Promoting child safety in primary care:

a cluster randomised controlled trial to reduce baby walker use

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ABSTRACT

Background

Baby walkers are commonly used items of nursery equipment, but cause more than 3000 injuries each year in the UK. There is currently little evidence regarding the effectiveness of interventions in primary care to reduce walker use.

Aim

To evaluate the effectiveness of an educational package provided by midwives and health visitors to reduce baby walker possession and use.

Design of study

Cluster randomised controlled trial.

Setting

Sixty-four general practices in Nottingham and North Nottinghamshire, UK.

Method

An educational package aimed at discouraging mothers-to-be from obtaining and using a walker was delivered by midwives and health visitors to 1174 mothers-to-be of at least 28 weeks gestation. The control arm received usual care. Primary outcome measures were the possession and use of a walker. Secondary outcome measures included the frequency and duration of walker use, knowledge and attitudes towards walkers, plans to use a walker with future children, recommending a walker to a friend, and use of stair gates and fire guards.

Results

Intervention arm participants were significantly less likely to own (odds ratio [OR] = 0.63, 95% confidence interval [CI] = 0.43 to 0.93) or to use a walker (OR = 0.26, 95% CI = 0.08 to 0.84). They were significantly less likely to plan to use a walker with their next child (OR = 0.52, 95% CI = 0.31 to 0.86) or to agree that walkers keep children safe (OR = 0.35, 95% CI = 0.16 to 0.78). There was some evidence that they were less likely to recommend a walker to a friend (OR = 0.51, 95% CI = 0.28 to 0.91) or to agree that they help children to walk more quickly (OR = 0.53, 95% CI = 0.29 to 0.95).

Conclusion

An educational package delivered by midwives and health visitors was effective in reducing baby walker possession and use. Providers of primary healthcare services should include baby walker education in their injury prevention strategy and child health promotion programme.

Keywords

child; injury prevention; randomised controlled trial; safety.

INTRODUCTION

Baby walkers (a seat in a frame on wheels) are used in the UK by 50% of parents of infants aged between 3 and 12 months.[1] Reasons for use include child enjoyment, helping children to walk more quickly, providing breaks from child care and keeping children safe.[2–5] Parents report that between 8% and 12.5% of children who use walkers suffer an injury in their walker,[6–8] and each year in the UK more than 3000 children attend accident and emergency departments following an injury in a walker.[9] Data from the US suggests that 29% of attendances result from serious injuries.[10] Head injuries, lacerations and burns and scalds occur,[10–12] most commonly resulting from stairway falls, tip overs and burns.[10,13]

Health for All Children[14] provides guidance for developing child health promotion programmes. It's guidance regarding baby walkers is that health professionals should ascertain parents' reasons for using a walker, try to find acceptable alternatives and encourage the use of stair gates and fire guards among

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those using a walker. We have only been able to find one published study assessing the effectiveness of an educational intervention to reduce walker use.[6] This non-randomised study, set in Singapore, which has a very high prevalence of walker use, found nurse education to be effective in reducing self-reported walker use. However, it is not clear whether similar findings can be replicated in a randomised controlled trial in primary care in the UK. We have therefore undertaken a cluster randomised controlled trial evaluating the use of an educational package to reduce baby walker use in primary care.

How this fits in

Baby walkers are commonly used but a considerable number of infants suffer walker related injuries. One study from Singapore found nurse education to be effective in reducing walker use, but it is not clear whether these results are generalisable to primary care in the UK. We found that an educational package delivered by midwives and health visitors was effective in reducing baby walker possession and use. Providers of primary health care services should include baby walker education in their injury prevention strategy and child health promotion programme.

METHOD

Participants

Seventy-one practices in the four Nottingham primary care trusts (PCT) and 15 in Newark and Sherwood PCT were eligible to take part.

Mothers-to-be of at least 28 weeks gestation, who were registered with participating practices were eligible. Participants were recruited by practice-based midwives who were trained in recruiting participants. The training stressed that all eligible women should be asked to take part in a study about child safety and the study information sheet indicated that the intervention group would be provided with extra advice about home safety and did not mention baby walkers. Exclusion criteria were inability to give informed consent and where the midwife or health visitor considered participation would cause distress due to depression or previous serious walker injury. The number of births at each participating practice during the recruitment period was collected to estimate the participation rate.

