



Review Article

Physical activity and sport participation: A systematic review of the impact of fatherhood

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ABSTRACT

Moderate to Vigorous Physical Activity (MVPA), including sport participation, is an important component of a healthy lifestyle. Scholars have devoted considerable attention to understanding the impact of parenthood on MVPA, albeit only for women. As the impact of fatherhood on men's lives is drawing more and more scholarly and societal attention, the aim of the current article is to provide an systematic overview of studies examining the impact of fatherhood on MVPA.

A systematic review was conducted in Google Scholar, Web of Science and Web of Knowledge, using (combinations of) the search terms: father(hood), parent(hood), exercise, physical activity, sport and leisure time. This resulted in 54 papers reporting differences in MVPA and/or sport between fathers and childless men or within men that became father, of which 13 were included.

Our overview of findings suggested that fathers spent less time on MVPA compared with childless men, but that fathers did not differ from their childless counterparts on the subarea of sport participation. Differences in time spent on MVPA were strongest between childless men and fathers with young children (<6 yrs).

Our systematic review revealed that fathers spent less time on MVPA compared to childless men, especially when they had young children. Interestingly, linkages between parental status and the subarea of sport participation were not found, which suggests that fathers cut back on other areas of MVPA. Given the impact of MVPA on a healthy lifestyle, future research in this field is warranted.

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1. Introduction

Physical activity, including sport participation, is an important component of a healthy lifestyle (Bauman, 2004; Janssen and LeBlanc, 2010; WHO, 2010). Beyond physical health, regular physical activity and sport participation were also argued to affect a wide range of social and psychological outcomes (e.g., Rimer et al., 2012; Skinner et al., 2008; Spaaij, 2009). It is therefore not surprising that policy makers aim at increasing the physical activity levels of people, and scholars are urged to obtain a better understanding of the determinants of physical activity (European Commission, 2007; Office of Disease Prevention and Health Promotion, 2008; WHO, 2010).

1.1. MVPA and sport throughout the life course

Although the terms Moderate to Vigorous Physical Activity (MVPA) and sports are often used interchangeably, they are not synonyms. Moderate to vigorous physical activity can be defined as movements that result in moderate to high energy expenditure, such as brisk walking or cycling (Caspersen et al., 1985). In addition, MVPA can include sports (Caspersen et al., 1985) which can be defined as games with rules that require motor actions and that can be played organised or unorganised, such as football or tennis (van Bottenburg, 2001; Tamboer, 1992). Sports can thus be seen as a specific form of MVPA.

MVPA rates, including sport participation, change over the course of people's lives. From early ages on MVPA and sport participation start to decline. Especially in the twenties and early thirties, there is a sharp drop in sport club membership and regular MVPA (Directorate-General for Education and Culture, 2014; Tiessen-Raaphorst, 2015). For instance the Eurobarometer (2014) showed the declining sport participation rates in the European Union. Among 15–24 year-old men 74% sports at least with some regularity, whereas this dropped to 51% for the age group of 25–39 (Directorate-General for Education and Culture, 2014). For women, there was a drop from 55% for the 15–24 years-olds to 41% for the 25–39 year-olds. In addition, the time spent on vigorous physical activity dropped significantly during these transitions from adolescence to young adulthood (Directorate-General for Education and Culture, 2014).

1.2. The importance of parenthood

It has been suggested that such drops in MVPA and sport can at least in part be explained by life events, such as changing schools, first-time employment and becoming a parent (Allender et al., 2008). The transition to parenthood has been marked as an important life event entailing large time constraints that appear to have a strong impact on MVPA and the drop-out from sport, especially for women (Allender et al., 2008; Bellows-Riecken and Rhodes, 2008; Mailey et al., 2014). Despite the fact that there is consensus in the literature that parenthood may negatively impact women's MVPA and sport participation, we are still in the dark regarding linkages between the transition to fatherhood and men's MVPA, including sport participation (for a review, see Bellows-Riecken and Rhodes, 2008).

