The use of baby walkers in Iranian infants

Shiva F, Ghotbi F, Yavari S F

ABSTRACT

Introduction: A study was conducted to define the pattern of baby walker usage and the rate of walker-related injuries in infants, as well as to determine the effects of baby walkers on the start of independent walking among infants.

Methods: Families of infants aged six months to two years who presented at health facility clinics in 2007 and 2008 were enrolled in the study. The study team interviewed the primary caregiver and documented the relevant data on a pre-designed questionnaire. The data of users of baby walkers was compared with that of non-users.

Results: Walkers were used by 54.5 percent of 414 infants. Their use was significantly higher in one-child families (p-value is 0.009) and in those with higher parental education levels (p-value is less than 0.001). 78.6 percent of users and 85 percent of non-users were walking by 12 months of age (p-value is 0.283); no significant difference was observed between the two groups in terms of the age at which the infants starting walking (p-value is 0.401). 76.8 percent of parents of users versus 8.2 percent of parents of non-users believed that walkers promote early walking (p-value is less than 0.001). 44.7 percent of parents of users knew that walkers can be hazardous, as compared to 22.3 percent of parents of non-users. No serious injury was reported, but 14.1 percent of infants sustained trivial walker-associated injuries.

Conclusion: Baby walkers do not hasten independent walking and may be associated with injuries. However, it was noted that knowledge of the associated hazards has not deterred parents from using baby walkers for their infants.

Keywords: baby walkers, infants, injury, walking

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Table I. The household particulars of the families included in the study.

Family characteristic	Value
Mean age of child ± SD (mths)	13.0 ± 4.97
Mean birth weight ± SD (kg)	3.1 ± 0.45
Caesarean deliveries (%)	51.2
One-child family (%)	60.1
Breastfeeding ≥ 6 months (%)	85.6
Mean age of mother ± SD (yrs)	26.1 ± 5.3
Mean maternal education ± SD (yrs)	11.1 ± 3.4
Working mother (%)	18.2
Mean age of father ± SD (yrs)	31.1 ± 6.1
Mean paternal education ± SD (yrs)	12.3 ± 3.7
Use baby walker (%)	54.5
Falls in baby walker users (n = 226)	14.1

SD: standard deviation

INTRODUCTION

Baby walkers are frequently used among infants. Studies have reported that 64%–92% of children below one year of age use walkers.[1-3] Baby walkers have been in use since the 17th century; however, during the last three decades, due to reports about injuries associated with infant walkers, questions have been raised about the safety of and rationality for using baby walkers.[1-6] Various researchers have found infant walkers to be not only ineffective but also dangerous. The American Academy of Paediatrics agrees with this opinion and has suggested banning the manufacture and marketing of mobile baby walkers.[6] Although the manufacture of baby walkers has been banned in Canada, several families continue to import them.[7] Although many parents believe that infants who use walkers are likely to start walking earlier than their peers, studies have revealed that walkers fail to show any positive effect on speeding up locomotor skills.[8,9] On the contrary, a number of researchers have even contended that baby walkers delay the attainment of crawling, standing and independent walking.[10] However, some experts are of the opinion that reports on the relationship of walkers to developmental delays are not conclusive.[11,12] Walker injuries have largely been trivial when walkers are used on flat surfaces without obstacles or stairs; nevertheless, walkers enable babies to move faster than usual so they can move quickly from a safe environment to an unsafe one before the caregiver has time to react.[13]

This study was conducted in view of the controversy about the usefulness and dangers of baby walkers. The primary outcome measures included the rate of baby walker usage in our community, parental attitudes toward baby walkers, the effect of

Department of Paediatrics, Shahid Beheshti Medical University, Paediatric Infections Research Centre, Mofid Children's Hospital, Dr Shariati Avenue, Tehran 15468154, Iran

Shiva F, MBBS, DCH
Associate Professor

Ghotbi F, MD
Assistant Professor

Yavari SF
Medical Student

Correspondence to:
Dr Farideh Shiva
Tel: (98) 91267 89986
Fax: (98) 2222 0254
Email: shivahfa@yahoo.com

Table II. Comparison of the household particulars of baby walker users with non-users.