Intervention

The intervention comprised an educational package; the objectives of which were to discourage mothers-to-be from obtaining a walker, discourage those who already had a walker from using it with their new baby, and encourage those wishing to use a walker to use it more safely. The design of the package was based on a literature review and an analysis of walker injury data from a national sample of hospitals and focus groups with mothers and health professionals.[4,5] It was also based on educational principles demonstrated to be effective in producing behavioural change.[15,16] Intervention-arm midwives and health visitors were trained to deliver the intervention. The training, and it's evaluation have been described elsewhere.[17] There were three stages to the educational package:

- At recruitment — the midwife and mother-to-be discussed plans to use a walker and it was emphasised that walkers do not help children walk more quickly, accidents can occur in walkers and no official checks are done on second-hand walkers. Advice not to buy or accept a walker as a gift was given with a postcard and a fridge magnet reinforcing these messages.
- 10 days postpartum — the health visitor and mother discussed plans to use a walker, the messages given at recruitment were reinforced, with information on walker injuries that included anonymised parental accounts of how walker injuries had occurred to their children. A birthday card, reinforcing these messages was given.
- At age 3–4 months — mothers completed a checklist about their child's development, strategies for looking after the child when they needed to do something else (for example, cooking a meal, answering the door or needing 5 minutes to themselves) and plans to use a walker, fire guards and stair gates. Safer actions and choices were reinforced, alternatives to walkers were considered and the messages given at recruitment and the birth review visit were reinforced. For those planning to use a walker, the health visitor discussed reducing frequency and duration of use and the use of stair gates and fire guards. The mother and health visitor agreed, and signed, a plan of action.

We took advice from the health professionals working in each practice regarding translation of study materials and one practice requested that materials were translated into Urdu. Where interpreters were routinely used in consultations with families, they were also used in consultations in which the intervention was delivered.

Control group health visitors and midwives were asked to continue to give the advice regarding home safety and baby walkers that they had provided prior to participating in the trial and did not have access to the educational materials produced for the trial. Data collected from surveys of participating health professionals at baseline indicated that the majority of midwives did not discuss walkers antenatally (82%) and many health visitors sometimes or never discussed walkers around birth (45%) or at the 3–4 month hip check (66%).[17]

Table 1. Sociodemographic characteristics and safety practices at baseline by treatment arm.

Characteristics	Intervention arm (*n* = 539) (*n*[%])	Control arm (*n* = 635) (*n*[%])
Number of children in family:		
0	246 (45.6)	312 (49.1)
1	199 (36.9)	239 (37.6)
2	72 (13.4)	69 (10.9)
≥3	22 (4.1)	15 (2.4)
First-time mothers[a]	246 (45.6)	312 (49.1)
Teenage mothers (aged <20 years)	21 (3.9)	33 (5.2)
Ethnic group non-white[a] (5[b])	32 (6.0)	16 (2.5)
Lives in rented accommodation[a] (4[b])	97 (18.1)	137 (21.6)
Single parent (20[b])	26 (4.9)	33 (5.3)
Receives means tested benefits (state support) (18[b])	78 (14.7)	101 (16.2)
Educational level[a]: (1[b])		
No qualifications	47 (8.7)	55 (8.7)
O Level/GCSE	227 (42.1)	352 (55.5)
A levels	81 (15.0)	90 (14.2)
Degree or postgraduate degree	184 (34.1)	137 (21.6)
Townsend score (mean [SD]) (41[b])	-0.63 (3.22)	-0.60 (2.93)
Safety practices		
Stair gate:[a] (18[b])		
On all flights of stairs	165 (31.3)	211 (33.6)
On some flights of stairs	20 (3.8)	13 (2.1)
No stair gate	109 (20.7)	117 (18.6)
Not applicable[c]	233 (44.2)	288 (45.8)
Fire guard:[a] (13[b])		
On all fires	132 (24.8)	139 (22.1)
On some fires	14 (2.6)	10 (1.6)
No fire guard	104 (19.6)	119 (18.9)
Not applicable[c]	282 (53.0)	361 (57.4)
Has walker already[a] (9[b])	93 (17.5)	125 (19.8)
Plans to use walker:[a]		
Yes	134 (24.9)	233 (36.7)
No	262 (48.6)	236 (37.2)
Unsure	143 (26.5)	166 (26.1)
Partners views on walkers[a]: (48[b])		
Should use	129 (25.0)	215 (35.3)
Shouldn't use	215 (41.6)	195 (32.0)
Don't know	173 (33.5)	199 (32.7)

[a]Analyses in Table 3 adjusted for these characteristics. [b]Missing values. [c]Family does not have stairs/fires or no children yet. SD = standard deviation.

