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Impact of a Father-Daughter Physical Activity Intervention: An Exploration of Fathers' Experiences

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Declarations

Author Contributions: Study conception and design: Philip J. Morgan, David R. Lubans, Narelle Eather, Myles D. Young, Alyce T. Barnes and Emma R. Pollock; Material preparation and data collection: Alyce T. Barnes, Philip J. Morgan, David R. Lubans, Narelle Eather, Myles D. Young, and Emma R. Pollock; Data analysis: Vibeke Hansen, Alyce T. Barnes, Philip J. Morgan, Emma R. Pollock; Writing – original draft preparation: Emma R. Pollock; Writing – review and editing: All authors. Read and approved final manuscript: All authors; Supervision: Philip J. Morgan.

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Compliance with Ethical Standards

Conflict of Interest: The authors declare that they have no conflict of interest.

Ethical Approval: This study was performed in line with the principles of the Declaration of Helsinki. The study was approved by the Human Research Ethics Committee at the University of Newcastle (H-2014-0330).

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Abstract

Most family-based physical activity interventions have been modestly successful and failed to engage fathers. Also, program impact on family functioning and psychosocial outcomes are rarely measured. We explored the impact of an innovative father-daughter physical activity program on family functioning and psychosocial outcomes for girls using qualitative methods. Of the 115 fathers who participated in the ‘Dads And Daughters Exercising and Empowered’ (DADEE) pilot study, a random sample (stratified by baseline physical activity status) of 23 fathers (mean (*SD*) age: 41.4 (4.8) years) participated in semi-structured telephone interviews. Audio recordings were transcribed and analyzed by an independent researcher using a mixed inductive and deductive thematic approach. Seven themes were identified highlighting improvements in: (i) daughters’ social emotional well-being, (ii) father involvement and engagement with their daughter, (iii) fathers’ parenting skills, (iv) the father-daughter relationship, (v) co-parenting, (vi) family relationship dynamics and, (vii) knowledge and understanding of gender stereotypes and gender bias. A number of strategies were also identified as to how the program improved these outcomes. Engaging fathers and daughters in physical activity programs may have substantive benefits for daughters’ mental health as well as broader outcomes for fathers and families. Enhancing fathers’ and daughters’ knowledge and skills through evidence-based strategies may be a useful approach to optimize the well-being of families.

Key words: Social-emotional wellbeing, Family relationships, Physical activity, Daughters, Fathers

Highlights:

- First qualitative study to explore the impact of a father-daughter exercise program
- Fathers identified positive effects on their daughters’ social emotional well-being
- Fathers improved their parenting and strengthened family relationships
- A father-daughter physical activity program can optimize family well-being

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Impact of a Father-Daughter Physical Activity Intervention: An Exploration of Fathers' Experiences

It is well-established that regular physical activity is associated with a plethora of biological and psychosocial health benefits for children (Janssen & LeBlanc, 2010). However globally, only 16% of girls aged 13-15 years are meeting physical activity guidelines (Sallis et al., 2016). In New South Wales, Australia, only 8% of adolescent girls meet the recommended 60 minutes of moderate-to-vigorous physical activity per day, compared to 15% of adolescent boys (Hardy et al., 2016). Moreover, girls' physical activity declines by 7% per year, compared to only 2% in boys (Dumith et al., 2011).

Researchers have identified a host of barriers that prevent girls from participating in physical activity including, lack of time (Vermeesch et al., 2015), lack of skills, parental and peer support, involvement in technology-related activities, accessibility to facilities and resources and, body-centered issues (Dwyer et al., 2006). Of note is that girls are expected to negotiate their way through complex traditional gender norms (i.e., male dominance in sport and physical activity), feminine ideals (i.e., pressure to display feminine traits rather than aggression, competitiveness and strength) and gender stereotypes (i.e., boys play soccer and girls do gymnastics) at home, school and in the community (Spencer et al., 2015). Although researchers have explored the importance of shifting traditional norms in these contexts, Rauscher and Cooky (2016) have previously argued that, current girls-only sport-based development programs fail to address issues related to gender.

Finding ways to address physical inactivity in girls may be important as studies have found that children and adolescents who are physically active are less likely to suffer from depression and anxiety, have greater cognitive functioning, enhanced self-esteem (Biddle & Asare, 2011) and increased resilience (Silverman & Deuster, 2014) compared to children who are inactive. Of concern is the clear disparity of mental health disorders between boys and girls (Bruckauf, 2017). For example, girls are at a greater risk of poor mental health than boys from a young age, with 26% of Australian adolescent girls reporting psychological distress, compared to 15% of adolescent boys (Lawrence et al., 2015).

