

Factors influencing caregiver's use of an infant walker

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Abstract:

Aim: Infant walkers are widely used in Singapore despite reports of injuries associated with their use. This study of 445 principal caregivers at two primary care polyclinics aimed to determine their knowledge and practice of use of walkers for their children/wards.

Methods: This was a prospective descriptive study, carried out in two polyclinics in Singapore. Caregivers of children brought to the clinic at 4–6 months age for routine immunizations were recruited. A questionnaire was administered which had been previously piloted. A follow up survey was conducted at the next immunization session.

Results: The study found 66.7% of young infants caregivers were unaware of walker related injury and only 37.5% of them were aware of alternatives to walkers. In addition, 48.3% thought that the walker helped the child to walk faster than the normal age of child development, although current evidence suggested that a walker could delay the walking milestone. The study also found 20.1% of caregivers who plan or have already started their child/ward on a walker would take precautions.

Conclusions: Factors that seemed to influence caregivers use of walkers include parental education, total household income, housing type, walker availability and the perception that walkers promote walking. Awareness of walker-related hazards, alternatives to walkers, and the total number of children in the household did not have a significant impact on the caregivers' decision to use the walker. There were 24 self-reported cases of walker-related injuries representing 7.7% ($n=311$). The main types of injuries included toppling over flat ground (5.5%) and falling over stairs/steps (1.9%).

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Key words: awareness, infant walker, precaution.

Introduction

An infant walker is a device with a wheeled base supporting a rigid frame that holds a fabric seat with leg openings and usually a plastic tray. Over past decades, infant walker-related injuries have been reported in numerous studies in various parts of the world, ranging from minor contusions to life-threatening head injuries, drowning and burns. In the USA, 34 walker-related deaths were reported from 1973 to 1998. Walk-

ers have also been implicated in delaying motor and mental development of the child. Safety measures such as the use of warning labels, public education, adult supervision during walker use and stair gates, have been employed but seemed inadequate. The American Academy of Pediatrics recommends a ban on the manufacture and sale of mobile infant walkers. Despite the dangers, infant walkers are still widely used in Singapore. Parents make the decision to use the infant walker and the present study explored their beliefs and attitudes toward this potential household hazard.

Materials and methodology

The aim of the study was to assess parents' and caregivers' knowledge and use of infant walkers, and factors that may influence their decisions on using them. The

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study also determined the incidence of walker-related injuries of children between 4 and 9 months of age.

This was a prospective descriptive study of parents and caregivers who brought their children to the polyclinics at 4–6 months of age for immunization. The timing of the interview was selected to coincide with the period when parents were most likely to put their children in a walker. The same cohort of caregivers was given the second questionnaire when they returned to the respective polyclinic for development assessment of their children at 9 months of age.

Caregivers who met the inclusion criteria were directed to the research nurse during the period of observation after their child's vaccination. Informed consent was obtained before completing the questionnaire.

Inclusion criteria:

- The parent and/or principal caregiver must have lived in Singapore for the past 5 years and continue to live in Singapore for the next 6 months
- A principal caregiver is the person who looks after the child for more than 75% of the child's waking hours
- The infants brought to the clinic by the principal caregivers were between 4 and 6 months of age.

Exclusion criteria:

- A parent or principal caregiver who does not consent to their participation in the study
- Guardians who brought the child for immunization were neither the parent nor the principal caregiver
- The parent or principal caregiver who were visually or hearing impaired such that he or she did not comprehend the informed consent or the questionnaire.

The research nurse conducted face-to-face interviews with the caregivers. The standardized English questionnaire consisted of closed and open ended questions to capture ideas and concerns beyond the options available in the questionnaire. The nurses would assist in the language and/or dialect translation when necessary.

Sites of study

The study was carried out in two SingHealth Polyclinics at Queenstown and Marine Parade, respectively. Both polyclinics, which were government aided primary care clinics, were located in housing estates in central and eastern parts of Singapore, respectively. They were comparable in terms of size, total patient attendance and patient profile.