Objective

The aim of this study was to evaluate the effectiveness of an educational intervention delivered by midwives and health visitors to reduce baby walker possession and use.

Outcomes

Primary outcome measures were possession and use of a walker. Secondary outcome measures included frequency and duration of use, knowledge and attitudes towards walkers, plans to use a walker with future children, recommendations to friends regarding walkers and use of stair gates and fire guards.

Primary outcomes, knowledge and attitudes and use of stair gates and fire guards were measured at recruitment and at follow up. Other outcomes were measured only at follow up. Outcomes were measured using a self-completion questionnaire, given to mothers-to-be by the midwife at recruitment (baseline data) and posted with a reply paid envelope to mothers when their child was 9 months old (follow-up data). To prevent confusion the questionnaires described walkers as 'a seat in a frame on wheels' and contained a picture of a child in a walker. Non-responders were sent two reminders, followed by a shortened version of the questionnaire containing only questions on primary outcome measures. The questionnaire was translated into Urdu for families where the midwife or health visitor felt this was appropriate.

The follow-up questionnaire also asked if mothers were willing to be interviewed. These interviews were used to explore possible explanations for why the intervention was, or was not effective. We also used them to assess the consistency of responses regarding walker possession reported on the questionnaire with that reported at face-face interview.

Sample size

To detect a 10% difference in baby walker possession, based on 50% of mothers in the control arm owning a walker, 80% power and a two-sided 5% significance level, 388 mothers per arm were required. The design effect was calculated as 1.374, based on an intra-class correlation coefficient of 0.017 (from a previous primary care child injury study in Nottingham[18]) and an average cluster size of 23 participants. Allowing for up to 10% losses to follow up, 1173 participants were required.

Assignment

Practices were stratified by practice deprivation based on the Townsend score[19] into three strata (≤-2, -1.99 to 0, >0) and randomly allocated within strata to treatment arms. Where midwives or health visitors were attached to more than one study practice, practices were allocated as one unit. The allocation schedule was computer generated by two of the researchers and a third undertook the allocation, with practices identified by a unique identification number to ensure the researcher was blind to the identity of the practices.

Masking

It was not possible to blind participants, healthcare providers or investigators to treatment arm allocation.

Statistical analyses

Data were double entered into a Microsoft Access database and discrepancies identified and corrected. Data were analysed using Stata version 7 and MLwiN version 1.1. Normally distributed continuous data have

been described using means and standard deviations. Categorical data have been described using frequencies and percentages. Balance of characteristics between treatment arms at baseline has been assessed informally. We took account of any clustering of outcomes within practices by using random effects logistic regression to estimate odds ratios and 95% confidence intervals (CIs) for primary and secondary outcome measures. Where there was evidence of any baseline imbalance between treatment arms, analyses have been adjusted by including these covariates in the models. Three subgroup analyses were pre-specified on theoretical grounds: whether the treatment effect differed by whether the mother-to-be was expecting her first child, receipt of means-tested benefits and educational level. Following analyses on the baseline data regarding plans to use walkers, a fourth subgroup analysis was specified, which was whether the effect of the intervention differed between those who were undecided and those who had decided to use a walker at baseline. For these analyses a term for the interaction between each of these covariates and treatment arm was added to the model.

Analyses were undertaken on an intention to treat basis, in that participants were analysed by treatment arm regardless of whether they received the intervention or not. In addition, three sensitivity analyses were undertaken. The first two assumed all those who did not respond to the follow up questionnaire or were otherwise lost to follow up owned a walker and did not own a walker, respectively. The third sensitivity analysis assumed all those who did not agree to be interviewed and reported they did not own a walker did own a walker. We used a significance level of 0.05 for primary outcomes and 0.01 for secondary outcomes.