Families may be an important target to address physical inactivity in girls (Gill et al., 2017). However, the evidence for the effectiveness of physical activity programs is limited by, lack of certainty around how best to engage families (O'Connor et al., 2009) and, small effect sizes in previous interventions (Biddle et al., 2014). Moreover, very little is known about the impact of family-based physical activity interventions on psychosocial and family functioning outcomes (Brown et al., 2016). For example, the majority of family-based physical activity interventions tend to focus on physical activity or other physical health markers (Brown et al., 2016). Thus, to expand the evidence-base, studies that examine broader outcomes (e.g., psychosocial) and potential

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ripple effects (e.g., family dynamics) of these interventions are required.

Another key limitation of existing family-based lifestyle interventions is the lack of father involvement. In a recent review of 213 studies testing family-based lifestyle behavior programs for children, fathers represented only 6% of parents (Morgan et al., 2017). This is a concern as fathers are key drivers of their children's physical activity behaviors and are more likely to engage in co-physical activity compared to mothers (Lamb & Lewis, 2010). Studies have shown that children prefer to play with fathers when given the choice and similarly, fathers find active play with their children equally enjoyable (Lamb & Lewis, 2010). As a result, physical play has been identified as an integral environment for fathers to bond with their children (Harrington, 2006). Although physical play has been associated with improvements in the father-child relationship (Lamb, 2010) and children's social emotional well-being (Fletcher et al., 2011) in observational studies, researchers have found that fathers are more likely to spend time playing with their sons compared to their daughters (Zahra et al., 2015).

To improve physical and mental outcomes for young girls, there may be utility in exploring the father-daughter relationship in more depth and specifically engaging fathers in family-based, physical activity interventions with their daughters. The *Dads And Daughters Exercising and Empowered* (DADEE) program was the world-first physical activity program to explicitly target fathers as an agent for change to improve their daughters' physical activity levels (Author). In the pilot randomized controlled trial (RCT), intervention fathers and daughters significantly increased their physical activity levels at post-intervention (2-months) compared to a control group, and these increases were maintained at 9-months (Author). In addition, relative to the control group, intervention daughters experienced greater improvements in social-emotional well-being, grew closer to their fathers (Author) and, improved their sport skills (e.g., catch, kick, throw) (Author).

Although these are promising findings, a deeper exploration is required to help pinpoint effective intervention components. Moreover, to the authors' knowledge, there has not been a single qualitative study exploring the impact of a father-daughter physical activity intervention. Therefore, we explored fathers' perceptions of the impact of the DADEE program on family functioning and psychosocial outcomes for girls and, to identify how and why these outcomes improved. Study findings could be used to design future family-based physical activity programs.

Methods

Study Design

Descriptive qualitative methods were used for this study to provide an in-depth understanding of the

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experiences of fathers who participated in the DADEE program (Creswell & Poth, 2017). A series of semi-structured, one-on-one telephone interviews were conducted post-program between September and November 2015. Given the sensitive nature of some questions (e.g., the father-daughter relationship), telephone interview methods were selected for data collection to increase the respondents' perception of anonymity (Greenfield et al., 2000). This may allow fathers to engage on a deeper level of conversation than would be observed in a face-to-face interview. Logistical flexibility (e.g., time and location of interview) and, reduced costs were additional advantages (Miller, 1995).

This project and the study's protocol were reviewed and approved by the Human Research Ethics Committee at the University of Newcastle [H-2014-0330]. All fathers provided written informed consent prior to their participation in the interview. Participants were assured that their responses would be treated confidentially.

Participants

To be eligible for the DADEE pilot RCT, participants had to be a father aged 18-65 with one or more daughters attending primary school (4-12 years). Fathers were excluded from the study if they lived with their daughter less than three days per week or, if they did not have doctor's approval when they failed to pass a pre-exercise screener. Participants were recruited through traditional media outlets, social media and, school newsletters.

Of the 57 intervention fathers from the pilot RCT, 84% ($n = 48$) were open to participating in a post-program interview. To ensure a broad representation, purposive sampling was used to stratify the 48 fathers by baseline physical activity status. Father and daughter physical activity levels were sourced from the pilot RCT data set where participants were advised to wear validated Yamax SW200 pedometers (Yamax Corporation, Kumamoto City, Japan) for seven consecutive days (Eston et al., 1998; Silcott et al., 2011). The sampling was based on whether the fathers and/or daughters in each family did or did not meet step count recommendations (i.e., $\geq 12,000$ steps for daughters and $\geq 10,000$ steps for fathers) (Tudor-Locke, Craig, Brown, et al., 2011; Tudor-Locke, Craig, Beets, et al., 2011). A total of 25 intervention group fathers were randomly selected from the study and 23 provided consent from four possible categories. The breakdown from each group was: (i) both father and daughter meeting physical activity recommendations ($n = 3$); (ii) father meeting physical activity recommendations but daughter not ($n = 6$); (iii) daughter meeting physical activity recommendations and father not ($n = 4$) and, (iv) neither father nor daughter meeting physical activity recommendations ($n = 10$). Additional measures obtained from the RCT data set included daughters' social emotional well-being reported by fathers

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using the 72-item Devereux Student Strengths Assessment (DESSA) (LeBuffe et al., 2009), and demographic information (e.g., participant age, education level) collected via online surveys.