Family characteristic	Users	Non-users	p-value
Female infant (%)	47.7	56.9	0.075
Mean birth weight ± SD (kg)	3.1 ± 0.5	3.1 ± 0.4	0.912
Caesarean delivery (%)	63.3	37.0	< 0.001
Smoking household (%)	25.7	33.5	0.084
One-child family (%)	65.9	53.2	0.009
Breastfeeding < 6 months (%)	18.1	10.1	0.025
Pacifier use in infant (%)	28.0	18.1	0.027
Mean age of mother ± SD (yrs)	27.3 ± 5.1	24.7 ± 5.3	< 0.001
Mean maternal education ± SD (yrs)	11.7 ± 3.2	10.4 ± 3.5	< 0.001
Working mother (%)	19.4	18.6	0.9
Mean paternal education ± SD (yrs)	12.7 ± 3.9	11.9 ± 3.5	0.033

Table III. Comparison of parental attitudes and mean age of independent walking in baby walker users versus non-users.

	No. (%)			p-value
	Users	Non-users	Missing data	
Parental attitude				
Walkers promote early walking (212 users, 133 non-users)	163 (76.88)	11 (8.27)	69 (16.7)	< 0.001
Walkers are hazardous for a child (222 users, 103 non-users)	106 (47.74)	23 (22.3)	89 (21.5)	< 0.001
Mean age of independent walking ± SD (mths) (n = 211: 145 users, 66 non-users)	11.39 ± 1.38	11.56 ± 0.947		0.372

SD: standard deviation

baby walker usage on independent walking and the prevalence of walker-related injuries in our study sample.

METHODS

Primary caregivers and their children who attended health facilities in the north of Tehran were recruited for this study. The inclusion criteria were infants and toddlers between 6–24 months of age and their parents who were available to the study team between May 2007 and April 2008. All the children had attended the primary health clinics affiliated with teaching hospitals for vaccinations, routine checkups or for minor childhood ailments. The exclusion criteria included children with congenital abnormalities, chronic illnesses or any condition that would interfere with locomotor skills.

Trained members of the study team collected relevant information from the parents through face-to-face interviews and documented the data using a pre-designed questionnaire. Queries included the sociodemographic characteristics of the family, the number of children, parental attitude toward the use of baby walkers, the reason for using a walker and the parents' awareness of walker-associated hazards. Reports of injuries, in particular serious injuries (requiring an emergency room visit, hospitalisation or resulting in mortality), were documented in infants who used walkers. In infants who had started walking, the age of independent walking was noted and compared with infants who had started walking without the use of walkers.

All the data was compared between users of walkers and non-users. Statistical analysis was conducted using the Statistical Package for the Social Sciences version 16 (SPSS Inc, Chicago, IL, US). The categorical variables were presented as percentages, and the quantitative variables were summarised as the mean and standard deviation. Chi-square analysis or Fisher's exact test was performed, where appropriate, to compare the categorical data between the two groups. The independent *t*-test was used to compare the means of the quantitative variables. A p-value < 0.05 was considered to be statistically significant.

RESULTS

A total of 414 infants and their parents fulfilled the criteria for inclusion. The caregivers accompanying the children were mostly mothers, or both the parents. Only four interviews (< 1%) were conducted with the father without the presence of the mother, and two of these toddlers had used walkers. The mean age of the infants included in the study was 13 months, and 216 infants were female. The mean birth weight of the infants was 3.1 kg. The mothers' age was 18–45 years, with a mean

Table IV. Reasons provided for the use of baby walkers (n = 226).

Reason	No. (%)
Promotes early walking	136 (60.17)
To keep the child occupied	57 (25.2)
Tradition	23 (10.17)
Parental wish/no reason provided	10 (4.4)

of 26 years. The mean level of maternal education was 11.1 years, and 18.2% of the mothers were working women while the rest were housewives. The mean age of the fathers was 31.1 years, and the mean level of paternal education was 12.3 years. 249 (60.1%) families had only one child. Baby walkers were used for 226 (54.5%) infants (Table I). The age for the onset of use of walkers was 3–9 (mean age 5.59 ± 1.47) months. Out of 226 walker users, 78 were still using the walker at the time of the study, i.e. they had not started independent walking. The mean age for discontinuation of walker usage was 9.65 ± 1.9 months.