RESULTS

Participant flow and follow up

Sixty-four practices, comprising 46 units, participated in the trial. Fifty-five of the eligible practices in Nottingham (77%) and nine of those in Newark and Sherwood PCT (60%) agreed to participate. A total of 1174 women were recruited to the trial between 12 September 2000 and 23 September 2002 and follow-up questionnaires were sent to mothers between 28 August 2001 and 23 July 2003. The progress of practices and participants through the trial are shown in Figure 1. Two practices did not recruit any participants due to long-term sickness absence of midwives.

Analysis

Data on the number of live births during the recruitment period were unavailable from one control arm practice. Excluding this practice, the participation rate was similar in the intervention (21.4%) and control arms (22.9%). Baseline sociodemographic and family characteristics are shown in Table 1 and attitudes and knowledge about walkers in Table 2. There were slightly more first-time mothers, those planning to use a walker and those whose partner thought they should use a walker in the control arm. There were more mothers-to be with higher educational qualifications and fewer with positive attitudes towards walkers in the intervention arm.

Table 2. Attitudes and knowledge about walkers at baseline by treatment arm.

Attitudes and knowledge about walkers	Intervention arm (*n* = 539)	Control arm (*n* = 635)
Walkers keep children safe:[a] (22[b])		
Strongly agree/agree	49 (9.3)	84 (13.5)
Neither/disagree/strongly disagree	479 (90.7)	540 (86.5)
Walkers are useful:[a] (17[b])]		
Strongly agree/agree	215 (40.6)	347 (55.3)
Neither/disagree/strongly disagree	315 (59.4)	280 (44.7)
Not many children have accidents in walkers:[a] (26[b])		
Strongly agree/agree	36 (6.8)	47 (7.6)
Neither/disagree/strongly disagree	493 (93.2)	572 (92.4)
Walkers help children walk more quickly:[a] (22[b])		
Strongly agree/agree	83 (15.7)	146 (23.4)
Neither/disagree/strongly disagree	446 (84.3)	477 (76.6)
Number of knowledge[c] questions correct:[a] (115[b])		
0	288 (57.8)	342 (61.0)
1	187 (37.6)	192 (34.2)
2	23 (4.6)	27 (4.8)

[a]Analyses in Table 3 adjusted for these characteristics. [b]Missing values. [c]The questionnaire contained two knowledge questions asking about the frequency of accidents in baby walkers and the mechanism by which walker accidents most commonly occur.

The primary and secondary outcome measures are shown in Table 3. Mothers in the intervention arm were significantly less likely to have a walker and to use a walker. The number needed to treat to prevent one mother from having a walker was 7 (95% CI = 5 to 12) and from using a walker was 11 (95% CI = 7 to 27). Intervention arm mothers were significantly less likely to plan to use a walker with their next child or to agree that walkers keep children safe. There was some evidence that they were less likely to recommend a walker to a friend or to agree that they help children to walk more quickly.

The effect of the intervention did not differ by whether the mother-to-be was expecting her first child ($P = 0.28$), received means-tested benefits ($P = 0.29$) or her educational level ($P = 0.66$). There was some evidence ($P = 0.10$) that the intervention was effective in those who were undecided about whether to use a walker (OR = 0.50, 95% CI = 0.27 to 0.90) but not among those who had already decided to use one (OR = 0.98, 95% = CI 0.52 to 1.82). Assuming that all non-responders to the follow-up questionnaire and those lost to follow up for other reasons (for example,

