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Knowledge, attitude and practices among caregivers regarding prevention of unintentional and accidental childhood injuries in preschool children

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ABSTRACT

Objectives: The objectives of this study were as follows. To evaluate the knowledge, attitude and practices (KAP) of caregivers of preschool children concerning the prevention of unintentional childhood injuries. To examine the correlation between sociodemographic factors and KAP scores.

Material and Methods: A cross-sectional study was conducted at the outpatient Department of Paediatrics of a tertiary care centre, enrolling 192 caregivers from April to June 2024. Data were collected using a validated questionnaire administered by the investigators. Statistical analysis was performed using Statistical Package for the Social Sciences version 22, with a P-value <0.05 considered statistically significant.

Results: Nearly half (46.9%) of the participants demonstrated high KAP scores. Higher KAP scores were significantly associated with higher caregiver education and the socioeconomic status (SES) of the family. A substantial proportion (80.7%) of caregivers recognized falls as a major cause of childhood injuries, while 92.2% acknowledged the risks of children riding as pillion riders on two-wheelers. However, only 74% considered helmet use an essential preventive measure. The prevalence of childhood injuries was reported to be 82.8% , with the majority, 72.9% , being minor injuries such as scrapes or bruises, while serious injuries, including fractures or head trauma, accounted for only 2.6% of cases.

Conclusion: Higher caregiver education and SES were strongly associated with better KAP scores. However, significant gaps in knowledge and practice, particularly concerning helmet use and children riding two-wheelers, highlight the need for targeted interventions, especially among lower socioeconomic groups.

Keywords: Falls in children, KAP of caregivers regarding childhood injuries, Road traffic accidents in children, Unintentional injuries in childhood

INTRODUCTION

Childhood injuries represent a major cause of morbidity and mortality,[1] particularly among children under the age of five. In India, unintentional injuries contribute to a mortality rate of 9.1/per 100,000 population, with transport-related injuries accounting for 2.8 deaths/per 100,000 population.[2] Effective prevention of these injuries necessitates well-informed caregivers who possess awareness of injury risks and implement appropriate preventive measures.

MATERIAL AND METHODS

Study design and setting

This cross-sectional study was conducted at the paediatric outpatient department (OPD) of a tertiary care centre over a period of 3 months, from April to June 2024. The study included a total of 192 caregivers of preschool children under 6 years of age.

Inclusion criteria

Caregivers of children under 6 years of age.

Caregivers willing to provide informed consent.

Exclusion criteria

Caregivers of children with chronic illnesses or disabilities.

Data collection

Data were collected by the investigators using a structured and validated questionnaire consisting of four sections with a total of 51 questions. Each correct response was awarded 1 point, and the total score was calculated. The questionnaire included the following sections:

1. Sociodemographic data: Information on age, gender, family type, socio-economic status (SES), education, and employment.
2. Knowledge: Comprised of 16 questions assessing awareness of common childhood injury risks and preventive measures.
3. Attitudes: Contained 10 questions evaluating caregivers' perceptions regarding injury prevention.
4. Practices: Included 25 questions assessing the current safety practices followed by caregivers.

Statistical analysis

The data were entered into a Microsoft Excel spreadsheet and subsequently analysed using the Statistical Package for the Social Sciences (SPSS) version 22 (IBM SPSS Statistics, Somers, NY, USA). Categorical variables were presented as frequencies and proportions. The Chi-square test and Fisher's exact test (for 2 × 2 tables only) were employed to assess the statistical significance of qualitative data. Continuous variables were expressed as means and standard deviations (SD). The independent *t*-test was used to determine the mean difference between two quantitative variables, while analysis of variance was applied to evaluate the mean differences among more than two quantitative variables. $P < 0.05$ was considered statistically significant. Nominal regression analysis was performed to identify predictors of high versus low and moderate versus low scores. Statistical analyses were conducted using Microsoft Excel and SPSS version 22.

RESULTS

A total of 192 participants were included in this knowledge, attitude and practices (KAP) study, which involved caretakers of children under the age of 6 years. A validated questionnaire consisting of 51 questions, along with demographic information, was administered to the participants by the investigators, and their responses were recorded. Each correct response in the KAP categories was awarded 1 point, and the total KAP score was calculated. Scores of 35 (70%) or above were classified as high scores, scores ranging from 25 to 34 (50–70%) were considered moderate scores and scores below 25 (50%) were categorised as low scores.