Period of study

A pilot study involving 20 caregivers was conducted in Queenstown Polyclinic to streamline the question-

naire in September 2000. The recruitment of the caregivers and the follow up of the infants at 9 months of age was carried out between November 2000 and December 2001.

Statistical analysis

To carry out statistical analysis, SPSS version 9.0 was used. Pearson correlation analysis was used for assessing correlation between the various factors and walker use. In the present study, $p \leq 0.05$ was regarded as statistically significant at the 95% confidence interval. A χ^2 test was used to compare the percentage difference between variables.

Results

Demographic profile and sample size of caregivers

A total of 447 caregivers of both sexes and ages above 21 years were recruited in the present study. Of these, 445 consented to the study. The two caregivers, who did not consent to the study, cited 'inadequate time to undertake the study' and 'inconvenience' as their reasons. The total number was reduced to 437 caregivers with a total of eight dropouts when the caregivers brought their child for review at 9 months of age. Repeated attempts to contact these dropouts by telephone failed.

Categories of principal caregivers

The principal caregivers included 50.8% parents, 26.7% grandparents, 13.3% maids and 9.2% nannies.

Housing types

The majority of the parents and caregivers lived in apartments – 80.2% in public housing and 9.9% in private condominiums. The rest lived in landed properties.

Total monthly household income

A total of 25.1% had a total monthly household income of <\$2000, 30.3% had an income of \geq \$2000 and <\$4000, 20.3% had an income \geq \$4000 and <\$6000 and 24.3% had an income of \geq \$6000. This was comparable to the national average in the Singapore 2000 population census.

Number of children in household

The majority of households (40.9%) had a single child, 35.3% had two children, 16.9% had three children and 6.9% had four or more children.

Intention to use infant walkers at 4 months of age

At 4 months of age, 39.6% ($n=176$) of caregivers had no plan to use the walker and 60.4% ($n=269$) of them planned to use the walker; of these, 22.0% ($n=98$) had already put their child/ward on walkers.

Source and features of walkers

It was found that 41.6% ($n=112$) of these caregivers would buy the walkers from departmental stores, 22.3% ($n=60$) would use the walkers of older siblings and 18.9% ($n=51$) would inherit the walkers from friends and relatives. A total of 41.2% would have inherited an existing infant walker.

The participants were asked to list the features they would consider in the choice of the walker (more than one option was allowed). Some 35.3% of the participants would consider the aesthetic design of the walker, 26.4% placed emphasis on the durability, 9.7% on the physical dimensions such as weight and height and 24.9% had no opinion.

Reasons for use of walker

Among the 269 caregivers who planned or were using the walker, 48.3% put their child in a walker as they perceived that the walker would assist the child in walking. Another 35.7% used the walker to keep the child preoccupied while 5.2% would position the child in the walker for feeding purposes.

Reasons for not using the walker

Among the 176 caregivers who indicated they had no plan yet to use the walker, 21.0% ($n=37$) pointed out that they were aware of the dangers, 6.8% ($n=12$) did not see the need to use the walker and no reason was given for 2.8% ($n=5$) of the respondents. The rest (69.3%, $n=122$) of the caregivers would not commit themselves at the point of the interview.

Precautions

Among those caregivers ($n=269$) who planned and who were using the walker, 20.1% ($n=54$) would take precautions to avoid injury. For these caregivers, adult supervision was the main precautionary measure (13%), followed by barriers to steps (2.2%) and barriers to electrical socket (0.8%). The majority (76.9%) of caregivers did not, or would not take precautions.

Awareness of walker related injury

Some 66.7% of all 445 caregivers indicated that they were unaware of walker-related injury. Thus only one-third of the caregivers were aware of the walker-related injuries.

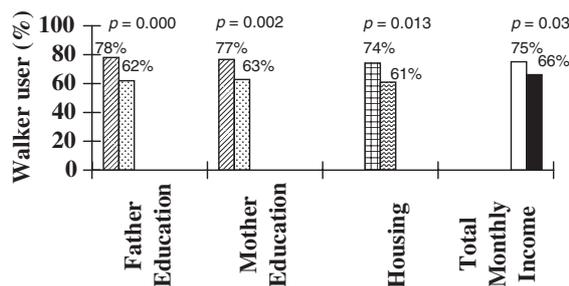


Figure 1 Social economic status (parents' education, housing status and household income) versus the child on the walker. Social economic status: (▨), Secondary and lower education; (▩), junior college and tertiary education; (▧), public housing; (▦), private housing; (□) income less than or equal to \$4000 (Singapore dollars), (■) income greater than \$4000 (Singapore dollars).