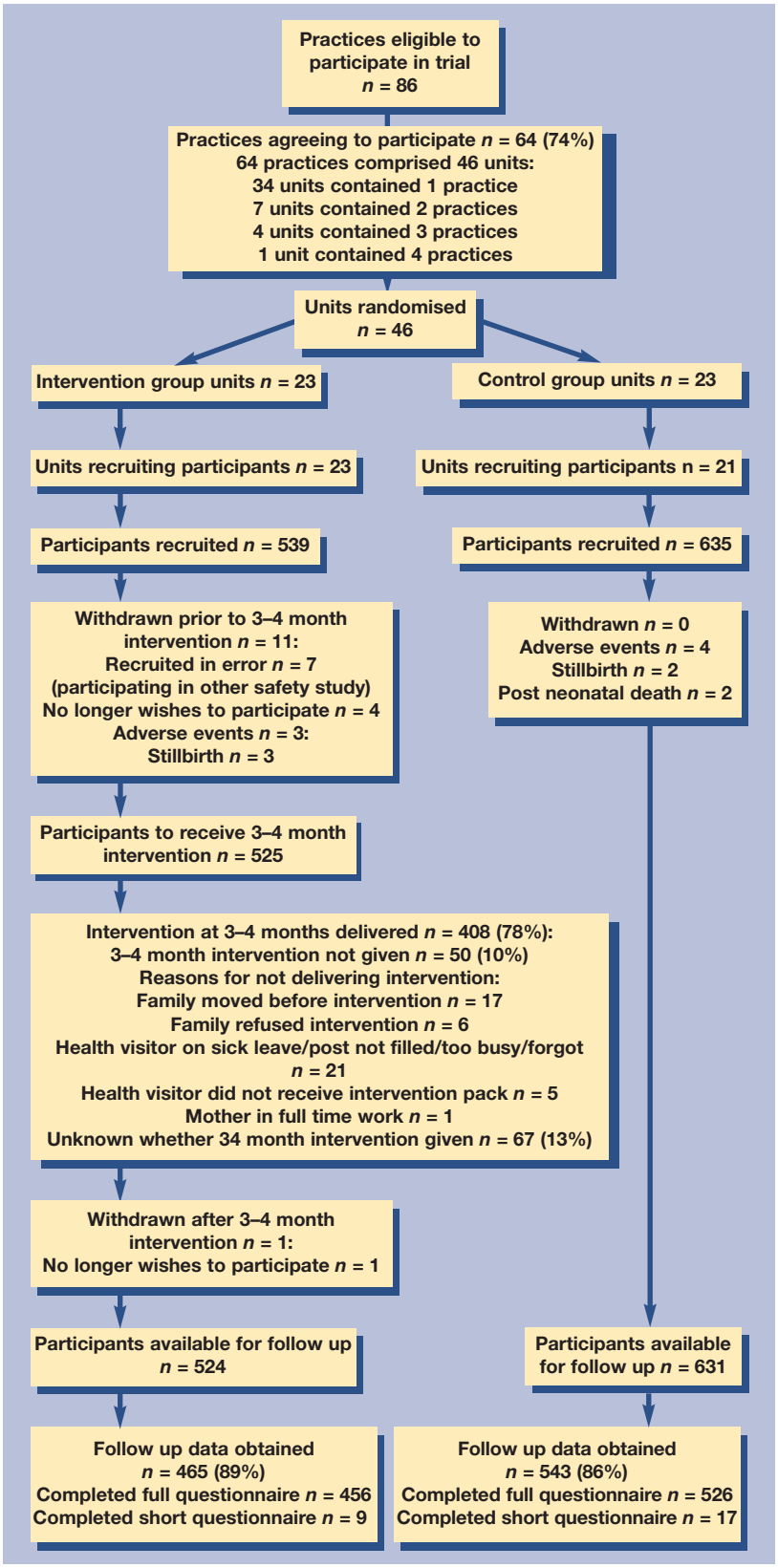

Figure 1. Flow chart detailing progress of units and participants through trial.

those who had a walker [OR for walker ownership = 0.61, 95% CI = 0.43 to 0.84] and did not have a walker [OR for walker ownership = 0.56, 95% CI = 0.44 to 0.73]) had little impact on the results.

Sixty-four per cent (650/1008) of mothers responding to the follow-up questionnaire agreed to be interviewed and 35 selected at random from a sampling frame stratified by walker use, deprivation and treatment arm were interviewed. Thirty-four of the face-face reports of walker use concurred with responses on the follow-up questionnaire. One mother reported having a walker on the questionnaire but had mistaken a push-along truck as a walker. A sensitivity analysis assuming that all those who did not agree to be interviewed and reported that they did not own a walker did own a walker indicated that the findings were robust to these assumptions (OR = 0.56, 95% CI = 0.40 to 0.77).

Surveys of participating health professionals[17] indicated that most (67%) midwives spent no more than 5 minutes, and most health visitors spent no more than 10 minutes at the birth review (93%) or at the 3–4 month review (64%) providing advice about walkers.