Table 1 depicts the sociodemographic characteristics and KAP scores of the participants. The majority of participants were over 30 years old (57.9%) and belonged to nuclear families (71.9%). Most caregivers (61.5%) were from the upper-lower socio-economic group. The primary caregivers were predominantly mothers (88.5%), with over half of the participants (62.3%) having at least a high school education or higher. A significant proportion of caregivers (56.3%) were unemployed and served as full-time caregivers. Nearly, half of the children had one sibling (47.9%), while 45.3% were only children.

The reported injuries among the children of these caregivers were as follows. About 72.9% (n140) had minor injuries such as scrapes and bruises, 7.3% (n14) had moderate injuries such as sprains or cuts and 2.6% (n5) had serious injuries such as fractures and head injuries. About 17.2% (n33) had no injuries [Table 1].

KAP scores

Significant differences were observed in knowledge (mean 12, SD 2.4, $P = 0.001$) and practice (mean 17.2, SD 3.2, $P < 0.001$) scores, but no difference was found in attitude scores [Table 1]. Higher scores in knowledge (mean 12, SD 2.5, $P < 0.001$) and attitude (mean 17, SD 3.2, $P = 0.015$) were associated with caregivers who were mothers and had at least a high school education, but no significant difference was found in practice scores. A significant variation in KAP, knowledge and attitude scores was noted across the number of siblings, with the 0–1 sibling group having higher scores compared to those with 2 or 3 siblings. The practice score remained more stable, with the 0–1 sibling group scoring higher than the 3-sibling group. Statistical analysis showed significant associations in all domains ($P < 0.001$ for KAP, knowledge and attitude; $P = 0.042$ for practice).

Table 2 displays the individual total scores for KAP. Knowledge scores ranged from 5 to 16, with a mean of 11.86 (SD 2.59), reflecting a moderate level of knowledge among participants. The top three knowledge questions answered correctly were as follows:

1. K13: 'Do hot drink spills cause burns?' (98.4%)

Table 1: The sociodemographic characteristics and distribution of KAP scores of the primary caregivers.

	Characteristics	*n*	%	KAP Score	SD	Knowledge	SD	Attitude	SD	Practice	SD
Age	Age less than 30 years	80	41.70	31.5	2.9	13.1	1.6	16.1	2.5	6.7	1.4
	Age more than 30 years	112	58.30	30.8	3.9	12.8	1.8	16	2.5	6.4	1.3
Type of family	Joint	138	71.90	31.6	6.4	11.1	2.6	4.1	2.4	16.4	2.8
	Nuclear	54	28.10	34.1	7.1	12.1	2.5	4.8	2.6	17.1	3.4
SES	Lower class	137	71.40	33.2	6.3	11.8	2.5	4.5	2.6	16.8	3.1
	Middle class and above	55	28.60	32.1	8.7	10.9	3	4.9	2.7	15.9	3.9
Relationship to child	Mother	170	88.50	34	6.9	12	2.4	4.7	2.5	17.2	3.2
	Father	12	6.30	27	7.6	9.7	3.1	3.9	2.8	13.3	3.4
	Grandparents	10	5.10	31.6	5.4	12.3	2.4	3.6	2.3	15.6	2.2
Education of caregiver	Below high school	15	7.81	29	7.2	9.7	2.5	3.2	2.1	16	4.1
	High school and above	177	92.19	33.8	6.9	12	2.5	4.7	2.5	17	3.2
Occupation	Unemployed	108	56.25	33.6	6.9	12	2.5	4.4	2.4	17	3.2
	Employed	84	43.75	33.3	7.2	11.6	2.6	4.8	2.7	16.8	3.5
Number of siblings	0 siblings	87	45.30	32.9	7.3	11.8	2.8	4.4	2.6	16.6	3.3
	1 siblings	92	47.90	33.6	6.9	11.8	2.3	4.8	2.4	17.3	3.3
	2 siblings	10	5.20	34.6	5.3	12.3	1.9	5.7	3	16.6	2.7
	3 siblings	3	1.60	27.3	7.3	9.6	3	1.6	1.5	16	3.6
Prevalence of injuries	Serious injuries, such as fractures or head injury	5	2.60	32.8	9.3	11.6	2.1	4.2	3.2	17	4.6
	Moderate injuries, such as sprains or cuts	14	7.30	31.5	5.5	11.5	2.2	3	2	16.2	3
	Minor injuries, such as scrapes or bruises	140	72.90	33.7	7.3	11.9	2.7	4.6	2.4	17	3.4
	No injuries to report	33	17.20	33.3	6.1	11.4	2.2	5	3.1	16.7	3.1

