

BMJ Open *This Much Water*: a qualitative study using behavioural theory to develop a community service video to prevent child drowning in Western Australia

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ABSTRACT

Objectives Drowning in children under the age of 5 is a frequently occurring, yet preventable event. This research used behavioural theory to test the suitability and appropriateness of a drowning prevention message in a community service video.

Design This qualitative study used content analysis of focus groups. Constructs from the Health Belief Model guided the data analysis.

Setting Community organisations and playgrounds in Perth, Western Australia.

Participants Participants were parents or carers of at least one child under 5 years residing in Western Australia. Seven focus groups (n=57) were conducted with eight participants in each group. Most participants were parents (96%), female (95%), aged between 25 and 34 years (63%) and were born in Australia (68%).

Results Participants indicated the community service video was credible in communicating the message that young children were susceptible to drowning in shallow water and that various water hazards existed in and around the home. However, a range of external factors, such as the child's age, type of water hazard, presence of siblings and other environmental factors, influenced risk perceptions. Child drowning was seen as a serious issue. Controlling access to water and the role of supervision were understood to be important factors in preventing drowning.

Conclusions The lack of published drowning prevention interventions shaped by behavioural theory limits the understanding of best practice. Using constructs from the Health Belief Model, this research confirmed the perceived seriousness, devastating and unforgettable consequence of drowning; however, findings were mixed regarding cues to action. Future development of drowning prevention media messages should test strategies to increase susceptibility and self-efficacy among the target group and explore the impact of different message senders. The findings provide a valuable understanding of possible messages and their execution for use in media campaigns, as one component of an effective public health intervention to prevent child drowning underpinned by behavioural theory.

INTRODUCTION

Drowning in children aged under the age of 5 is a frequently occurring, yet preventable event.¹ Child drowning patterns vary widely

Strengths and limitations of this study

- This is the first study, as far as the authors are aware that has mapped behavioural theory, specifically constructs from the Health Belief Model to test the suitability and appropriateness of a drowning prevention message via a community service video.
- This exploratory qualitative study with parents and caregivers used focus group discussions to elicit information on a relatively novel area in the public health literature.
- The use of the reporting guidelines outlined in the consolidated criteria for reporting qualitative research enhanced study rigour, comprehensiveness and credibility.
- Due to the purposeful sampling and pragmatic considerations, participants were only from metropolitan Western Australia, predominantly female and Caucasian, thus limiting the transferability of findings.
- Conducting relatively heterogeneous focus groups may have limited the credibility and authenticity of responses. To obtain more varied data homogeneous focus groups may be valuable.

across regions and countries.¹ For example, in low-income to middle-income countries (LMIC), drowning among children under 5 years typically occurs during daily activities.² In contrast, in high-income countries (HIC) such as Australia, children under the age of 5 drown in and around the home or in recreational settings.^{3,4}

Despite widespread implementation of injury prevention strategies, Australian child drowning rates remain unnecessarily high.⁵⁻⁷ Between 2014 and 2015, 26 children under the age of 5 fatally drowned, a 30% increase on the previous year.⁴ More than half of these fatalities were males, with home swimming pools the leading drowning location.⁴ In all cases, a lapse in supervision was a contributing factor.⁴ In Western Australia (WA), eight children under 5 years fatally drowned in 2013,



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the highest recorded rate in a decade, and a further 35 hospitalisations of non-fatal drowning incidents were recorded.⁸ Similar to Australian statistics, all fatal drownings occurred in and around the home, with backyard swimming pools the leading drowning site among those aged 1 to 3 and the bath or shower for those aged under 12 months.⁸

Drowning prevention is complex, requiring a comprehensive approach.^{9–11} The International Lifesaving Federation Drowning Prevention Strategy provides a framework for selecting evidence informed preventative strategies.¹² The framework outlines four strategies: (1) education and information-based strategies addressing poor knowledge or misjudgement of hazards, which include community education and mass media; (2) warnings and denying of access to eliminate or isolate drowning hazards, such as signage, pool fencing and regulations; (3) supervision to extend lifesaving services, such as lifeguard services, parent and carer supervision and first aid facilities; and (4) survival skills to address ability to cope once in difficulty, which includes community-based swimming and resuscitation training and rescue equipment.¹² In addition, the literature supports a need for interventions that are underpinned by theory and robust evaluation.^{9 10 13}