1.3. Overlooking the impact of fatherhood

In general, the consequences of fatherhood have been largely neglected in scholarly literature (Eggebeen and Knoester, 2001). For many decades, scholars started from the assumption that for men, employment status would be a much stronger predictor of their identity and well-being than their parental status. However, against the backdrop of an increasing number of mothers who have remained in the work force after childbirth, and more egalitarian gender roles, the impact of fatherhood on men's lives has been drawing more and more scholarly attention (e.g., Eggebeen, 2002; Marsiglio et al., 2000; Pleck, 2004).

Although scholars have called for more research on the impact of fatherhood on engagement in sport and exercise (Allender et al., 2008; Bellows-Riecken and Rhodes, 2008; Garfield et al., 2006; Kay, 2006), there are only a few studies which explicitly scrutinize the impact of fatherhood on men's physical well-being (e.g., Dykstra and Keizer, 2009; Eggebeen and Knoester, 2001; Keizer et al., 2010; Keizer et al., 2011; Knoester and Eggebeen, 2006). In general, knowledge about the impact of fatherhood on actual MVPA and sport participation appears to lag behind the knowledge about the impact of motherhood on MVPA and sport participation (Bellows-Riecken and Rhodes, 2008).

1.4. Fatherhood as time-constraint or as social activity?

In the literature, two conflicting mechanisms are postulated regarding the impact of fatherhood on men's lives. Below, we apply them to MVPA and sport. On the one hand, scholars have argued that, in similar lines or reasoning as for women, having children decreases the amount of time men are able to invest in MVPA and sport (e.g., Bellows-Riecken and Rhodes, 2008). Being a parent consumes time that could have otherwise been spent on other activities, such as sport. In addition, becoming a father may alter one's social network. Scholars (Eggebeen and Knoester, 2001; Keizer et al., 2010) have argued that these changes could be either long-lasting –becoming a father is seen as a transforming event that changes men's outlook, attitudes and behaviour permanently, or temporary –changes in men's behaviour depend on their life course stage and the extent to which men actively perform the role of father. If the restricting impact of fatherhood on men's lives is long-lasting, we would likely see that fathers have lower rates of MVPA and sport participation compared to childless men. If the impact of fatherhood on men's lives is temporary, it is expected that the rates of MVPA and sport participation of fathers start to resemble those when they were still childless, once they become empty nesters. We expect this pattern to hold stronger for sport participation than MVPA; Men who view sport as a central aspect of their lives, i.e. who have a strong sport identity (Brewer et al., 1993), might seize the opportunity of the empty nest to take up previous rates of sport participation.

The second, and conflicting, hypothesis is that fatherhood might increase MVPA, including sport participation. It is argued that fathers want to set an example of healthy sport and physical activity behaviour for their children, and function as role models for their children (e.g., Isgor et al., 2013; Shropshire and Carroll, 1997; Yao and Rhodes, 2015). In addition, fathers may become involved in sport club activities of their children or engage in joint activities with their children. If the latter mechanism is the leading mechanisms, we expect to find that

fathers have higher rates of MVPA in comparison to childless men, in particular on the subarea of sport participation.

1.5. The current review

The aim of the current study is to provide an overview of literature on the impact of fatherhood on MVPA in general and sport in particular and set a research agenda for this field.

Although a review has already been conducted on the impact of parenthood on physical activity (Bellows-Riecken and Rhodes, 2008), the present review focusses on fathers in particular, as many scholars urged for more studies focussing on the impact of fatherhood of MVPA and sport (Allender et al., 2008; Bellows-Riecken and Rhodes, 2008; Coakley, 2006; Kay, 2006). As the mechanisms underlying engagement in MVPA in general, which may or may not include sport, and sport in particular may differ, and the association of fatherhood with MVPA might be different from that with sport participation, we focus on both outcome measures in the current review. Although there are indications that fatherhood impacts other physical well-being indicators, such as sedentary behaviour, household physical activity or BMI as well, (e.g., Candelaria et al., 2012), a focus on these outcomes is beyond the scope of the current review.