The DADEE Intervention

The DADEE program was designed to increase the physical activity levels of fathers and their daughters. Secondary aims were to improve daughters' fundamental movement skill proficiency, fathers' and daughters' screen time, fathers' physical activity parenting practices, the father-daughter relationship and, daughters' social emotional well-being. The program was a multi-component, 8-week intervention, with each session containing theory-based education sessions, practical physical activity sessions and, home-based tasks. The overall development of the intervention was based around the core constructs of self-determination theory (autonomy, competence, relatedness) (Deci & Ryan, 1985) and social cognitive theory (self-efficacy, goals, social support) (Bandura, 1986). Theory constructs were incorporated through face-to-face learning experiences and home-based tasks.

The education sessions for fathers covered key information regarding the important role of the father, evidence-based parenting strategies (e.g., authoritative parenting) to improve their daughters' physical and mental health and, innovative ways to engage in appealing one-on-one co-physical activities. To track their progress, fathers completed a host of weekly tasks in their logbook (e.g., Ask your daughter for her thoughts on a current topic in the news; Create a physical activity goal that includes your daughter). Information delivered during the daughters' sessions aimed to empower girls to become a physical activity leader for their father and increase their levels of activity. In addition, daughters would receive collector cards on completion of home-based tasks (e.g., Organize a circuit workout for you and dad down at the park). Home-based tasks aligned with the weekly theme (e.g., Fitness and Physical Activity).

Both fathers and daughters learnt about, beauty issues that affect girls, pervasive cultural messages, how society treat and interact with girls compared to boys and, key critical thinking strategies to counter negative bias and promote equal opportunities. Daughters received a diary during the program and wrote down examples of gender prejudice or gender equity they were exposed to and, were encouraged to discuss these with their dad. Key social-emotional skills (e.g., self-control and persistence) taught during the program were reinforced through daughters receiving a sticker if they completed the tasks associated with the weekly psychological skill (e.g., I showed self-control, I saw dad show self-control, I explained self-control to someone else, or I helped someone else show self-control). Following the education sessions, fathers and daughters participated in practical sessions together consisting of rough and tumble play, sport skills and, fitness-based

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activities. In addition, family members (e.g., mother/partners, siblings, grandparents) were invited to attend one session. Further information on intervention components are found elsewhere (Author).

Semi-Structured Telephone Interviews

The interview questions were developed by members of the research team. Interview questions aimed to explore fathers' experiences in participating in the intervention, around key themes of parenting, the father role, father-daughter relationship, daughters' social emotional well-being, also extending to explore the impact on the family (See Table 1 for interview questions). (Table 1 about here). Interviews were conducted by two members of the research team (including author AB), who were trained in qualitative methods and involved in the intervention implementation. Probing techniques to facilitate elaboration on responses were also used.

Data Analysis

All interviews were audio tape recorded and transcribed verbatim. A hybrid inductive and deductive thematic analysis was performed (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006) with the use of NVivo software (Version 9, QSR international). This type of qualitative descriptive analysis was deemed appropriate in this study as the aim of the research was to explore fathers' understandings and experiences of the DADEE program, rather than attempt quantification of results (Braun & Clarke, 2006). The analysis was conducted by Author VH, who is experienced in thematic analysis and, who was not involved in any aspect of the intervention delivery. VH completed the analysis to minimise issues relating to 'seeing what one is expecting to see' (Shenton, 2004). The analysis included 5 steps (Braun & Clarke, 2006; Fereday & Muir-Cochrane, 2006):

1. An initial coding hierarchy was developed a priori based on the research questions and interview guide in close collaboration with the research team. This provided the initial framework of the analysis.
2. During the first phase of data immersion, notes were made of important concepts in the dataset as well as potential themes.
3. This was followed by a first cycle of coding, where the a priori codes were applied to the full dataset, followed by a second coding phase where inductive (data-driven) codes were generated. These inductive codes were in some instances an expansion or further specification of the deductive codes or separate from these.
4. After sorting the text into codes, brief code descriptors were generated and were used to inform the clustering of data into themes.
5. The final stage of theme confirmation was conducted to ensure that the thematic structure in the data was a trustworthy representation of the broader meanings expressed in the full dataset. Detailed thematic

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summaries were generated with the extensive inclusion of participant quotes. These were reviewed and discussed amongst the research team, leading to minor changes to the thematic structure based on insights from the data collection.