SD: Standard deviation KAP: Knowledge, attitude and practices scores, SES: Socioeconomic status

Table 2: Distribution of knowledge, attitude, and practices scores

Measure	Minimum	Maximum	Mean	Std. Deviation
Total K Score	5	16	11.859	2.5879
Total A Score	0	10	4.661	2.5918
Total *P* Score	7	23	16.969	3.3471
Total Score	15	47	33.49	7.0637
KAP Score			***N***	**%**
High			90	46.90%
Moderate			79	41.10%
Low			23	12%
Total			192	100.00%

KAP- knowledge, attitude, and practices

2. K15: 'Can children sustain electrical burns at home?' (87.5%)
3. K9: 'Do children face a higher risk of unintentional poisoning-related deaths compared to adults?' (89.1%).

Attitude scores ranged from 0 to 10, with an average score of 4.66 (SD 2.59), indicating a generally low attitude score. The top three attitude questions answered correctly were as follows:

1. A7: 'How safe is it for children to travel on two-wheelers?' (92.2% considered it unsafe)
2. A8: 'How important is it for children to wear helmets when cycling or skating?' (74% considered it essential)
3. A6: 'Is it safe for children to access windows unsupervised?' (89.1% considered it unsafe).

Practice scores ranged from 7 to 23, with a mean score of 16.97 (SD 3.35), indicating moderately high practice levels. The top three practice questions answered correctly were as follows:

1. P23: 'Are sharp objects stored out of reach?' (95.8%)
2. P24: 'Do you leave your child alone at home?' (93.8%)
3. P12: 'Has your child been taught not to play with matches?' (86.5%).

KAP scores ranged from 15 to 47, with an average of 33.49 (SD 7.06), indicating high overall KAP scores. Most participants scored moderate to high in knowledge and

Table 3: Cross-tabulation of the levels of high, mod, and low Knowledge, attitude, and practices score with demographic characteristics

Category	High KAP	Moderate KAP	Low KAP	χ Pearson's Chi-square value	*P*-value
Age of the Participant					
Less than 30 years *n*=80	8 (10%)	72 (90%)	0 (0%)	10.85	0.007**
More than 30 years *n*=112	19 (16.9%)	89 (79.46%)	4 (3.5%)		
Type of Family					
Joint (including extended) *n*=138	71 (51.4%)	51 (37.0%)	16 (11.6%)	4.379	0.114
Nuclear *n*=54	19 (35.2%)	28 (51.9%)	7 (13.0%)		
SES					
Lower class (*n*=137)	63 (46.0%)	62 (45.3%)	12 (8.8%)	6.183	0.045**
Middle class and above (*n*=55)	27 (49.1%)	17 (30.9%)	11 (20.0%)		
Relationship of Participant to Child					
Mother (*n*=170)	86 (50.6%)	67 (39.4%)	17 (10.0%)	16.37	0.012**
Father (*n*=12)	2 (16.7%)	5 (41.7%)	5 (41.7%)		
Grandparents (*n*=10)	2 (20%)	7 (70%)	1 (10%)		
Education of Caregiver					
Below high school, *n*=15	3 (20.0%)	8 (53.3%)	4 (26.7%)	6.025	0.049**
High school and above *n*=177	87 (49.2%)	71 (40.1%)	19 (10.7%)		
Occupation of Caregiver					
Unemployed *n*=108	53 (49.1%)	42 (38.9%)	13 (12.0%)	0.561	0.755
Employed *n*=84	37 (44.0%)	37 (44.0%)	10 (11.9%)		
Number of Siblings					
0 (*n*=87)	34 (39.1%)	40 (46.0%)	13 (14.9%)	9.486	0.148
1 (*n*=92)	49 (53.3%)	34 (37.0%)	9 (9.8%)		
2 (*n*=10)	7 (70.0%)	3 (30.0%)	0 (0%)		
3 (*n*=3)	0 (0%)	2 (66.7%)	1 (33.3%)		