2. Method

2.1. Literature search

We conducted our systematic literature search in March 2015. The initial search was carried out by a systematic search in Google Scholar, Web of Science and Web of Knowledge, using (combinations of) the search terms: father(hood), parent(hood), exercise, physical activity, sport, leisure time. Furthermore, a systematic search was carried out in PubMed, using the MeSH terms: fathers, parents, sport and motor activity.¹ From this initial search, 31 papers were identified as potentially relevant based on their title. After careful screening, ten of these papers met the inclusion criteria described below. The bibliography of these included papers was then reviewed for potentially interesting papers that were not found during the initial literature search. This yielded 23 new papers. Two of these papers met the inclusion criteria. The bibliography from these two included papers resulted in four new potentially relevant papers, of which one met the inclusion criteria. As a result, a total of 13 papers were included in this review (Adamo et al., 2012; Andersen and Haraldsdóttir, 1994; Barnekow-Bergkvist et al., 1996; Berge et al., 2011; Burton and Turrell, 2000; Candelaria et al., 2012; Gaston et al., 2014; Hull et al., 2010; Nielsen et al., 2006; Nomaguchi and Bianchi, 2004; Rhodes et al., 2014; Yang et al., 1999; Zick et al., 2007). See Table 1 for the details of these papers.

2.2. Inclusion/exclusion

The inclusion criteria for this review were partially based on the review of Bellows-Riecken and Rhodes (2008). Only original papers published in journals with a peer-review system in English were included. No restriction was made with regard to publication date. Because the focus of this review is on fatherhood, the respondents had to be males. When a study's sample consisted of both males and females, result needed to be specified for males and females.

As this review aims to examine the effects of fatherhood on exercise and sport, the included papers needed to include men whose children are below the age of seven or report differences between fathers and childless men. This implies that papers only describing the prenatal period were not included.

The dependent measures in the review had to be quantitative and include measurements of sport participation, physical activity (PA) and/or moderate to vigorous physical activity (MVPA).

3. Results

3.1. Characteristics of the studies

The papers in this review (see Table 1) were published in the period of 1994 until 2014. Almost half of the papers (six) were published in the last five years (2009–2014).

The majority of the studies included in this review were conducted in North America; five from USA and three from Canada. Two studies were conducted in Denmark and one each in Sweden, Finland and Australia.

Seven studies used a cross-sectional design, five studies were longitudinal and one study was based on both cross-sectional and longitudinal analysis. However, it should be noted that also in four of the longitudinal studies the comparisons were made between fathers and childless men (Andersen and Haraldsdóttir, 1994; Barnekow-Bergkvist et al., 1996; Berge et al., 2011; Yang et al., 1999). With large sample sizes, this design would allow for reliable conclusions about differences between fathers and childless men. However, the sample sizes of these studies cannot be considered large ($N = 88$, $N = 194$, $N = 1030$ and $N = 616$, respectively), and this limits the reliability of these studies. Hull et al. (2010) and Rhodes et al. (2014) used a longitudinal design with a within-subject analysis, which is more informative about individual changes compared to between-subject designs with smaller sample sizes.

3.2. MVPA and sport measures

Ten studies used self-reported measures of MVPA and sport as dependent variables. Interestingly, only three studies used a standardised questionnaire to measure PA (GLTEQ; IPAQ; PYLTPAQ) (Berge et al., 2011; Candelaria et al., 2012; Hull et al., 2010). The other seven self-report studies used either self-constructed scales or national guidelines, which limits the opportunities to compare results internationally. Four studies used accelerometer data to establish the dependent variables. This means that one study (Candelaria et al., 2012) included both self-report and accelerometer data. Although self-report is often used to measure MVPA and sport participation, accelerometers are more objective instruments to assess the PA of respondents (Hagstromer et al., 2010; Sabia et al., 2014). A down side of this method is that it is more difficult to use it in large samples, which explains the use of questionnaires in most large scale multi-wave studies (P. Lee et al., 2011).