Results

Participant Characteristics

On average, interviews with fathers lasted 45 minutes. The mean (*SD*) age of the fathers who participated in the interviews was 41.4 (4.8) years. The mean age (*SD*) of the daughters ($n = 31$) whose fathers participated in the interviews was 8.6 (2.1) years. Interviewed fathers' average step count was slightly higher than the average observed in a national survey of men (Australian Bureau of Statistics, 2013), but marginally lower than the average steps of fathers who were not interviewed. Daughters whose fathers were interviewed had an average step count that was similar to data observed in a national sample of girls (Australian Bureau of Statistics, 2013). This was also similar for daughters whose fathers were not interviewed.

Of the 23 consenting fathers, 15 had one participating daughter in the program (65%) and, the remaining fathers had two daughters. Almost all fathers ($n = 21$) were married and almost two thirds ($n = 15$) had achieved a university degree. The two groups were comparable for key characteristics, outcome variables and mean program satisfaction scores. See Table 2 for additional information on participant characteristics. (Table 2 about here)

Thematic Analysis

Thematic analysis of the interviews revealed a range of themes representing fathers' perceptions of the impact of the DADEE program on family functioning (e.g., father-daughter relationship, fathers' involvement and engagement with their daughter, fathers' parenting beliefs and practices, co-parenting, family relationship dynamics and, knowledge and understanding of gender stereotypes and gender bias) and, psychosocial outcomes (e.g., daughters' social emotional well-being). The seven identified themes also fell under multiple levels of influence (e.g., impact of the DADEE program on daughters, fathers, wives/partners and, the whole family). For a schematic depiction of these themes, see Figure 1. (Figure 1 about here)

Theme 1: Daughters' Social Emotional Well-being - "Confidence in her Ability"

One of the strongest perceived impacts of the program identified by all fathers was on their daughters' social emotional well-being. Positive changes were identified by fathers in relation to their daughters' confidence, assertiveness, resilience and persistence but also, a greater acceptance of risk and challenge:

[She is] much more confident in taking on challenges and much less affected by those challenges when

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things aren't quite working out. She'll be more persistent at overcoming them, and think about them to try and work out how to make it work, no matter what. (Father #20, 1 participating daughter)

There were strong commonalities linking the program's educational sessions for daughters with these positive behaviors. For example, 14 out of 23 fathers agreed that developing daughters' psychological skills through accessible language (e.g., stay calm) and associated actions, was key to enhancing their daughters' social emotional well-being:

As a parent it's easy to say, 'Have a go at this,' and 'Stay calm,' those kind of things but actually having someone else tell them and putting the actions towards it and then explaining to the kids the importance of this. It was quite helpful. (Father #14, 1 participating daughter)

Equally important was the greater level of emotional maturity, control, independence and leadership skills fathers witnessed in their daughters following program participation. Father #10 (1 participating daughter) explained, "At home she [daughter] is definitely trying to take more responsibility for her own things. She is genuinely trying to be independent and do things for herself."

Empowering daughters to become physical activity leaders was identified by 16 fathers as a key motivator to become more self-reliant. This was identified through daughters having choice in selecting home-based activities and, using collector cards as incentives:

[Daughter] was very keen on the cards and what I did like about that is that it encouraged the daughters to get their dads going. You know, "Come on dad, hurry up. We've gotta go and do this." (Father #11, 2 participating daughters)

Theme 2: Father Involvement and Engagement with their Daughter - "Significance of the Role"

All fathers identified improvements in their involvement in their daughters' lives and, many created new goals for themselves in terms of being a more present father. For example, Father #17 (1 participating daughter) shared that his "...overall goal is to just be more involved in her [daughter] upbringing." Of the 23 interviewed fathers, 17 perceived that the DADEE program education sessions gave them a new and well-rounded view of girls' physical, mental and emotional health. For example, information on the number of girls meeting physical activity guidelines compared to boys, drop-out rates for girls in sport, body image issues and, fathers spending more time with their sons. Father #21 (2 participating daughters) stated that he "...thoroughly appreciated all of the evidence that was presented...a lot of the conversation was around why we're engaging girls, where they're losing out, why it's important."

Furthermore, 20 fathers explained that the evidence-based research on positive father interaction instilled

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a profound realization and overwhelming sense of responsibility of being a positive role model for their daughters. One father (Father #20, 1 participating daughter) felt that, “Sometimes it's almost scary, I feel like, it's like being alerted to the significance of the [father] role and how critical it is.” This information also made fathers aware of the meaningful impact they could have on their daughters’ physical and social emotional development:

I suffered from the preconception that probably mums would have a lot more impact on the daughter’s life than the dad would, but what we learned there was not quite that. The dad does have a massive impact on a daughter. (Father #13, 1 participating daughter)

Theme 3: Fathers’ Parenting Skills - “Long-Lasting Parental Strength”

The parenting information was another area commonly valued by all fathers, providing many with the affirmation of the “correct” way to parent. Fathers gained a new set of “tools” to apply (e.g., explaining reasons for household rules) and, new parenting styles to trial (e.g., authoritative parenting). Father #12 (2 participating daughters) mentioned that, “The different parenting techniques really helped me.”