SD- standard deviation KAP- knowledge, attitude and practices scores, SES- socioeconomic status, ***P*-value<0.05

practice, with knowledge scores averaging 11.86 and practice scores averaging 16.97. In terms of KAP classification:

1. High KAP scores: 46.9% of participants, reflecting strong overall KAP
2. Moderate KAP scores: 41.1% of participants, indicating room for improvement
3. Low KAP scores: 12.0% of participants, suggesting gaps in knowledge, attitude or practices.

Table 3 presents the results of Chi-square tests to assess statistically significant differences in KAP scores based on various characteristics. Participants above 30 years of age showed a significant association with higher KAP scores ($P = 0.007$). In addition, those from middle-class and above SES exhibited higher KAP scores ($P = 0.045$). Mothers as caregivers were also associated with significantly higher KAP scores ($P = 0.012$), and caregivers with at least a high school education had higher KAP scores ($P = 0.012$).

Table 4 presents the results of a multinomial regression analysis to examine the association between key variables and KAP scores, comparing high versus low and moderate versus low KAP scores.

High KAP score versus low KAP score: The intercept value of 0.878 ($P = 0.000$) indicates a significant baseline difference between the low KAP category and the other categories. Education level (primary school or below) shows a trend toward lower odds of achieving high KAP scores compared to middle school and above, though this was not statistically significant at the 0.05 level.

Moderate KAP score versus low KAP score: The intercept value of 16.712 ($P = 0.000$) indicates a significant difference between moderate versus low KAP scores. Individuals from lower SES were found to have substantially higher odds of having a moderate KAP score compared to those from middle or higher SES categories.

DISCUSSION

Preschool injuries in India are a significant cause of preventable morbidity and mortality in India.[3] In India, 15–20% of deaths among children are due to injury, according to the study by Krishnamurthy *et al.* on the prevalence of accidents among children under 5 in an urban

Table 4: between important variables and knowledge, attitude, and practices scores (high vs. low, moderate versus low) using multinomial regression model

	High vs low				Moderate versus low			
Category	**B**	**Wald**	***P*-Value**	**Exp (B)**	**B**	**Wald**	***P*-Value**	**Exp (B)**
Intercept	0.878	0	1	-	16.712	172.68	0	-0.049
SES								
Lower class	0.487	0.827	0.363	1.627	1.141	4.258	0.039	3.131
Middle class and above	Reference	-	-	-	Reference	-	-	-
Occupation								
Unemployed	-0.299	0.305	0.581	0.741	-0.305	0.313	0.576	0.737
Employed	Reference	-	-	-	0b	-	-	-
Type of Family								
Nuclear	0.157	0.074	0.786	1.17	-0.634	1.253	0.263	0.531
Joint	Reference	-	-	-	0b	-	-	-
Education								
Below high school	-1.573	3.389	0.066	0.207	-0.199	0.074	0.785	0.819
High school and above	Reference	-	-	-	Reference	-	-	-
Main Caretaker								
Mother	0.645	0	1	1.905	-15.432	180.211	0	1.99E-07
Father	-1.862	0	1	0.155	-16.869	166.538	0	4.72E-08
Grandparents	Reference	-	-	-	Reference	-	-	-

SES- socioeconomic status

setup.[2] This study highlights the significant correlation between sociodemographic factors such as SES and caregiver and educational status of caregivers with high KAP scores.

The participants in our study were mostly over 30 years old and belonged to nuclear families. The predominance of nuclear families in this study reflects broader trends observed in urban settings in developing countries.[4] Studies like those by Gielen *et al*. (1995)[5] found that nuclear families might face unique challenges, such as reduced adult supervision compared to extended or joint families. No significant difference was observed in our study.