In eleven studies, the time spent in (MV)PA was measured. The time spent in MVPA is an interesting measure from a health perspective, as more time spent in MVPA is associated with higher health benefits (I. M. Lee and Paffenbarger, 2000; Warburton et al., 2006). Four studies (also) measured variables related to sport in particular. Andersen and Haraldsdóttir (1994) measured the time spent on sports. Nielsen et al. (2006) and Zick et al. (2007) specified the time spent in different types of sports. Barnekow-Bergkvist et al. (1996) were the only scholars who not only measured the time spent on sport and PA, but also asked for more information about the activities that were undertaken during that time. They included questions about whether respondents participated in a sports competition and the number of sports the respondents participated in.

3.3. The impact of fatherhood

The majority of the studies included in the current review found an inverse association between fatherhood and MVPA. Five studies reported significantly less time spent on MVPA for fathers compared

¹ 'Motor activity' is a MeSH term that includes sport, exercise and physical activity.

Table 1
Descriptions of the included studies.

Authors	Participants (only males)	Independent variables	Dependent variables	Findings [recalculated values in brackets]
Cross-sectional				
Adamo et al. (2012)	N = 1078 Canadian Health Measures Survey; age 20–65	Number of dependent children in the home (<6 yrs.; 6–11 yrs.; 12–17 yrs) vs no dependent child in the home	Accelerometer-measured MVPA (minutes/day); Percentage meeting Canadian MVPA guidelines of 150 min/week	Fathers with child <6 yrs. 5.7 min/day less MVPA than childless men ($p = 0.066$); A lower percentage of fathers with child <6 yrs. (9.8%) reach MVPA guidelines than childless men (23%) ($p < 0.05$)
Burton and Turrell (2000)	N = 13,425 Australian Health Survey; age 18–64	Living with dependent children vs. not living with dependent children	Self-report: PA (METS-minutes/fortnight (2 weeks)) (sufficient = > 1600)	A higher percentage of fathers with dependent children are insufficiently active (71%) compared to men without dependent children (66%)
Candelaria et al. (2012)	N = 965 United States of America; age 20–57	Living with children <18 yrs. in home (0–5 yrs.; 6–12 yrs.; 13–17 yrs) vs. Living with no children <18 yrs. in home. Including number of children	Self-report: IPAQ Accelerometer-measured MVPA (minutes/day);	No sig. differences
Gaston et al. (2014)	N = 1029 Canadian Health Measures Survey; age 18–64	Father of at least one dependent child (<6 years, 6–11 years, or 12–15 years) vs. childless. Including number of children	Accelerometer-measured MVPA (minutes/day)	Fathers with child <6 yrs. engage in 5.6 min/day less MVPA than childless men ($p < 0.001$)
Nielsen et al. (2006)	N = 783 Denmark; age 20–29	Fatherhood (no children, 1 child, more children)	Self-report: PA in fitness centers (never, previous or currently active), bicycling (km/week), jogging (km/week) and any other sports (h/week).	Fathers 2.3 times more likely to be inactive than childless men ($p < 0.0005$)
Nomaguchi and Bianchi (2004)	N = 5984 National Health Interview Survey, United States of America; age 18–64	Fatherhood (number of children <18 yrs.; children <5 yrs. (yes/no))	Self-report: time spent on PA (sport, exercise, PA hobbies) (minutes/fortnight)	Fathers 67 min/fortnight [4.79 min/day] less exercise than childless men ($p < 0.001$); Fathers with children <5 yrs. 64 min/fortnight less on exercise than men without children <5 yrs. ($p < 0.001$)
Zick et al. (2007)	N = 1669 American Time Use Survey; age 15–29	Having children vs. childless	Self-report: at least 30 min/day spent in overall PA, team sports or non-team sports	No sig. differences
Longitudinal				
Andersen and Haraldsdóttir (1994)	N = 88 Denmark; age 16–19 and 23–27	Having children vs. childless	Self-report: sport activity (hrs/week)	No sig. differences
Berge et al. (2011)	N = 1030 Project EAT, United States of America; age 20–31 (males and females)	Having children (<5 yrs) vs. childless	Self-report: Godin Leisure-Time Exercise Questionnaire: total PA and MVPA (hrs/week)	Fathers 1.56 h/week [13.37 min/day] less MVPA than childless men ($p < 0.01$)
Hull et al. (2010)	N = 310 United States of America; age mean 24.3 (males and females)	Having first child, having subsequent child, childless	Self-report: Past Year Leisure Time Physical Activity Questionnaire: PA (hrs/week)	Over a 2 year period, having a first child resulted in 5.0 h/week decrease in PA compared to 1.5 h/week decrease for childless men ($p = 0.05$, $d = 0.45$). [Difference 3.5 h/week > 30 min/day]
Rhodes et al. (2014)	N = 157 Canada; age 25–40	Having first child, having second child, childless	Accelerometer-measured MVPA (minutes/week)	Fathers with a second child 34.37 min/week [4.91 min/day] less MVPA than childless men ($p < 0.01$)
Yang et al. (1999)	N = 616 Cardiovascular Risks in Young Finns project; age 9–18 and 21–30	Having children vs. childless	Self-report: Physical activity index (5 low - 14 high) calculated from: frequency and intensity of sport club training; sports competition; leisure time PA	No sig. differences
Cross-sectional and longitudinal				
Barnekow-Bergkvist et al. (1996)	N = 194 Sweden; age 15–18 and 33–36	Having children vs. childless	Self-report: overall leisure time PA (6 levels from sedentary to "heavy keep-fit activities"); membership of sport club; exercise times/week; participation in sports competition; number of sport activities	No sig. differences