Many discussed quite significant successes, not only in terms of a greater confidence to parent in a consistent and calm way, but also regarding their children’s acceptance of discipline. Father #22 (1 participating daughter) shared that his daughter is “...more accepting of the fact that she should limit it. Where before she was unbearable to say the least when it came to lessening her screen time.”

Notably, 8 fathers specifically spoke about having found a new shared language with their daughter as a result of the session’s focus on developing psychological skills. For example, Father #13 (1 participating daughter) stated that “...we learned about the coping strategies together. And so those things come up in our dialogue in terms of my parenting... it's influenced the way that I parent.”

Of interest, 14 fathers found it extremely helpful to receive information regarding the guidelines for screen time as well as key strategies to reduce screens in the home (e.g., screen time limits, replacing screen time with co-activity):

It certainly has provided a very good wake up call for my parenting skills in terms of awareness, and then actual management of screen time. It has also made me a much more aware parent, and effective parent. (Father #19, 1 participating daughter)

Theme 4: Father-Daughter Relationship - “More Glue Connecting Us”

As a result of the program, all participants voiced very similar perceptions of the father-daughter relationship having grown stronger, tighter and having in a sense, matured. For example, Father #20 (1

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participating daughter) shared detailed information regarding his relationship with his daughter, “It’s like the connection between us, that we used to hug before, and we hug now, it feels like there’s more glue connecting us.” These new feelings were expressed in better communication, sharing of more deep and sensitive information. Father #15 (1 participating daughter) mentioned that, “Some of the most meaningful conversations that we probably had were really either spent going to or from the DADEE sessions.” Fathers were increasingly being seen as a confidante and, for many, this was a role previously held exclusively by mothers.

Notably, 20 participants felt that the DADEE program provided a unique environment to enjoy structured, one-on-one time with their daughter. Father #15 (1 participating daughter) felt that, “. . . although there were a whole heap of people out on the field, it really did feel as though you were giving your whole attention and energy to one person, your daughter.” Of those 20 fathers, 9 specifically said that they enjoyed the program due to the sport setting. To support this, Father #16 (2 participating daughters) shared that the program was, “A really non-confrontational way for me to spend time and improve my relationship with the girls.”

For eight fathers, the home-based tasks (e.g., conversation starters) and communication tips (e.g., active listening, emotional mirroring) were integral in creating a pathway for open communication and more frequent meaningful conversations. The home-based tasks prompted one father (Father #15, 1 participating daughter) to “. . . just go for a little five minute walk or 10 minute walk around the block and have a little “us” time.”

Theme 5: Co-Parenting - “We’re a Team”

In addition to improvements in the father-daughter relationship, 17 participants expressed subtle positive changes in behaviors and reactions as a couple. Most of these fathers spoke of having gained a greater understanding of the importance of positive co-parenting. For example, Father #8 (1 participating daughter) stated, “I’m certainly more mindful of the relationship I have with my wife, and in terms of how our kids see us.” Moreover, another father mentioned, “I think we’re a bit more focused as to what we need to do, and how we’d like to raise children” (Father #17, 1 participating daughter). These improvements were displayed through fathers showing more love and affection to their wife/partner in front of the children, having a new appreciation of their wife’s role in a family and exhibiting more support:

...making sure I’m taking time to just support my wife in life...making sure that I’m telling her that she’s doing a good job, just supporting some of the decisions that she makes. (Father #14, 1 participating daughter)

There was also a greater degree of consistency between mothers and fathers in relation to discipline (e.g.,

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standing united as parents). Fathers described this as having a greater level and depth of communication with their wife/partner from sharing the information learnt (e.g., effective parenting practices) during the program. Father #2 (2 participating daughters) felt that, “We've probably tried a bit harder to be consistent with the girls, and have a conversation about what we think.”

A few fathers also identified that the home-based activities that included their wife/partner (e.g., Help your partner with a child-rearing task that is not normally your responsibility) were successful in encouraging fathers to fulfill new familial roles.

Theme 6: Family Relationship Dynamics - “As a Family Unit”

Overall, there was clear evidence that the program had brought about positive changes within the household of 21 families. For example, Father #2 (2 participating daughters) highlighted that, “We play together more as a family... and it's become more enjoyable and less of a chore.” Similarly, Father #12 (2 participating daughters) stated, “We're spending all that time together now. We still get caught up at work a lot, but [now we are] able to come home, and look forward to those little traditions we've created”.

