 ; mean \pm sd first follow-up score was 9.3 ± 1.6 and mean \pm sd second follow up score was 8.3 ± 1.4 (see Table 2). The mean \pm sd score of

Table1: Categorization of participants based on the demographics characteristics

Demographics of Respondents	No of Respondents n (%)
Sex	
Male	80 (73.4)
Female	29 (26.6)
Age	
20-30 years	39 (35.8)
31-40 years	38 (34.7)
>40 years	32 (29.5)
Education	
Illiterate	19(17.4)
Primary	20 (18.4)
Secondary	34 (31.2)
Undergraduate	21 (19.2)
Graduate	15 (13.8)
Socioeconomic Status	
Poor	7(6.4)
Lower Middle Class	28(25.7)
Middle Class	67 (61.5)
Upper Middle Class	7(6.4)
Marital Status	
Married	72 (66.1)
Unmarried	37 (33.9)
Presence of children	
Children not present	39 (35.8)
Children present	70 (64.2)

practice at baseline was 6.5 ± 2.6 ; mean \pm sd scores at first and second follow-ups were 14.4 ± 1.7 and 12.1 ± 2.1 respectively (see Table 2). Significant statistical difference ($p < 0.001$) was seen from baseline knowledge, attitude and practice to first and second follow-up KAP scores.

Effect of demographic characteristics on KAP score:

Age: The respondents were divided into three groups; 1st group (20-30 years), 2nd group (31-40 years) and 3rd group (>40 years). In all the three groups a significant improvement was seen from baseline KAP score, to first and second follow-up KAP scores. However, the change seen in the KAP scores between these three age groups was not statistically significant ($P > 0.001$). (See table 2).

Gender: The mean \pm sd total baseline KAP scores of female (23.2 ± 6.3) was higher when compared to male (21.7 ± 5.1). A significant ($P < 0.001$) improvement in baseline scores was seen in both male and female compared to first and second follow-ups after education. However, there was no statistically significant difference seen between the improvement of KAP scores in male and female ($P > 0.001$). (See table 2)

Table 2: Categorization of KAP scores based on different time intervals and demographics of participants				
Parameter	BASELINE (mean \pm sd)	First follow up KAP (mean \pm sd)	Second follow up KAP (mean \pm sd)	P value
Overall KAP score	22.1 \pm 5.5	40.5 \pm 3.7	34.9 \pm 4.3	<0.001*
Knowledge	7.9 \pm 1.9	16.8 \pm 2.6	14.6 \pm 2.7	<0.001*
Attitude	5.6 \pm 2.4	9.3 \pm 1.6	8.3 \pm 1.4	<0.001*
Practice	8.5 \pm 2.6	14.4 \pm 1.7	12.1 \pm 2.1	<0.001*
AGE				
20-30 years (n=39)	24.1 \pm 4.8	41.1 \pm 3.6	35.7 \pm 5.1	>0.001*
31-40 years (n=38)	21.5 \pm 4.9	40.6 \pm 4.1	34.7 \pm 4.1	
>40 years (n=32)	20.3 \pm 6.1	39.6 \pm 2.8	34.3 \pm 3.6	>0.001**
GENDER				
Females (n=29)	23.2 \pm 6.3	41.2 \pm 3.7	35.8 \pm 4.2	<0.001*
Males (n=80)	21.7 \pm 5.1	40.2 \pm 3.6	34.6 \pm 4.3	>0.001**
EDUCATION				
Illiterate (n=19)	20 \pm 3.5	39.5 \pm 2.3	32 \pm 3.5	<0.001*
Primary (n=20)	21.1 \pm 4.5	39.3 \pm 4.7	35 \pm 2.5	
Secondary & undergraduate (n=55)	22.6 \pm 5.7	40.8 \pm 3.6	35.5 \pm 4.9	>0.001**
Graduate (n=15)	24.2 \pm 6.8	42.1 \pm 2.9	36.9 \pm 2.9	
MARITAL STATUS				
Unmarried (n=37)	24.6 \pm 4.6	41.6 \pm 3.5	35.8 \pm 5	<0.001*
Married (n=72)	20.8 \pm 5.4	39.9 \pm 3.6	34.5 \pm 3.5	>0.001**
SOCIOECONOMIC STATUS				
Poor (n=7)	18.6 \pm 2.6	39.3 \pm 2.2	32.7 \pm 3.4	<0.001*
Lower middle class (n=28)	20.4 \pm 5.1	39.7 \pm 2.5	33.9 \pm 2.9	
Middle class (n=67)	22.5 \pm 5.4	40.7 \pm 4.2	35.4 \pm 4.7	>0.001**
Upper middle class (n=7)	28 \pm 4.3	42.5 \pm 2	37.7 \pm 4.1	
PRESENCE OF CHILDREN IN HOUSE				
Children present	20.7 \pm 5.4	39.8 \pm 3.6	34.5 \pm 3.9	<0.001*
Children not present	24.4 \pm 4.6	41.6 \pm 3.4	35.8 \pm 4.9	>0.001**