During strategy and message development, behavioural theory can help identify appropriate cognitions, emotions and processes to target,¹⁴ as well as aid in identifying successful components of existing messages for replication in other settings.^{15–17} Thus, strategies shaped by theory-based formative research can guide deployment of finite resources to support behaviour change.^{16 18} However, few drowning and injury prevention studies have documented the use of behavioural theory or formative research.^{10 17 19–22}

Consistently, the Health Belief Model (HBM)²³ has proven a useful framework to test and guide intervention messaging.¹⁴ The HBM assumes that an individual's motivation to take action results from their perceived susceptibility to and severity of a problem, and the perceived benefits and barriers to taking action, which determines health threat perceptions outcome expectations. Modifying factors, such internal and external cues to action (for example, mass media) and an individual's confidence in their ability to take action (self-efficacy) further influence the likelihood of behaviour change.^{14 24 25} These constructs can help us understand human behaviour, and in turn how to better address complex health issues.

Present study

This research was undertaken to support the work of a drowning prevention non-government organisation in Western Australia which targets parents/carers of children under 5 years to reduce drowning deaths and hospitalisations (*Keep Watch* programme). *Keep Watch* promotes four messages: supervise, restrict access, learn and respond. Mass media, community and professional

education and cardiopulmonary resuscitation training are key programme strategies. The *Keep Watch* mass media campaign runs during the Australian summer months each year.

The aim of this research was to use behavioural constructs from the HBM²³ to test the suitability, appropriateness and acceptability of the drowning prevention message in a newly developed community service video *This Much Water* and to make recommendations for future messaging. This paper is part of a larger suite of research as reported previously.²⁶

METHODS

The consolidated criteria for reporting qualitative research checklist²⁷ was used to guide study design and report on findings. The main method used in this study was focus group discussions. The study received ethics approval from the Curtin University Human Research Ethics Committee (SPH-44-2014).

Sample selection and recruitment

Participants were aged 18 years and over, the parent or carer of at least one child aged under the age of 5 residing in the Perth metropolitan area of WA. Purposive and snowball sampling was used to recruit participants. Email invitations to participate in the study were sent to childcare and playgroup providers located in the Perth metropolitan area. Recruitment flyers were also displayed in key locations at these premises. Those responding to the invitation and meeting the inclusion criteria were provided with an information sheet, describing the research and a consent form.

Procedures

Seven focus groups (n=57) were held at convenient locations within community organisations and playgroups. Participants were shown a 30s online community service video (*This Much Water*) that promoted environmental and parent-based drowning prevention strategies (see <https://www.youtube.com/watch?v=XC95OAOJaY0>) and included Australian celebrities talking about water safety and emphasising that a child can drown in a small amount of water (2 inches or 6 cm). Details of the data collection procedures have been fully described and published,²⁶ however, they are described again here briefly. Focus group participant characteristics were collected at the start of each group via a short participant questionnaire. The semistructured interview schedule (see online supplementary file 1²⁶) was tested for face validity prior to implementation. Focus group discussions were facilitated by two trained researchers and were of 45 to 60 min in duration. The co-facilitator observed discussions to capture any relevant non-verbal cues and recorded field notes. Discussion was audiotaped and then transcribed verbatim by the primary analyst.

Data analysis

Content analysis using a directed approach of which the is goal is to extend a theory²⁸ was conducted using the

**Table 1** Health Belief Model construct definitions for analyses

Behavioural theory	Construct	Brief definition
Health belief model	Perceived susceptibility	Beliefs regarding the chance of a child drowning in a small amount of water
	Perceived severity	Beliefs regarding how serious the consequences of a child drowning would be
	Perceived benefits	Beliefs regarding the efficacy of the advised actions in the video to reduce the risk or seriousness of issue
	Perceived barriers	Beliefs regarding the tangible and psychological costs of the advised actions in the video
	Cues to action	Strategies to activate an individual's readiness to take action to reduce the risk of a child drowning
	Self-efficacy	An individual's confidence in their ability to take action and overcome barriers to reduce the risk of a child drowning

Adapted from Glanz *et al.*²⁵

HBM²³ constructs as the theoretical lens for data coding.²⁹ Transcripts were entered in to NVivo V.10 qualitative data analysis software (QSR International). The primary analyst initially coded the data independently. All coding was reviewed by two other members of the research team. Transcripts were each read in their entirety as a complete set of data to establish a general understanding of themes and categories.²⁶ An inductive process was used to identify common themes and emerging categories as it provides a relatively a straightforward, systematic set of procedures for analysing qualitative data.³⁰ Following initial coding, data were grouped in categories. Eventually, consistent patterns (or themes) could be identified. [Table 1](#) shows the applied definition for each theory construct used in this research.