For 18 fathers, participation in the program had been instrumental in their families spending more time together. The quality of interaction within families were in many cases characterized by a greater level of understanding and appreciation of each other, and a greater level of involvement of all family members in decision making. For example, Father #5 (2 participating daughters) mentioned that, “Any family decisions, we'll try and discuss with [our daughters] and make sure they understand why they're being made. It's helped with our family discussion.”

Improvements in the overall dynamics of the family was described by 12 fathers as a result of positive flow on effects from fathers and their daughters attending the program (e.g., being more aware of their role as a father, improvements in daughters' social emotional well-being, having a closer father-daughter relationship, shared parenting strategies). Father #15 (1 participating daughter) described his experiences, “From my wife's point of view, she can say that there's been a real change in the [father-daughter] relationship and it's helped the entire family.”

The fathers were unanimous in praising the benefits of the program, however, two fathers spoke of having difficulty balancing the attention of two daughters during the program and, five fathers spoke of a temporary realignment or shifting of loyalties (e.g., sons feeling left out).

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Theme 7: Knowledge and Understanding of Gender Stereotypes and Gender Bias - “It Has Really Opened my Eyes”

The session on gender was described by 21 participants as being particularly powerful:

It was very powerful educating myself in that type of stuff. Stuff that I would never even would think about. Like things about how girls always have pink rooms or pink clothes. And also too about how physical you should really be with your daughter. (Father #3, 1 participating daughter)

Although participants expressed having had a general prior awareness of how girls are influenced through society, the real impact for fathers was on their role in addressing these issues:

I've always considered myself reasonably enlightened in terms of sexism, but I think that he [Facilitator] made a massive impact on me in [regards to] a less conscious sexism. And me being a middle-aged white male, I probably don't suffer from a lot of discrimination, so becoming conscious of that, and especially having a daughter and realizing the impact that that would make on her life. (Father #13, 1 participating daughter)

This session provided 8 fathers with the parenting advice on fostering their daughters' interests in Science, Technology, Engineering and Math (STEM) subjects, household jobs (e.g., drilling, car maintenance) and sports (e.g., soccer, cricket), that may have been previously neglected because of gender. Father #6 (2 participating daughters) highlighted, “And now I say to [Daughter]...”You wanna be a cricket player? Yeah, no worries... It's not this, "Oh, that's a boy's sport," anymore or, "A girl's sport.”

Some participants voiced that the benefits from this session had been quite unexpected, and a few expressed a sense of regret of not having had this knowledge before. This new awareness of promoting gender equity, as well as consciously addressing gender misconceptions, for some, was also something that happened at a whole family level. Notably, Father #13 (1 participating daughter) shared that, “there is a heightened awareness of sexism in the whole family.”

Discussion

The primary aim of this paper was to explore the impact of a father-daughter physical activity program on family functioning and psychosocial outcomes for girls. Seven themes were identified highlighting the unique and broad impact of the program on fathers, daughters and, family units. The current study also aimed to provide insight into how and why changes occurred.

In summary, fathers reported the program having positive effects on their daughters' social emotional well-being. These effects were attributed to the program's focus on empowering daughters as physical activity

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leaders and, developing daughters' psychological skills. Fathers improved their own lifestyle behaviors as a result of new knowledge and skills and, a determination to be a better father for their daughter. Moreover, fathers felt a physically and emotionally closer bond with their daughters, due to quality time spent at the program and, a new awareness of evidence-based strategies to assist in their communication with their daughter. Fathers shared the learnings of the program with their wife/partner and, recognized subtle improvements in their relationship. Positive changes occurred in overall family dynamics due to the positive flow on effects of other outcomes, such as enhanced daughters' social emotional well-being, improved parenting practices and, stronger father-daughter relationships. Finally, fathers gained a newfound understanding of the negative impact gender stereotypes and gender bias had on their daughters' development and, their important role in advocating for equal opportunities for girls.

Daughters' Social Emotional Well-Being

All fathers identified improvements in some aspect of their daughters' social emotional well-being. Many attributed this to the program's focus on developing girls' psychological skills (e.g., self-control and persistence) and, empowering daughters as physical activity leaders for their fathers. Only a small number of interventions have targeted the child as the agent of change for family physical activity (Brown et al., 2016) and, few family-based physical activity interventions targeting girls measure social emotional well-being. However, one such web-based health promotion program produced significant improvements in daughters' perceived psychosocial stress. The 3-session program was designed to enhance daughters' well-being by improving dietary intake, increasing physical activity and, reducing drug use risks. Notably, the third session had focused on developing mothers' and daughters' coping, problem solving and communication skills. Despite positive findings, it was unclear what factors led to reductions in stress (Schwinn et al., 2014). Therefore, current study findings are notable as they provide greater insight into the program aspects that fathers believe led to improvements in their daughters' social emotional well-being.