with childless men (Adamo et al., 2012; Berge et al., 2011; Gaston et al., 2014; Nomaguchi and Bianchi, 2004; Rhodes et al., 2014). In addition, one within-subject study that examined changes in the time spent on PA for men who made the transition to parenthood found that men spent less time on PA after becoming a father (Hull et al., 2010). These studies reported the time spent on MVPA differently: some studies reported MVPA in minutes or hours per day, whereas others reported per week or fortnight (see Table 1). To be able to compare the effects of fatherhood on MVPA across studies, we had to recalculate to outcome measures to average minutes of MVPA per day (see Table 1: recalculated values in brackets). The results indicated that fathers spent an average of 10.7 min per day (SD = 9.99, range: 4.79–30.00) less on MVPA compared with their childless counterparts.

Three studies found significant differences between fathers and childless men in the percentages or odds of being inactive. Adamo et al. (2012) found that 9.8% of fathers reached the MVPA guidelines, compared with 23% of childless men ($p < 0.05$). In addition, Burton and Turrell (2000) found that 71% of fathers with dependent children were inactive, compared with 66% of men without dependent children. Nielsen et al. (2006) reported that fathers were 2.3 times more likely to be inactive compared with childless men ($p < 0.0005$). Four of the eleven studies measuring MVPA reported no significant differences between childless men and fathers (Barnekow-Bergkvist et al., 1996; Candelaria et al., 2012; Yang et al., 1999; Zick et al., 2007).

None of the studies included in this review found significant linkages between fatherhood and any specific sport-related dependent variables.

3.4. Number and age of children

Following the scholarly debate about fatherhood as a transformative event versus an event with only a temporary impact, the abovementioned findings that fathers *in general* seem to spend less time on MVPA in comparison to childless men needs some nuancing.