Most of the participants belonged to the upper-lower socio-economic class and had a high level of education.

The moderate to high KAP scores in this study among middle-class families echo findings from studies like those by Morrongiello *et al*. (2006)[6] and Salam *et al*.[4] which found that higher SES is often linked to better awareness and implementation of safety practices.

The results indicate that socio-economic status, especially being in the lower class, significantly impacts the likelihood of having a moderate KAP score compared to a low KAP score.

Most caregivers are mothers, and the majority are unemployed, potentially allowing for more involvement in caregiving. The positive correlation between caretaker education and KAP scores aligns with other research. For instance,[7] Kendrick *et al*. (2013) found that mothers with higher education levels are more likely to engage in preventive behaviours. This study reinforces the idea that education significantly impacts the ability to understand and implement safety practices.[7]

A significant portion of children (72.9%) experienced minor injuries, with serious injuries being rare (2.6%). This was similar to a study published by Wells *et al*.[8]

The near-equal distribution between males and females in this study aligns with findings from other research where both genders are similarly affected by childhood injuries. However, some studies, like those by Hyder *et al*. (2009)[9], have noted higher injury rates in males due to riskier behaviour patterns, particularly as they grow older.

The distribution of KAP scores in this study is encouraging but highlights the need for improvement, especially among the 12% with low scores. Studies by Peden *et al*. (2008)[10] stress that even moderate awareness might not translate to consistent safety practices, suggesting that educational interventions should not only increase knowledge but also ensure it leads to action. The distribution of KAP scores shows a strong overall performance (46.9%, percentage with high KAP scores), with nearly half of the participants

achieving high scores. However, there is a notable percentage in the moderate and low categories, highlighting the need for targeted interventions to improve KAP levels among these individuals.

Employment status might affect the time and attention devoted to child safety practices, with unemployed caregivers potentially having more direct involvement in childcare.

The number of siblings could play a role in injury risk due to sibling interactions and shared attention from caregivers. Fewer siblings may lead to better caregiver attention and, subsequently, improved outcomes for the child have been discussed in numerous studies. For example, research has suggested that when children have fewer siblings, particularly those in smaller family sizes, parents can provide more individualised attention, which could be reflected in the cognitive, emotional and social development of the child.[11]

Road traffic accidents and falls

Falls are the most common type of accident for children under five; one study found that falls were the most common type of accident, accounting for 68.1% of accidents. About 80.7% of caretakers in our study were aware of falls as a major cause of childhood injuries in our country.

Child safety on two-wheelers is still a major problem in India as many feel that it is safe to travel on two-wheelers and many are not open to the use of helmets while cycling. Helmet safety is to be followed. Only 74% of caretakers in our study think that helmets are essential when riding. People travel on two-wheelers with children as pillion riders, which needs to change in our country and stricter enforcement is required.

Focused interventions could be aimed at those in the moderate and low KAP score categories to improve their knowledge, attitudes and practices. Despite high correct responses, there are still gaps (e.g., 12.5% for K15, can children sustain electrical burns at home) that can be targeted for further educational interventions. Identifying why these gaps exist could help improve education programs.

Limitations

The sample size was small. A multi-centric study can be conducted across various populations to assess the KAP among caregivers better.

CONCLUSION

This study contributes to the broader literature by confirming that middle socio-economic status, higher caretaker education and employment correlate positively with better KAP scores regarding child injury prevention. However, the variation in scores suggests that targeted efforts are needed to close the gaps identified in lower socio-economic and less educated groups.

In response to these observations, our department has taken action to raise caregiver awareness and improve practices related to preventing childhood injuries. We have implemented short educational sessions during paediatric OPD visits, where caregivers receive training on common injury prevention methods, first aid and home safety measures. Informational posters and brochures in regional languages are available in waiting areas to reinforce key messages. To help caregivers assess risks at home, we plan to introduce a simple home safety checklist. Periodic follow-ups and feedback from caregivers will help refine these efforts and ensure a sustained impact in preventing childhood injuries.

Future studies should explore the long-term impact of tailored interventions on reducing childhood injuries, especially in diverse socio-economic contexts. Comprehensive analysis can help in refining educational strategies and improving safety practices further.

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