Father Involvement and Engagement with their daughter

The DADEE program had a profound impact on fathers becoming more present and involved in their daughters' lives. Fathers identified that the DADEE program provided them with the evidence on, current issues in girls, holistic benefits of positive father involvement and, strategies and motivation to improve engagement with their daughter. This is important detail given that father involvement has been positively linked to girls' physical activity levels (Blackshear, 2019) and, self-esteem (Keizer et al., 2019). However, of concern is that there has been no attempt to engage fathers to improve girls' physical and mental health outside the current

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study.

Fathers' Parenting Skills

Previous qualitative studies have found that fathers often lack self-confidence in parenting (Sicouri et al., 2018), information to role model healthy behaviors and, the skills to implement effective parenting practices (Lindsay et al., 2018; Walsh et al., 2017). Not only did the education sessions in the DADEE program improve fathers' perceptions of their role as a father, it also improved their understanding, skills and approach to parenting. Fathers attributed this newfound parenting confidence to having a greater understanding of effective parenting styles (e.g., authoritative) and, possessing a suite of practical strategies (e.g., swapping screens for outside play, explaining the reasons for rules in a warm and consistent manner) that provided them with a clear focus and motivation for positive parenting.

Father-Daughter Relationship

All fathers believed participation in the DADEE program strengthened the father-daughter relationship. Many mentioned that the weekly sessions allowed fathers and daughters to enjoy structured, one-on-one time together, through fun physical activity games and challenges. Further, home-based tasks motivated fathers to engage in more active and purposeful tasks with their daughter outside of the program (e.g., Go for a walk and ask your daughter for her opinion on a decision you have to make). Although many parents believe co-activity provides an opportunity for parent-child bonding, lack of time and incompatibility (i.e., common interests, motivation and skills) are barriers that severely limit parents' opportunities to be physically active with their children (Rhodes & Lim, 2018). Notably, fathers in the current study prioritized spending time with their daughter that the DADEE program had fostered, which may have implications for father-daughter relationship closeness (Lamb, 2010).

In addition, fathers identified that the strategies used throughout the program to develop communication skills (e.g., conversation starters) were integral in creating a pathway for more frequent meaningful conversations. This is important information given that adult daughters who look to their father for emotional support, often define the quality of their father-daughter relationship through the levels of open discussion and mutual respect (Freeman & Almond, 2010).

Co-Parenting

Co-parenting has been described as the central component to family functioning (Feinberg, 2003; Weissman & Cohen, 1985) and, has been linked to the healthy development of a child including improved social-emotional well-being, pro-social behavior and social competence (Dopkins Stright & Neitzel, 2003;

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McHale et al., 2002; McHale et al., 1999). Fathers in the present study reported subtle improvements in the quality of the father-mother/partner relationship. This improvement was mostly attributed to fathers becoming more aware of the importance of positive co-parenting. Some fathers found that the home-based activities involving their wives/partners were helpful, and others made the effort to share the information learnt during the education sessions with their wife/partner. Similarly, Sicouri and colleagues (2018) found that fathers who attended a parenting support service resisted the cultural assumption of being the secondary helper and, identified themselves as being 'part of the team'.

Family Relationship Dynamics

Improvements to the overall family unit (e.g., spending more time together and improved family interactions) was experienced by almost all fathers as a result of participating in the DADEE program. Positive effects on fathers and daughters had a cascading impact on the whole family. Engaging family members and targeting the family psychosocial environment have been identified as key recommendations for increases in child and family physical activity (Brown et al., 2016). While it was not a primary focus, the DADEE program fostered family involvement through family members attending one session and, engaged families through home-based tasks. Moreover, the DADEE program targeted broader outcomes, such as the father-daughter relationship, father involvement and, daughters' social emotional well-being, which may have been key to positive changes amongst the family unit.

Knowledge and Understanding of Gender Stereotypes and Gender Bias

Rauscher and Cooky (2016) have previously criticized physical activity programs targeting girls, suggesting that they focus only on individual girls and their immediate social networks, rather than placing more attention on larger systems such as gender bias, ideologies and stereotypes, that have powerful negative influences on girls. To address this issue, the unique and impactful gender session in the DADEE program provided novel information and, key critical thinking strategies for fathers and daughters to become gender equity advocates. Daughters were also encouraged to write down examples of gender prejudice or gender biases they had been exposed to in a diary, and discuss these examples with their father. Further, family members (e.g., mothers/partners, grandparents, siblings) were invited to the gender session, which may explain the buy-in amongst the whole family.