Most importantly, the findings from our review indicate that the age of the child(ren) matters. Five studies incorporated the age of the children as one of the independent variables (Adamo et al., 2012; Berge et al., 2011; Candelaria et al., 2012; Gaston et al., 2014; Nomaguchi and Bianchi, 2004). Based on the findings from these studies, it can be concluded that the impact of fatherhood on MVPA is most detrimental when children are young. In four studies, age of the child significantly shaped the effect of fatherhood on MVPA. Adamo et al. (2012) (marginally significant $p = 0.066$), Gaston et al. (2014); Berge et al. (2011) and Nomaguchi and Bianchi (2004) concluded that fathers with children younger than five or six years old engaged significantly less in MVPA than childless men did. In contrast, in the study of Candelaria et al. (2012) no significant effect of the age of the child was reported.

Furthermore, seven of the studies included in this review examined the impact of the number of children the father had (Adamo et al., 2012; Candelaria et al., 2012; Gaston et al., 2014; Hull et al., 2010; Nielsen et al., 2006; Nomaguchi and Bianchi, 2004; Rhodes et al., 2014). With the exception of Rhodes et al. (2014), no study found a significant moderating impact of number of children on linkages between fatherhood and MVPA and/or sport.

4. Discussion

4.1. The impact of fatherhood on MVPA and sport participation

Eight studies reported either a decrease in the time spent on MVPA and/or an increase in the odds of being inactive for fathers compared to childless men. This finding is in line with the time-constraints hypothesis, indicating that fathers have less time available for MVPA.

Based on the outcomes of six of these studies, we calculated that fathers spent on average almost 11 min a day less on MVPA than

childless men. Although more studies are necessary to perform a reliable meta-analysis, this finding implies that, per week, fathers spent almost 75 min less on intensive PA compared to their childless counterparts. Such differences may have important health implications, as official guidelines advice 150 min of MVPA per week (WHO, 2010). Therefore, based on our results, soon-to-be fathers or fathers who had just had their first child would be an excellent target group for exercise initiatives for PA promotion.

Because of the fact that some of the studies included in our review differentiated between MVPA in general and sport in particular, we were able to examine to what extent the subarea of sport was affected by fatherhood. None of the four studies (Andersen and Haraldsdóttir, 1994; Barnekow-Bergkvist et al., 1996; Nielsen et al., 2006; Zick et al., 2007) that used dependent variables specifically related to sports reported a significant relationship between fatherhood and sport. This indicates that fathers may spend less time on general MVPA compared with childless men, but that a reduction in time is not driven by a reduction in sport participation. An explanation for this finding could be that the arrival of children alters fathers' mode of transport rather than their sport participation. In that case, decreases in MVPA activities such as cycling for transport may explain the differences in MVPA between fathers and childless men. Based on the absence of significant linkages between fatherhood and sport, it would be insightful to know how fatherhood affects the type of organisational form, intensity, level of competition or type of sport played by men. Unfortunately, few studies incorporated measures that are able to tap into these questions (but see the study of Barnekow-Bergkvist et al. (1996) for a notable exception).

Our review indicates that differences between childless men and fathers were most striking when children are young. This can be seen as evidence for the view of fatherhood as a role that is being acted out more actively at certain stages in a man's life course. However, without studies that truly take a life course perspective on linkages between fatherhood and MVPA and follow men over the years, we cannot provide firm conclusions. Future research should investigate the longevity of the possible change in MVPA. Fathers who consider MVPA, including sport, to be an important part of their daily life and identity (i.e., have a strong sport identity (Brewer et al., 1993)), can be expected to be more inclined to pick up an active lifestyle after their youngest child is older than five or six. In future research, it could be investigated to what extent the relationship between fatherhood and MVPA, including sport, is affected by a person's sport identity.

4.2. Why are fathers important?

Besides the apparent health benefits of MVPA and sport for fathers themselves (e.g., I. M. Lee and Paffenbarger, 2000), there is ample evidence that parents have a strong impact on the socialisation of children in sport and physical activity (Dagkas and Quarmby, 2012; Pot et al., 2014; Pugliese and Tinsley, 2007; Wheeler, 2012), although review studies remain indecisive about the impact of parents on their children's participation in MVPA and sport (Trost and Loprinzi, 2011; Yao and Rhodes, 2015). Although there are relatively few studies that focussed on the independent roles of fathers and mothers in sport socialisation (Coakley, 2006), there are indications that especially father's MVPA and sport habits influenced the MVPA and sport habits of children (e.g., Isgor et al., 2013; Shropshire and Carroll, 1997; Yao and Rhodes, 2015). However, it might be the case that these linkages are not visible when scholars only use cross-sectional designs; it is likely that fathers who highly value MVPA spent more time engaging their children in MVPA at the cost of their own active leisure time. These reflections underscore the need to use longitudinal panel studies in order to obtain a thorough and nuanced understanding of the antecedents and consequences of father's and children's levels of PA.