RESULTS

Focus groups were conducted with parents and carers of children aged under 5 years. Most of the participants were female (n=54), aged between 25 and 34 years (n=36) and had completed high school (n=56). [Table 2](#) shows the participant characteristics.

The HBM constructs

Findings for selected HBM constructs—susceptibility and severity, barriers and benefits, cues to action and self-efficacy—are described below and verbatim quotes from participants are provided.

Perceived susceptibility

All participants understood the community service video key message to be that young children can drown in a small amount of water and that supervision can prevent child drowning ('it's a fact'). Participants reported that they liked the message delivery, as it was simple and to the point. The message was seen to be important, and the locations listed (pool, bath tub, nappy bucket, play pool, beach) were all potential drowning locations which in turn can increase the susceptibility to drowning:

I haven't thought about a nappy bucket before. It's not something that I've thought of before...I would think of bath, beach, pool... (Focus Group 1)

I'm probably a bit more aware after it (after viewing the video). You know every time I go past it... I should probably kick that bucket over and I don't. I know the risk exists. (Focus Group 3)

For some, the video led to the consideration of additional locations as potential drowning risks. Participants

Table 2 Focus group participant characteristics (n=57)

		%	n
Gender	Female	95	54
	Male	5	3
Caregiver status	Parent	96	55
	Caregiver	4	2
Age	18–24 years	5	3
	25–34 years	63	36
	35–44 years	28	16
	45–64 years	4	2
Birth country	Australian born	68	39
	Overseas born	32	3
Education level	High school	28	16
	TAFE certificate/diploma	37	21
	University/college	33	19
	Do not know	2	1
Resuscitation training in previous 12 months	Yes	23	12
First aid training in previous 12 months	Yes	37	19
Swimming pool at place of residence	Yes	9	5

TAFE: Technical and Further Education.

acknowledged there were a large number of possible drowning locations in their environment:

There are quite a lot of things [drowning hazards] really when you think about how busy your backyard is. (Focus Group 1)

...it makes me think about my dog bowl of water at home. Which is something I've never thought of before. (Focus Group 1)

Comments suggested the child's age, parent/carer child-rearing experience and the type of water hazard influenced participants' perceptions of risk and susceptibility. Some participants reported that only very young children could drown in a small amount of water (ie, those unable to turn their head or push themselves up out of the water). However, swimming pools, were considered to present the greatest drowning risk. Some participants discussed that the risk of children drowning decreased in the presence of older siblings and as children grew older:

...I would hear, at this age [two], their splash and that they have the strength to be able to push themselves up or help their brother in the bath. Not that I leave them for long periods of time... So it's slightly different at a younger age... (Focus Group 3)

...maybe at what, eight months, nine months they would know to turn their head a little you know? (Focus Group 5)

Some participants acknowledged that the level of supervision varied by location, and that it was important to remind parents of the risks:

Yeah you get more and more relaxed [about supervision]. Like if he's in the backyard and I can see him from the kitchen while I make a cup of tea. I know there's water and stuff out there but the length of time you leave them gets kind of longer and longer. And I wouldn't leave them near a pool. (Focus Group 3)

...you just forget. You know it's so easy to forget these things, so it needs to be kept fresh in everyone's minds always (Focus Group)

Perceived severity

Child drowning was seen to be a serious health issue with devastating and unforgettable consequences ('you would never get over it'). Some described the video content as serious, which was further enhanced by the use of black and white imagery ('black and white makes it serious').

Perceived benefits and barriers

Participants generally accepted that supervision and water restriction were protective factors for child drowning, "I was in the wrong and I wasn't watching my children properly and one of my children almost drowned" (Focus Group-7). However, some participants felt that constant child supervision was unrealistic, "...I mean in the real world, nobody..., and this is not having a go at anybody because even as parent when mine were younger

...nobody watches their kid every second" (Focus Group 6).