DISCUSSION

Summary of main findings

We have found that an educational package delivered by midwives and health visitors was successful in reducing baby walker possession and use, in reducing the likelihood of mothers planning to use a walker with subsequent children and in encouraging more negative attitudes towards walkers. There was some evidence that the intervention was effective among those who were undecided about whether to use a walker ante-natally but not among those who were already planning to use a walker.

Strengths and weaknesses the study

This is the first randomised controlled trial to evaluate an educational package to reduce walker possession and use. The strengths include incorporating the views of parents and health professionals into the design of the intervention and recruiting a large number of practices, from inner city, suburban and rural areas with a range of deprivation scores and achieving high follow-up rates, which were similar between treatment arms. Our sensitivity analyses suggested that even if all non-responders had a walker this would not alter the conclusions we would draw regarding our findings. While it is possible that the proportion of non-responders owning a walker may vary by treatment arm, the number of non-responders was small and similar across treatment arms, suggesting that even if this did occur it is unlikely to substantially alter our conclusions.

There was some evidence of imbalance between the treatment arms at baseline, which may reflect post-randomisation recruitment bias. This could have arisen either by midwives inadvertently selecting women to invite to participate on the basis of the midwives'

Table 3. Unadjusted and adjusted odds ratios for primary and secondary outcome measures.

Primary outcome measures (responders to short and full follow up questionnaires)	*n* (%)		Odds ratio (95% CI) *P*-value	
	Intervention arm (*n* = 465)	Control arm (*n* = 543)	Unadjusted	Adjusted[a]
Has a baby walker	131/463 (28.3)	230/543 (42.4)	0.54 (0.39 to 0.75) *P* <0.0001	0.63 (0.43 to 0.93) *P* = 0.02
Used a baby walker[b]	124/141 (87.9)	229/235 (97.4)	0.21 (0.08 to 0.53) *P* = 0.0001	0.26 (0.08 to 0.84) *P* = 0.03
Secondary outcome measures (walker users only)	Intervention arm (*n* = 124)	Control arm (*n* = 229)		
Used walker less than once a day	41/113 (36.3)	91/216 (42.1)	0.79 (0.45 to 1.36) *P* = 0.39	0.77 (0.3 to 1.53) *P* = 0.46
Used walker for less than 1 hour per day	91/117 (77.8)	152/214 (71.0)	1.35 (0.79 to 2.33) *P* = 0.27	1.50 (0.78 to 2.87) *P* = 0.22
Secondary outcome measures (those completing full follow-up questionnaire only)	Intervention arm (*n* = 456)	Control arm (*n* = 526)		
Would use a walker with next child	56/432 (13.0)	132/508 (26.0)	0.43 (0.26 to 0.69) *P* = 0.001	0.52 (0.31 to 0.86) *P* = 0.01
Would recommend walker to a friend	63/454 (13.9)	135/523 (25.8)	0.45 (0.28 to 0.73) *P* = 0.001	0.51 (0.28 to 0.91) *P* = 0.02
At least one knowledge question correct	180/422 (42.7)	160/489 (32.7)	1.47 (1.12 to 1.93) *P* = 0.006	1.37 (0.97 to 1.94) *P* = 0.07
Agrees or strongly agrees that:				
Baby walkers keep children safe	20/454 (4.4)	53/522 (10.2)	0.43 (0.23 to 0.81) *P* = 0.009	0.35 (0.16 to 0.78) *P* = 0.01
Walkers are useful	142/455 (31.2)	241/524 (46.0)	0.55 (0.37 to 0.82) *P* = 0.004	0.70 (0.47 to 1.04) *P* = 0.08
Not many parents experience accidents with walkers	23/452 (5.1)	43/525 (8.2)	0.60 (0.35 to 1.02) *P* = 0.06	0.60 (0.33 to 1.07) *P* = 0.09
Baby walkers help children walk more quickly	21/454 (4.6)	48/522 (9.2)	0.47 (0.27 to 0.80) *P* = 0.005	0.53 (0.29 to 0.95) *P* = 0.03
Walker owners used stair gates on all or some stairs[c]	98/119 (82.4)	165/210 (78.6)	1.16 (0.59 to 2.28) *P* = 0.66	1.17 (0.59 to 2.34) *P* = 0.66
Walker owners used fireguards on all or some fires[c]	70/103 (68.0)	98/169 (58.0)	1.57 (0.93 to 2.65) *P* = 0.09	1.72 (0.94 to 3.15) *P* = 0.08