P value for the comparison within groups at different time intervals (*Friedmann test) and for comparison between groups at different time intervals (**Kruskal–Wallis tests)

Education: The mean \pm sd total baseline KAP score for illiterate respondents (20 \pm 3.5) was lower than mean \pm sd scores of respondents who were educated till primary level (21.1 \pm 4.5). Similarly, respondents with education till secondary and undergraduate level had higher baseline KAP scores than those with primary education level but lower than that of those who had education till graduate level. Significant improvement (P<0.001) was seen in all the four groups from baseline after education. However, there was no significant statistical difference seen between all the four groups in improvement of KAP scores (P>0.001). (See table 2)

Marital Status: The mean baseline KAP scores of unmarried respondents were higher than married respondents but there was significant improvement (P<0.001) seen in both the groups from baseline to first and second follow-up. Here also there was no significant statistical difference (P>0.001) seen

between KAP scores of both married and unmarried respondents (See table 2).

Socioeconomic Status: The respondents who were poor had lower baseline KAP scores when compared to middle and rich classes. Significant improvements (P<0.001) in baseline KAP scores were seen in first follow-up and second follow up after education in all socioeconomic groups. However, no statistical significant difference (P>0.001) was seen in KAP scores between respondents belonging to different socioeconomic classes. (See table 2)

Presence of Children: The respondents who were without children had a better baseline KAP score when compared to those with children. However, a better improvement was seen in case of those having children from baseline to first follow-up. There was no significant statistical difference seen between the two groups (P>0.001). (See table 2)

DISCUSSION

Accidental poisoning is a major cause of morbidity and mortality in developing countries. The introduction of whole range of new and complex chemicals in the form of pesticides, household cleaners, medicines etc has widened the spectrum of toxic products to which children may get exposed.¹³

The retrospective analysis showed that majority of accidental poisoning cases happened in the age group of 0-12 years (50% of the total accidental poisoning cases). The common agents involved in these cases of accidental poisoning were household products (Kerosene, paint thinners and drugs) in most of the cases. Our study results were similar to a study conducted by Gupta SK et.al at All India Institute of Medical Sciences, New Delhi which showed that in most of the cases of accidental poisoning, victims were children and the main agents involved were household products (insecticides, pesticides, phenyl and detergents) and drugs.¹³ Study conducted by Dutta A.K et.al at Kalawati Saran Hospital, New Delhi also showed that children were main victims in case of accidental poisonings. Drugs and kerosene were the main agents involved in those cases.¹⁴ Similarly, a study conducted at Burdwan medical college, West Bengal showed that kerosene and insecticides and pesticides were the major culprits in accidental poisoning cases in children.¹⁵ Accidental poisoning cases due to hydrocarbons and drugs in children can be attributed to the fact that mainly kerosene is stored in water bottles in households and drugs are not kept in a locked area out of reach of children because of which they have an easy access to these substances.

Several studies conducted to assess the effect of educational interventions on KAP of respondents showed that educational interventions among pesticide handlers improved their knowledge regarding safe handling and usage of pesticides which could be extrapolated from the fact that baseline KAP scores of pesticide handlers significantly improved after providing educational interventions at first follow-up and second follow-up.^{16,17} A meta-analysis done by Cochrane study group to assess the effect of home safety education and provision of safety equipment on poison-prevention practices and poisoning rates showed that home safety interventions were effective in increasing safe storage of medicines.¹⁸ This study revealed the fact that educational programs are successful in improving the knowledge, attitude and practice of general public on knowledge regarding prevention of accidental poisoning. There is a need for further research in this area to chalk out exact incidence of accidental poisoning in the country as accidental poisoning is still an area of neglected research in the country. The decrease in the KAP scores from first follow-up to second follow-up strongly suggests that there was a decrease in the retention of

knowledge as time elapses and hence, a need for continuous educational intervention. There is also a continuous need of educational programs to create more awareness about the storage, safe handling and usage for prevention of accidental poisoning in larger population.

CONCLUSION

The results of this study showed that accidental poisoning mainly occurred in the age group of ≤ 12 years and it was mainly due to the fact that the poisonous substance was within the easy reach of the child or was stored at improper place. Common household substances especially hydrocarbons (kerosene, paint thinner), drugs, insecticides and pesticides account for accidental poisoning in children. The results of this study showed that educational interventions also significantly can help overcome this problem as they help in increasing the knowledge and awareness of the people regarding the common poisonous substances around them. Education of the public will further promote the safe handling, storage and usage of the common poisonous household substances which in turn helps in the prevention of accidental poisoning.

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