A range of barriers impacted on child supervision around water including: lack of time; competing responsibilities; perceived inability to always control the environment; not anticipating injury events or a false sense of security; the need to encourage self-learning and independence; child characteristics and prior experiences:

Like my child was never a climber, but my nephew would scale the bench like no other [laughter]... even when she was a baby I never thought about this type of stuff [small amounts of water]. I was just lucky that she wasn't the type of kid to get into these types of things at all. (Focus Group 7)

Others who cared for participants' children, such as grandparents were also seen as a barrier to appropriate water safety behaviour, often viewed as being less knowledgeable of drowning risks or as having a lower perceptions of drowning vulnerability. Accordingly, participants felt they had to 'nag' others about supervision or reducing access to locations and become more vigilant to account for the poor supervision practices:

It's hard to get them [grandparents] to understand when they think "oh there's nothing wrong with my kids". (Focus Group 4)

I'm always sitting there [by the pool at the grandparents' house] with my children...I stay in that pool area until they're all out...they [the grandparents] leave a brick holding the gate open. My kids aren't allowed outside when that happens. But their mentality is that he can't drown [because he has had swimming lessons]. (Focus Group 7)

Cues to action

The *This Much Water* hand gesture (indicating 2 inches or 6 cm) within the video provided a visual and practical measure to assess the likelihood of a child drowning in any given situation:

... you know you think it's only a little bit of water so it's alright and then you go oh it's probably an inch and you don't pour it out. But because it [hand gesture] gives you something to compare to, it gives you a measure. (Focus Group 3)

Some participants felt the video did not provide clear strategies to control access to drowning hazards, and it was suggested that these be included in the video or via another medium (eg, website):

Would there be some suggestions for what you can do with things like the dog bowl, like your dog has to drink and it can't jump on the bench and you don't want it to anyway, so what do you do about it? (Focus Group 1)

However, some participants reported adapting water safety practices according to a child's age, height,



behaviours and individual characteristics (eg, a child who is a 'climber' or 'has taken swimming lessons') were also mentioned by some participants.

Self-efficacy

Participants were aware that children should be supervised around shallow water, however, responses to the video suggested that a few participants were not aware of strategies to control access to hazards or the amount of water that a child could drown in.

I asked my child health nurse for a pamphlet about resuscitation after seeing that ad. (Focus Group 2)

...after seeing that ad I might think about some things that I should put inside. But I don't think it's winter, so this (thing), and this could accumulate water. (Focus Group 1)

Comments suggested that participants were not confident in their ability to supervise around water and reduce the risks of particular drowning sites, and the video was not seen to increase self-efficacy:

Message framing and execution

Focus group discussions explored message comprehension, acceptability and attractiveness. Including celebrities in the community service video was seen as a method to attract attention and participants felt that the celebrities would help promote the issue. However, the expertise of celebrities and their motivation for involvement was questioned, particularly those who were not parents. Most participants advocated the use of parents to deliver the message, and a few participants suggested having a child in the video to attract attention and increase the emotional connection with viewers:

...there's an understanding...you can tell if they're a parent by just the way they approach it, the language that they use. It makes a huge difference. Because then you feel like you can relate to them, understand what they're saying. (Focus Group 5)

It makes it a bit more relevant when you go 'Oh they're a mum, they're a dad'. (Focus Group 7)

While participants favoured a video featuring males and females ('there was a good mix of male and female'), they believed that those delivering the message should be culturally diverse ('the *This Much Water* video wasn't (culturally) diverse') to ensure the message was acceptable to a broad range of people. Repetition was also viewed positively:

...it repeats and it repeats and it repeats so you really see it...And it's not the same person saying it so it's not like me going around saying 'this much, this much' and you going oh my god shut up. It's different people. (Focus Group 6)

A number of participants commented that the video did not connect with them emotionally. A few participants

noted they pay attention to and recall real life accounts of health issues:

It (the video) wasn't making any kind of emotional connection as far as relating to it. It was more just the message... (Focus Group 6)

Like the one (another drowning video) with mum and the pool. That's connecting with people, a situation and emotional attachment. (Focus Group 6)

A small minority felt that the video should show a child drowning. One participant noted while this would be disturbing, it would increase the perception of risk among other parents. However, when discussing other advertisements that used graphic imagery, participants noted that while attention grabbing, they were viewed unfavourably, with participants reporting not being able to watch or turning away:

It's horrible. It makes me want to change the channel. (Focus Group 6)

The one with the kid in the pool? Yeah, I hate that ad. (Focus Group 6)

You don't want to watch heart wrenching stuff all the time but it gets your immediate attention because it's quite shocking. (Focus Group 7)

When discussing other injury prevention messaging, participants mentioned avoiding excessively strong visuals, though for some, these videos motivated them to change their behaviour:

...I remember it, and it makes me think about first aid. (Focus Group 1)

Sometimes when you're driving around you see that crashed car. You know, they leave it somewhere. It freaks you...makes you think I wouldn't want to be in that car, so you do kind of slow down. It shows you what can happen. (Focus Group 2)

DISCUSSION

Our research found that the *This Much Water* video was effective in communicating the message that young children are susceptible to drowning in shallow water and that various water hazards exist in and around the home. However, participants suggested that a range of external factors, such as a child's age, type of water hazard, presence of siblings and backyard pools, influenced the risk of drowning. This research found that child drowning was seen as a serious issue, and that controlling access to water hazards and the role of supervision were understood to be important factors in preventing drowning.

This study's findings are consistent with the injury prevention literature that suggests parents are strategic in their supervisory practices, allocating more resources when they consider their child to be susceptible to injury and the consequences of that injury are potentially severe.^{31 32} Further, when a water hazard such as a

backyard pool is viewed as a high-risk drowning location, parent supervision tends to increase.³³

Findings in this research suggest the messaging should aim to increase perceived susceptibility. Of interest, Morrongiello *et al*³⁴ found that perceived susceptibility increased when parents saw themselves to be similar to those parents whose children had been injured. In addition, including real-life stories, a suggestion also made by participants in this research, has been shown to increase perceived child injury susceptibility,³⁵ and encourage supervision.³⁴ Given the perception that the message was seen to be more relevant when it came from parents, this strategy may warrant further investigation for future community service videos. In other research, print images of injury consequences and negative emotions have increased parents' appraisal of injury risk,³⁶ and story-based messages have been shown to be more effective than information-based messaging to improve safety practices.³⁷ Accordingly, future child drowning prevention media messages should undergo further formative research to increase saliency with the target audience.

Message comprehension is a prerequisite of message processing and acceptance,³⁸ and to perform a behaviour, individuals must first know what that behaviour is.¹⁴ Poor knowledge regarding the causes of injuries can be a significant barrier to child safety^{39 40} and negatively impact safety practices.⁴¹ This research found that participants understood the messages and behaviours being requested within the *This Much Water* video, which is a positive finding.

Messages that improve self-efficacy have been linked to the adoption of recommended health behaviours.⁴² Evidence suggests that parents who believe they can adequately supervise their child may be more willing to change their behaviours.⁴³ Our study showed that when used alone, the *This Much Water* video did not increase self-efficacy, with some participants indicating a lack of confidence in supervising their child or limiting access to water hazards.²⁵ Accordingly, messaging should communicate how to manage access to possible drowning locations. Providing and encouraging the development of personal strategies to reduce drowning risks (eg, encouraging parents not to leave children unattended to answer a phone call) may be valuable considerations.

Attracting attention is an essential component of health communication messages.⁴⁴ This research found that using parents as message senders may increase message relevance and believability, though for some participants, using known celebrities was thought to assist in attracting attention. Given participants in this research only viewed a message that was delivered by celebrities (some of whom were parents), it may be valuable for future formative research to explore the use of celebrity parents and non-celebrity parents to determine whether different reactions are obtained.

Strengths and limitations

This exploratory research used the HBM to test the suitability and appropriateness of a drowning prevention message via a community service video, which is novel in the drowning prevention literature. However, the sample was predominantly female, the research was collected in one Australian state, there were few carers and the majority of participants were Caucasian. We aimed to have regional representation in our focus groups; however, all participants were from metropolitan WA. This may be a limitation of the study, however the metropolitan weighting does reflect the geographical distribution of drownings in WA. Conducting relatively heterogeneous focus groups may have limited the validity of responses. In future, homogeneous focus groups (such as sex, carer status, child age and ethnicity) may obtain additional, more varied data. Finally, the authors acknowledge using focus groups to explore a socially sensitive topic such as child drowning and supervision may elicit socially desirable responses.