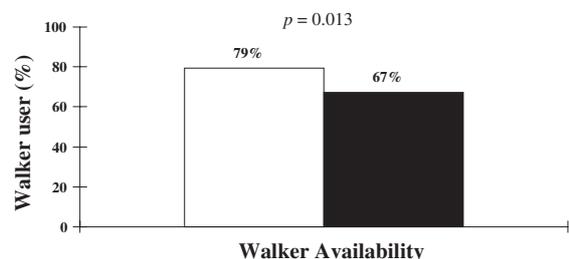


Figure 2 Walker availability versus the percentage of children using walkers. Walker availability: (□) inherited from sibling/friend/relative, (■) purchased.

Alternatives to walkers

It was found that 37.5% of caregivers were aware of alternative options to the walker in the care of their child/ward. The remaining 62.5% indicated that they did not know or were unaware of the alternative options for walker.

Factors influencing the caregivers' use of the infant walker

Figure 1 shows the socioeconomic status based on parents' educational level, housing type and total monthly household income for children using walkers. Figure 2 shows the availability of walkers for children in the present study. Figure 3 shows the perception that walkers facilitating the child's walking development.

Factors with less influence on the caregivers in the use of walkers

Caregivers' awareness of walker-related injuries and alternative options to walkers would not affect their decision to use the walker. Similarly the number of

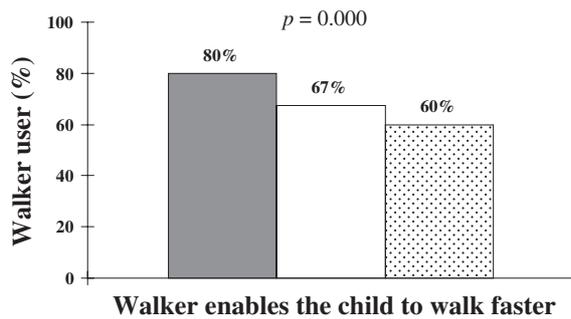


Figure 3 Perception that 'walker enables child to walk faster' versus the percentage of children using walkers. Perceptions: (■) agree, (□) do not know, (▨) disagree.

household children was not a significant factor in using walkers.

Incidence of walker-related injuries in this group of caregivers

When this group of children was followed up to 9 months of age, 311 (or 71.2%) children still used the walker ($n=437$). There were 24 (7.7%) self-reported cases of walker-related injuries ($n=311$). The main types of injuries included toppling over flat ground (5.5%) and falling over stairs/steps (1.9%).

Discussion

Infant walkers are commonly used in both developing and developed countries all over the world. Older studies up to 1992 showed that 55 to 92% of infants between 5 and 15 months of age used walkers.¹ Recent studies in UK, Austria and USA still revealed widespread use, from 50 to 77%.^{2,3,4} A local study done in 1997 showed that 90% of infants on follow up at a government polyclinic between 7 and 10 months used walkers.⁵

Although 39.6% ($n=176$) of caregivers in the present study reported that they did not plan to use the walker when their child was 4 months of age, eventually 71.2% (311/437) of this group used the walker when their child was 9 months old. It is apparent that there are other factors, which could influence the caregivers' use of the walker.

In Canada despite a ban on the sale of new walkers, there were persistent reports of walker-related injuries.⁶ In a review of 26 patients seen at an emergency department in a Canadian children's hospital for walker-related injuries, Morrison *et al.* reported that eight were purchased from the USA and were bought second-hand.