Strengths and Limitations

This study provides a rich understanding of fathers' experiences after participating in a novel physical activity intervention targeting fathers and their daughters. The collection of quantitative measures prior to the

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interviews allowed our team to interview fathers stratified by baseline physical activity levels, providing a mix of active and inactive fathers and daughters. Author (VH), who was not involved in the study, conducted the analysis and, careful consideration was taken to delivery of the interviews, the systematic organization and analysis of the data and to improve the credibility of the data, discussion with colleagues was employed (Lincoln & Guba, 1985). Limitations of the current study include a sample of participants from a relatively homogeneous sample, with fathers reporting high socioeconomic status and educational levels. Moreover, as the families were recruited for a physical activity program, they may have had previous interest in enhancing their physical activity and may not be representative of all families. Interviews were also completed by researchers who were involved in the study design and delivery, however, an external researcher conducted the analysis to offset this potential bias. Also, due to budget constraints, a single coder analyzed the interview data. It may have been beneficial to have collected this data with other family members in addition to long-term follow-up with families.

Implications

Our findings are particularly novel and have several implications for future family-based physical activity interventions. Based on the results of the current study, targeting girls as the agent of change for their fathers' physical activity and, developing their psychosocial skills could have a profound impact on girls' physical activity levels and their future physical, mental, emotional and social health. It is also important to educate fathers about the critical role they play in a family, particularly for daughters, as it may be instrumental in improved outcomes for both fathers and their daughters. Given the positive association between possession of adequate parenting skills and father engagement (Lamb, 2013), researchers should seek to engage fathers to improve their self-efficacy in implementing positive parenting strategies (Lindsay et al., 2018).

The physical activity context allowed fathers and their daughters to talk, laugh, learn and create memories. Providing fathers with strategies to improve communication with their daughters may also have prompted fathers to bond with their daughters on a deeper level. Improving the quality of the father-daughter relationship may have implications for daughters' self-esteem (Keizer et al., 2019) and, underscores the importance of targeting this relationship in future research. Findings also suggest that educating fathers on the benefits of co-parenting and providing them with necessary skills may lead to positive changes in the relationship with their wife/partner and, overall family functioning (Sicouri et al., 2018).

The DADEE program is one of the first physical activity interventions that has specifically made girls aware of the causes and consequences of the underlying structural factors that adversely impact on girls' activity

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levels. Empowering daughters to understand and challenge gender prejudice and educating fathers to become a gender advocate for their daughter may be a vital precursor to increasing gender equality within a family and the broader society.

The findings from this study may assist researchers and health professionals to facilitate development of more effective family-based physical activity interventions that achieve improvements in daughters' physical and mental health, as well as broader outcomes for fathers and families. Moreover, placing a greater emphasis on intervention benefits to the family environment and enhanced daughters' social emotional well-being may be an appealing hook to recruit and engage fathers into future family-based interventions (Brown et al., 2016).

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Table 1*Semi-Structured Interview Guide*

Discussion guide questions
<ul style="list-style-type: none"> • Did you enjoy coming to DADEE with your daughter? Why/Why not? • What were the best things about the program? • Tell me about your experience in the Dads education sessions. What did /didn't you enjoy/like/find useful? • Tell me about your experience in the DADEE physical activity sessions in DADEE? What did /didn't you enjoy/like/find useful? • Do you think your experience in the program would have been different if you brought a son, or if mum brought the daughter(s)? How? • Has the program provided you with any useful parenting strategies? • What things are you now doing differently since completing the DADEE program? • What things are your daughter(s) now doing differently since completing the DADEE program? • Since participating in the DADEE program, has your daughter taken up any new sport/physical activities? If so, which sport(s)? • Has the DADEE program changed your family's lives? • After receiving the program, have you seen any changes in your daughter? If so what? • Can you tell me about the things you do together now (both physical activity and non-physical activity) as a result of participating in the DADEE program? • Tell me about your father-daughter bond/relationship since completing the DADEE program. • Do you see being a 'role model' for your daughter in terms of physical activity and social emotional well-being important? Is that a responsibility you want and/or do you think it would benefit your relationship with your daughter? • Now that you have participated in the DADEE program can you tell me if you have a new goal in relation to being a father? • In your opinion what is the greatest strength of the DADEE program? • Do you have any further ideas comments on the topic that were not covered in the questions?

Table 2*Participant Characteristics*

Characteristic	Mean	SD
Father age (years)	41.4	4.8
Daughter age (years)	8.6	2.1
Father baseline step count (steps/day)	8691	2528
Daughter baseline step count (steps/day)	10359	2699
Daughter social emotional well-being (percentile)	32.6	23.1
	<i>n</i>	%
Daughter social emotional well-being (Category)		
Needs instruction	9	39
Typical	13	57
Strength	1	4
Participating daughters per family		
1	15	65
2	8	35
Australian born	23	100
Married	21	91
Education level		
School certificate/trade	3	13
Certificate/diploma	5	22
≥ University degree	15	65
Full-time employment	22	96
Meeting physical activity recommendations		
Both father and daughter	3	13
Neither father or daughter	11	48
Father, but not daughter	6	26
Daughter, but not father	3	13

Figure 1

Schematic Diagram of the Impact of the DADEE Program on Family Functioning and Psychosocial Outcomes