CONCLUSIONS AND IMPLICATIONS

Best practice child drowning prevention interventions are underpinned by evidence-informed decision-making. However, the lack of published drowning and injury prevention interventions and strategies shaped by behavioural theory and evaluation limits understanding of best practice. Accordingly, this research fills an important gap in the drowning and injury prevention literature. The findings provide a valuable understanding of possible messages and delivery strategies to use in a child drowning prevention campaign in a high-income country with a number of video elements identified as beneficial when developing a child drowning prevention message. These included using a simple message in visual and aural form, repetition, multiple and culturally diverse message senders together with the provision of strategies to address the issue. Future development of drowning prevention media messages should test strategies to increase susceptibility, behavioural capability and self-efficacy among the target group and explore the impact of different message senders (celebrities or others).

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REFERENCES

- World Health Organization. *Global Report on Drowning: preventing a leading killer*. Geneva, Switzerland, 2014.
- Rahman A, Mashreky SR, Chowdhury SM, *et al*. Analysis of the childhood fatal drowning situation in Bangladesh: exploring prevention measures for low-income countries. *Inj Prev* 2009;15:75–9.
- Szpilman B, Bierens A, Handley A, *et al*. *Drowning: prevention, rescue, treatment*. 2nd ed: Springer Berlin Heidelberg: Imprint: Sprinige, 2014.
- Royal Life Saving Society Australia. *National drowning report*. Australia: Royal Life Saving Society, 2015.
- Franklin RC, Scarr JP, Pearn JH. Reducing drowning deaths: the continued challenge of immersion fatalities in Australia. *Med J Aust* 2010;192:123–6.
- van Weerdenburg K, Mitchell R, Wallner F. Backyard swimming pool safety inspections: a comparison of management approaches and compliance levels in three local government Areas in NSW. *Health Promot J Austr* 2006;17:37–42.
- Pearn JH, Nixon JW, Franklin RC, *et al*. Safety legislation, public health policy and drowning prevention. *Int J Inj Contr Saf Promot* 2008;15:122–3.
- Royal Life Saving Society Western Australia. *2013 western australian drowning report*. Perth, Western Australia: Royal Life Saving Society Western Australia, 2014.
- Wallis BA, Watt K, Franklin RC, *et al*. Interventions associated with drowning prevention in children and adolescents: systematic literature review. *Inj Prev* 2015;21:195–204.
- Leavy C, Leaversuch N, McCausland J. A review of drowning prevention interventions for children and young people in high, low and middle income countries. *J Community Health* 2015;1–18.
- Leavy JE, Crawford G, Franklin R, *et al*. Drowning A2 - Quah, Stella R. In: *International Encyclopedia of Public Health (Second Edition)*. Oxford: Academic Press, 2017:361–5.
- International Life Saving Federation. *Drowning prevention strategies. A framework to reduce drowning deaths in the aquatic environment for nations/regions engaged in lifesaving*. Belgium: The International Life Saving Federation, 2011.
- Leavy JE, Crawford G, Leaversuch F, *et al*. A review of drowning Prevention Interventions for Children and Young people in High, Low and Middle Income Countries. *J Community Health* 2016;41:424–41.
- Nutbeam D, Harris E, Wise M. In: Ryde N, ed. *Theory in a nutshell: a practical guide to health promotion theories*. Australia: McGraw-Hill, 2010.
- Glanz K, Bishop DB. The role of behavioral science theory in development and implementation of public health interventions. *Annu Rev Public Health* 2010;31:399–418.
- Noar S. A 10-year retrospective of research in health mass media campaigns: where do we go from here? *International Perspectives* 2006;11:21–42.
- Trifiletti LB, Gielen AC, Sleet DA, *et al*. Behavioral and social sciences theories and models: are they used in unintentional injury prevention research? *Health Educ Res* 2005;20:298–307.
- Randolph W, Viswanath K. Lessons learned from public health mass media campaigns: marketing health in a crowded media world. *Annu Rev Public Health* 2004;25:419–37.