Some 41.2% of caregivers in the present study made use of a walker from the child's older siblings or

acquired them from friends and relatives. The availability of existing walkers was also shown to significantly contribute to the use of walkers. A 'walker round-up' at which walkers were collected and destroyed in return for prizes may be a strategy to address this problem.^{6,7}

It was found that 41.6% of caregivers (112/236) would consider purchasing the walker from department stores when their child was 4 months old. In a study by Bar-on *et al.*, 97% of parents heard about walkers before their baby's birth and 65% did not decide to use one until after birth.⁴ Thus, a period of time, up to several months, exists from when the mother hears about walkers until she decides to purchase one. This 'window period' provides an opportunity for appropriate anticipatory guidance to potential walker-related dangers.

The present study showed that among the 269 caregivers who planned to use the walker, 40.3% perceived that the walker enabled the child to hasten independent walking. Another significant portion 35.7% used the walker to keep the child preoccupied or as a 'child-minder'. This was similar to other studies in which parents gave various reasons for using walkers, such as keeping the child quiet and happy, encouraging mobility and promoting walking, providing exercise and holding the child during feeding.^{8,9,10} One third of parents in one study used walkers because they believed that walkers would keep their infants safe.^{10,11} The majority of parents perceived the walker as being beneficial.¹² Bar-on *et al.* reported that 78% of the caregivers believed that the walker was beneficial and believed that walker use accelerated development of independent walking.⁴

The present study also shown the perception that walkers promoted walking, significantly influenced the caregivers' decision to use the walker ($p=0.000$). In fact current evidence suggested no clear benefits. Ride-nour in his randomized trials on 15 pairs of twins showed that walker use did not influence the onset of independent walking.¹¹ Engelbert *et al.* in an in-depth analysis of two infants, reported disharmonic and delayed motor development mimicking spastic diplegia which might be linked to the early use of infant walkers.¹³ Another study of 105 infants by Siegel and Burton showed that walker-experienced infants sat, crawled and walked later than controls that did not use walkers.¹⁴ They scored lower on Bayley scales of mental and motor development. Nonetheless, it seemed that there were no lasting detrimental effects on typical children, nor was there any impact on the child's eventual motor development and intelligence.^{11,15}

The study results showed that only one third of the caregivers were aware of walker-related risks. Among the 176 caregivers who indicated that they did not plan to use the walker, one fifth (21%) claimed to be

aware of walker-related dangers and 6.8% indicated that they 'did not see the need to use the walker'. However, Laffoy *et al.* showed that although none of the parents of 158 infants cited safety concerns as a reason to stop using the walker, non-users (45%) did so.¹² Of the users, 12.5% had at least one walker-related injury.

The present study showed that awareness of walker-related injuries did not significantly deter the caregivers from using the walker ($p=0.107$). In one study, 32% of parents reported that they used the walker again after the injury and 59% acknowledged that they were aware of the potential dangers of walkers before the injury episode.¹⁶ In another study, one third of children were still in walkers 2 months after the initial injury.⁸ Other key factors such as perception of benefits and convenience could have exerted a stronger and more direct influence on the caregivers' decision.

Among the 269 caregivers who planned or were using the walker, almost 80% did not take precautions. For the rest who indicated that they would take precautions, the main measure was supervision (13%). Few would install barriers to steps (2.2%) and block electrical sockets (0.8%). However, adult supervision was found to be inadequate to prevent injuries. Moving at more than 1.5 m/s, an infant could dash across a room before an adult could have time to react. Smith *et al.* found that in 69% of cases, 78% of children were being supervised at the time of the injury by an adult.¹⁶

Other studies had shown that many of these events occurred with one or both parents in the room.^{8,17,18} Installation of stair gates is not totally safe. Rieder *et al.* found that more than one third of falls down stairs occurred when the stair gates were present, but the gates were either left open or improperly attached.⁸ On follow-up 2 months after an infant sustained a fall from stairs, less than half of the homes put up stair gates. Kendrick and Marsh showed that families using walkers were less likely to use stair gates, fireguards and had a higher number of unsafe practices.²

This lack of information on childhood injury prevention in the community was further illustrated by the result that only 37.5% of the caregivers were aware of alternative options to walkers. Even awareness of alternatives to walkers did not create a significant impact in the use of walkers ($p=0.872$).