50.4% percent of the parents believed that baby walkers help the infant to acquire the ability to walk earlier than non-users, about 36% were of the opinion that walkers did not have any effect on acquiring locomotion, while the rest did not know if walker usage had any such effect. Out of the 325 parents who answered the question about the hazards associated with walker usage, 57.8% believed that walkers pose no danger to infants, while 36.3% thought that a walker could cause a baby to fall and that parents need to be extra careful. 2.1% were of the opinion that walker usage could result in weak legs or a weak back, or cause a delay in learning to walk.

A comparison of household characteristics between users of walker and non-users is shown in Table II. Walker use was significantly higher in one-child families ($p = 0.009$), in families with older parents ($p < 0.001$), those with a higher level of maternal and paternal education ($p < 0.001$ and $p < 0.003$, respectively), and in children born after a caesarean delivery ($p < 0.001$). In addition, the termination of breastfeeding before six months of age and the use of a pacifier were more common in users of walkers as compared to non-users ($p = 0.025$ and $p = 0.027$, respectively). 230 infants were > 12 months of age, of whom 224 had started walking; 150 of these were users of walkers and 74 were not. 181 of these toddlers (78.6% of walker users and 85% of non-users) had started walking by 12 months of age ($p = 0.283$). No significant difference in the mean age of onset of independent walking was observed between the two groups ($p = 0.372$) (Table III).

Among parents of walker users, 76.8% believed that walker use helps the infant to start walking early, while only 8.3% of parents of non-users held this belief ($p < 0.001$). On the other hand, 44.7% of parents of walker users thought that walkers could be hazardous for the infant, while only 22.3% of parents of non-users considered walkers to be unsafe. No serious injury was reported, although 14.1% of the infants had incurred trivial injuries through falls while using the walkers. The reasons stated for starting infants on walkers are compiled in Table IV.

DISCUSSION

In our study, baby walkers were used in the majority (about 54%) of infants (Table I). Most parents who used walkers for their babies did so because they believed that it would help the infant to achieve the milestone of independent walking earlier. Among our study sample, a higher percentage of non-users started walking before 12 months of age as compared to users of walkers; however, the difference was not found to be significant. The number of walker users in our study is much lower than those of other studies, such as Thein et al's study in Singapore, which found that 90% of babies used walkers[14] and Al-Nouri et al, who quoted a figure of 83%.[2] Our numbers are similar to those of other studies that have reported walker usage of over 50%.[7,15]

The reasons stated by parents in our study for walker usage included ensuring early walking, keeping the baby occupied and tradition, in that order (Table IV). The reasons for walker usage that have been stated by other studies include easier supervision, to keep the infant amused, occupied and contented, to accelerate walking, to help in feeding, and for the purpose of exercise; some parents even thought that their infants would be safer in a walker.[1,6,13,16] Although it is the general belief of parents that walkers accelerate walking, the opposite may, in fact, be true.[17] In Garrett et al's study of 190 infants, of whom 102 used walkers, it was shown that all three milestones of crawling, standing and independent walking were achieved later in children who were walker users.[10] On the other hand, a systematic review of the effects of equipment use on motor function in infants reported that although four studies that qualified for the review had suggested that baby walkers may delay motor development, the age at which infants started independent walking was in the normal range in all cases. The authors concluded that even if the use of baby walker was associated with mild motor delay, it was transient and not applicable in real life situations for normal infants; however, they also acknowledged that insufficient studies had been conducted

in premature infants and in children with co-morbidities that make them prone to developmental delays.[18] In our study, there was no significant difference in the age of onset of walking between infants who used walkers and those who did not.