[a]*Analyses adjusted for characteristics starred in Tables 1 and 2.* [b]*Denominator = those with a walker + those who did not own a walker but had used a walker (n = 15).* [c]*Denominator excludes families without stairs or fires. Intraclass correlation coefficient for possession of baby walker = 0.053 and for use of walker = 0.050.*

perceptions about their propensity to use a walker, or by women becoming aware that the trial was aimed at reducing baby walker use prior to giving consent and choosing whether or not to participate based on this knowledge. We took several steps to try and minimise such bias. Firstly, we trained midwives in recruiting women and highlighted the importance of inviting all eligible women and in presenting the trial as a safety project rather than as a trial to reduce walker use. Secondly, the trial information leaflet referred to child safety and did not mention baby walkers. Furthermore during the trial we monitored the participation rate by treatment arm and found this to be similar. We also measured a wide range of factors that we considered may be associated with walker use including attitudes towards walkers, plans to use walkers and partners views and adjusted the analyses for these factors.

As our outcomes were self-reported, intervention arm mothers may have under-reported walker possession and use. The consistency of walker use disclosed on the questionnaire and at interview, the high percentage of participants agreeing to be interviewed and the results of the sensitivity analysis assuming those not willing to be interviewed who declared not owning a walker did actually own one, leads us to believe that under reporting is unlikely to substantially influence our findings.

Although on a population level use of walkers results in a considerable number of injuries, walker-related injuries are too rare to use as an outcome measure within a trial such as this. Parental reports suggest that between 8% and 12.5% of walker users suffer an injury in their walker.[6–8] Based on these figures and the number of walker users in each treatment arm, the number needed to treat to prevent one walker-related injury would range from 53 to 91. This does, however, assume that those families in the intervention arm who choose to use a walker despite having the intervention, have a similar risk of injury as those choosing to use a walker in the control arm who did not receive the intervention.

Teenage mothers, lone mothers and those from ethnic minority groups were under represented in our trial compared to the population of Nottingham, but not to that of Nottinghamshire.[20–22] This occurred because many inner city practices in Nottingham were taking part in another injury prevention trial and were therefore ineligible for this trial. It is possible that the effect of the intervention may differ among these groups and work examining this hypothesis would be useful.

Comparisons with existing literature

We have only been able to find one study specifically

aimed at reducing walker use in the published literature. This smaller non-randomised study set in Singapore found that community health nurses' advice, coupled with the use of pamphlets illustrating four common walker-related injuries was effective in reducing walker use, with an effect size (OR = 0.34, 95% CI = 0.22 to 0.53) of similar magnitude to that found in our study.[6] These findings, plus those from our trial support evidence from systematic reviews that suggest that while educational interventions aimed at reducing specific home injuries can be effective, there is little evidence that those aimed at reducing a range of home injuries are effective.[23,24]

Implications for clinical practice and further research

Providers of primary healthcare services should include walker education in their injury prevention strategy, in their child health promotion programme and train midwives and health visitors to deliver such education. This education has the potential to reach virtually all mothers-to-be in the UK as they receive at least some of their antenatal care and most of their postnatal care in the community.[25] Although a relatively short time was spent by midwives and health visitors delivering the intervention, in practice, this may be even less. It is therefore encouraging that a recent study found providing nurse advice at only one consultation produced similar results.[6] Our findings suggest that education should be targeted at those who are undecided about using a walker and that other strategies may be required to address use among those who have already decided to use a walker.

Previous work suggests that walkers are more likely to be used by low income families and those in deprived areas[1] and, although we did not find evidence of a differential effect by receipt of means-tested benefits, the power to detect such an effect would have been low. Further work is therefore required to confirm our findings among more disadvantaged populations, as well as among teenage mothers, lone mothers and those from ethnic minority groups.

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Ethics committee

Ethical approval for the trial was provided by the ethics committee at the Queen's Medical Centre, Nottingham, UK (EX029902). All participants gave written consent to participate in the trial

Conflict of interest

None

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