A playpen was a safer option but in view of the limited size of public housing in Singapore, space for the playpen could be a constraint. Alternatively infant walker-like devices that do not roll across the floor on wheels are available in Singapore. These stationary activity centers allow children to bounce, swivel and tip. Toys may be placed on these activity centers to keep the child occupied. A preliminary report postulated that the recent decrease in the number of walker-related injuries could be attributed in part to the

availability of walker alternatives such as these stationary activity centers.¹

Parental education seemed to be a contributing factor in using walkers ($p=0.000$ for father's education level and $p=0.002$ for mother's educational level). This could tie in with the other socioeconomic indicators such as the total monthly household income ($p=0.030$) and housing types ($p=0.013$), which were also significant correlating factors in the present study. These results were similar to another study, that showed residence in a deprived area and unemployment was independently associated with the use of walker.²

The more educated and affluent caregivers, living in larger houses, may be more aware of safety measures for their child and could afford the space and cost of playpens or stationary activity centers or the employment of maids in lieu of walkers as 'child minders'. This differed from the study by Bar-on *et al.*, which reported that the decision by caregivers to use walkers was independent of the caregivers' education level and the birth order of the child.⁴

The results showed that the total number of children in the household did not correspond with the use of the walker. We were not able to explain this correlation as we earlier anticipated that with increasing number of children, the walker might be chosen as a convenient childminder.

The incidence of walker related injury was 7.7%, with 24 self-reported cases of injuries. There may be an underestimation of the incidence of walker-related injuries in the present study due to under-reporting by the caregivers and the short follow-up period for children from 4 to 9 months of age as injuries can also occur after 9 months of age. Another local study showed that the incidence of walker-related injury was 12.5%.⁵ It was also possible that administration of the questionnaire during the study could have promoted greater awareness of the walker related dangers to the caregivers so that they took more precautions.

In the USA, there were 8800 children younger than 15 months of age who were treated in hospital emergency in 1999, with 34 reported cases of death associated with the use of walkers from 1973 to 1998.^{19,20} This could be the tip of the iceberg. Population surveys suggested that there might be as many as 10 times more injuries that were treated in primary care or minor cases that were ignored or did not warrant medical attention. Parents reported that 12–40% of their children sustained walker-related injuries at some stage.¹⁹

The present study revealed that falls such as toppling over flat ground and falling over stairs constituted the majority of injuries (7.4%). This is comparable to worldwide studies where falls were the predominant form of injury. Whereas falls from stairs

were implicated in 75 to 96% of cases in other studies, it was less common in Singapore, as the majority of citizens live in single-level apartments without stairs.^{8,16,21–23}

Other walker-related injuries such as pinch injuries to digits,¹⁷ burns,^{8,20,21,24,25} poisoning and drowning were reported in other studies.^{17,22,26,27} These injuries were not observed in the present study. An ongoing detailed long-term children's injury surveillance system will be instrumental in providing a more reflective overview of walker-related injuries in Singapore.

Conclusion

Two thirds of caregivers of infants were unaware of walker-related injury and only 37.5% of them were aware of alternatives to walkers. More than half perceived that the walker helped the child to walk faster despite contradictory evidence. Only 20% of caregivers who plan or have already started their child/ward on a walker would take precautions. Factors which seemed to influence caregiver's use of walkers include: parental education, total monthly household income, housing type, walker availability and perception that a walker promotes walking. Awareness of walker-related hazards and alternatives to walkers and the total number of children in the household did not appear to be significant factors.

Summary of implications for GPs

Childhood injury, the third most common cause of mortality and morbidity in Singapore, is largely pre-

ventable. Indeed, preventive care is part of every family physician's duty and responsibility. There is an urgent need for family physicians, often as the first line of contact with the caregivers of infants in primary care, to advocate child safety in the home environment. With the help of the health promotion authorities, it is not a difficult task to incorporate a simple health education program in primary care. Such a program could address the lack of public awareness on child safety and correct their wrong perception of the use of equipment such as the walker being completely safe. The program, which may include talks, posters in clinics and dissemination of child safety pamphlets and other literature, can be incorporated in the immunization schedule to optimize the child's visits to family physicians.

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