Another important factor is the incidence of walker-related injuries. No serious walker-related injuries among the infants in our study were reported, although falls resulting in trivial injuries had occurred in 32 (14.1%) infants, none of whom had required medical attention (Table I). This finding is similar to those of other studies that state that according to parental reports, 12%–40% of infants who use walkers may sustain some kind of walker-associated injuries.[1] The absence of serious injuries in the children in our study is an interesting finding, in contrast with the results of other studies. In a retrospective clinical review, Partington et al found that 14.7% of head injuries in 129 hospitalised toddlers were associated with walker usage.[17] A study in Virginia reported that in children under 12 months of age, the annual incidence of emergency room visits due to walker-associated injuries is 8.9 in 1,000. According to reports from the National Electronic Injury Surveillance System of the United States Consumer Product Safety Commission, almost a quarter of walker-related injuries are severe, i.e. comprising fractures or blunt head traumas. In other reports, 10% of all walker-associated injuries involved skull fractures, and almost 5% were burns. Injuries to fingers and toes were seen in a smaller percentage of patients.[1]

Most walker-related injuries are caused by falls, either by the infant falling out of the walker or the walker tipping over the stairs with the infant inside the walker, which may result in severe trauma. In most cases of severe injuries, the children had fallen down the stairs while using the walker.[1] In a report from Australia, 21 out of 24 children below 13 months of age, who were admitted to the hospital with burns sustained during walker use, were burnt because they had pulled on an electric cord or table cover, while two had touched a hot stove and another had been injured when his parent was trying to ignite a fire. The authors concluded that the danger results from the improved mobility as well as the greater speed provided by the baby walker.[19] Partington et al have suggested that babies in walkers are more prone to serious head injury by virtue of the increased kinetic energy that results from the larger mass (baby plus walker) and the high speed; while falling, the infant remains in the walker, and thus the head is not protected on impact. It has been noted that a baby in a walker may achieve a speed of > 3 ft/sec.[17] In view of findings indicating substantial risks for both trivial and serious traumas, and in rare cases, death associated with baby walkers, and the lack of benefits, the American Academy of Paediatrics has recommended that the sale of mobile baby walkers should be banned.[1]

No serious injuries were sustained by the infants in our study. We do not know the cause of this discrepancy between our results and those of other reports. It may be that the retrospective studies encountered in our literature survey were conducted on infants who had been hospitalised with injuries and whose aim was to define the cause of the injury. On the other hand, our study was conducted on normal healthy infants with the objective of determining risk factors related to baby walker usage. According to some studies, in the vast majority of children who incur serious harm through baby walker-associated injuries, the episodes occurred when the infants in walkers fell down stairs; therefore, the combination of baby-walker use and a flight of steps set the scene for serious harm.[17,20] It has been shown that redesigning infant walkers to prevent falls down the stairs was associated with a marked decrease in the number of walker-related injuries.[3] Although data on the type of housing of our participants was not recorded, it can be assumed that the families in our study live mostly in single-floor apartments as the most common type of accommodation in our city is apartment buildings. The absence of stairs may have accounted for the absence of serious injuries among the infants in our study.

There are some limitations to the study. We did not obtain data about the incidence of injuries from non-users of walkers. A comparison of the incidence of injuries between walker users and non-users would provide a clearer picture of the dangers of baby walkers. In addition, we were unable to find a study comparing the incidence of injuries between walker users and non-users in the literature. However, studies have shown a 76% decrease in the number of walker-related injuries from 1990 to 2001, which has been attributed to the adoption of "passive injury-prevention strategies, such as use of stationary activity centres as alternatives to mobile infant walkers and modifying the shape of infant walkers to prevent stair-fall injuries".[1,2]

An interesting finding in our study was that a higher percentage of parents who utilised walkers thought that walkers were dangerous as compared to parents of non-users. Most parents were aware that babies in walkers need constant supervision to prevent injuries. DiLillo et al have reported that more than one-third of caregivers who used baby walkers were aware of the risks of walker usage.[16] Studies from industrialised countries

have found that in the majority of episodes (69%), adults were present in the room at the time of injury and in some cases, the incident occurred in spite of the parents' presence.[17]

The findings of this study do not support the most common reason provided by parents for walker use, i.e. early walking, as there was no significant difference in the age of independent walking between walker users and non-users. In fact, our study showed the opposite trend, that a higher percentage of non-users started independent walking before 12 months of age. Although no serious injuries were sustained with walker usage because most children in our study lived in single-storey apartments without stairs, the possibility of accidents still does exist. As such, we do not recommend the use of baby walkers as it does not encourage independent walking and there is always a likelihood of accidents occurring on non-level surfaces.

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