- Leavy JE, Crawford G, Portsmouth L, *et al*. Recreational drowning Prevention Interventions for adults, 1990–2012: a review. *J Community Health* 2015;40:725–35.
- Winston FK, Jacobsohn L. A practical approach for applying best practices in behavioural interventions to injury prevention. *Inj Prev* 2010;16:107–12.
- McGlashan AJ, Finch CF. The extent to which behavioural and social sciences theories and models are used in sport injury prevention research. *Sports Med* 2010;40:841–58.
- Hamilton K, Peden AE, Pearson M, *et al*. Stop there?s water on the road! identifying key beliefs guiding people?s willingness to drive through flooded waterways. *Saf Sci* 2016;89:308–14.
- Rosenstock IM. The Health Belief Model and Preventive Health Behavior. *Health Education & Behavior* 1974;2:354–86.
- Rosenstock IM, Strecher VJ, Becker MH. Social learning theory and the health belief model. *Health Educ Q* 1988;15:175–83.
- Glanz R, Viswanath O. *Health Behavior and Health Education: Theory, research, and practice*. 4th ed. San Francisco, CA: Jossey-Bass, 2008.
- Denehy M, Crawford G, Leavy J, *et al*. Formative research to develop theory-based messages for a Western Australian child drowning prevention television campaign: study protocol. *BMJ Open* 2016;6:e010033.
- Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care* 2007;19:349–57.
- Hsieh HF, Shannon SE. Three approaches to qualitative content analysis. *Qual Health Res* 2005;15:1277–88.
- Reeves S, Albert M, Kuper A, *et al*. Qualitative research: why use theories in qualitative research? *BMJ* 2008;337:631–4.
- Thomas DR. A general inductive approach for analyzing qualitative evaluation data. *Am J Eval* 2006;27:237–46.
- Morrongiello BA, Widdifield R, Munroe K, *et al*. Parents teaching young children home safety rules: implications for childhood injury risk. *J Appl Dev Psychol* 2014;35:254–61.
- Morrongiello BA, Dayler L. A community-based study of parents' knowledge, attitudes and beliefs related to childhood injuries. *Can J Public Health* 1996;87:383–8.
- Morrongiello BA, Ondejko L, Littlejohn A. Understanding toddlers' in-home injuries: I. Context, correlates, and determinants. *J Pediatr Psychol* 2004;29:415–31.
- Morrongiello BA, Zdzieborski D, Sandomierski M, *et al*. Video messaging: what works to persuade mothers to supervise young children more closely in order to reduce injury risk? *Soc Sci Med* 2009;68:1030–7.
- Ablewhite J, Peel I, McDaid L, *et al*. Parental perceptions of barriers and facilitators to preventing child unintentional injuries within the home: a qualitative study. *BMC Public Health* 2015;15:280.
- Morrongiello BA, Bell M, Butac M, *et al*. What features of images affect parents' appraisal of safety messages? Examining images from the A Million Messages programme in Canada. *Inj Prev* 2014;20:16–20.
- Ricketts M, Shanteau J, McSpadden B, *et al*. Using stories to battle unintentional injuries: narratives in safety and health communication. *Soc Sci Med* 2010;70:1441–9.
- Aitken ME, Graham CJ, Killingsworth JB, *et al*. All-terrain vehicle injury in children: strategies for prevention. *Inj Prev* 2004;10:303–7.
- Khanom A, Hill RA, Brophy S, *et al*. Mothers' perspectives on the delivery of childhood injury messages: a qualitative study from the growing up in Wales, environments for healthy living study (EHL). *BMC Public Health* 2013;13:806.
- Vincenten JA, Sector MJ, Rogmans W, *et al*. Parents' perceptions, attitudes and behaviours towards child safety: a study in 14 European countries. *Int J Inj Contr Saf Promot* 2005;12:183–9.
- Sellström E, Bremberg S, Gärling A, *et al*. Risk of childhood injury: predictors of mothers' perceptions. *Scand J Public Health* 2000;28:188–93.
- Luszczynska A, Tryburcy M, Schwarzer R. Improving fruit and vegetable consumption: a self-efficacy intervention compared with a combined self-efficacy and planning intervention. *Health Educ Res* 2007;22:630–8.
- Ingram JC, Deave T, Towner E, *et al*. Identifying facilitators and barriers for home injury prevention interventions for pre-school children: a systematic review of the quantitative literature. *Health Educ Res* 2012;27:258–68.
- Atkin C, Freimuth V. Guidelines for formative evaluation research in campaign design. In: Rice R, Atkin CK, eds. *Public communication campaigns*. 4th ed. California: SAGE, 2013.

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