4.3. Limitations of the studies

It should be noted that the studies included in this review were all conducted in either Anglo-Saxon (Australia, Canada, USA) or Nordic countries (Denmark, Finland and Sweden). This may have influenced the conclusions we draw on linkages between fatherhood and MVPA and sport, as the extent to which fatherhood might impact MVPA and sport might differ substantially across countries. Across countries, fathers differ in the time they contribute to child care (Miranda, 2011). In addition, the normative climate of what a good father should do with his or her child differs across countries. As a consequence, becoming a father in one country might provide more opportunities or will yield more barriers for one's own MVPA and sport participation than becoming a father in another country. Future research should investigate to what extent societal context influences the linkages between fatherhood and MVPA and sport participation. Because of these cultural dependencies, conclusions of these findings with regard to PA stimulation policies should be made carefully.

The majority of the studies included in this review are characterised by a cross-sectional research design. As such, we are unable to tell the extent to which fatherhood truly impacts MVPA; it might also be the case that men who were frequently active and attached high value to MVPA were less likely to make the transition to fatherhood. Future studies should ideally make use of longitudinal research designs in order to be able to study the influence of becoming a father on MVPA and sport participation in particular.

Another important point with regard to the design of the studies is that scholars have not always used a clear and homogeneous reference category of childless men. In some studies, childless men were individuals who could still make the transition to fatherhood (e.g., Nielsen et al., 2006), whereas in others this category was a mixture of men who could still become fathers and those who were permanently childless (e.g., Adamo et al., 2012). For a comprehensive and clear understanding of the impact of fatherhood on men's physical activity, it is important to have a clear and homogeneous reference category of childless men, although this would reduce external validity. Comparing fathers that live with their children with fathers who do not live with their children, for instance due to a divorce, could also provide some valuable insights in the question whether the time constraint is the main cause of lower PA levels for fathers.

An interesting finding is that most studies in this review measured the time spent in MVPA or sport participation. This means that mainly the quantity of MVPA and sport was studied. This might be interesting from a health perspective, as more time on physical activity is associated with health benefits (e.g., I. M. Lee and Paffenbarger, 2000). However, from the perspective of sport socialisation and motivation for MVPA and sport during the life-course, it is also important to know what types of activities a person participates in (e.g., Allender et al., 2006; Bourdieu, 1978). The study of Barnekow-Bergkvist et al. (1996) gave some indication of the type of sport participation and motivation at age 16 and 34. It appears that unbound activities without a game element, such as running and swimming which we did not define as sports in this review, were more popular among older men. This suggests that the flexibility of the activities might be an important determinant of father's physical activity. Future studies could test whether fatherhood has a stronger impact on the type of activity, the type of organisation (e.g., club or unbound) or the level of participation (e.g., recreational or competitive).

5. Conclusion

The current paper reviewed existing studies on linkages between fatherhood and MVPA, including sport participation. Overall, these studies indicated that fathers spent less time on MVPA compared to childless men, especially when the former had young children. For the subarea sport participation, linkages with fatherhood were not found.

Future research, preferably using longitudinal panel models, should investigate in detail how fathers make alterations to their (sport) life to incorporate the arrival of a child. These findings indicate that attention in the promotion of physical activity and sports should be devoted to men who recently became a father.

Conflict of interest

The authors declare that there is no conflict of interest.

Transparency document

The Transparency document associated with this article can be found, in online version.

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