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Implementation of policies and practices to increase physical activity among children attending centre-based childcare: a cross-sectional study

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Abstract

Issue addressed: Supporting centre-based childcare services to create physical activity (PA) environments is a recommended strategy to improve child PA. This study aimed to describe the implementation of PA policies and practices by these services, and to examine the associations with service characteristics.

Methods: Nominated supervisors of childcare services (n=309) in the Hunter New England region, New South Wales, Australia, completed a telephone interview. Using previously validated measures, the interview assessed the implementation of evidence-based practices shown to be associated with child PA. This includes: a) provision of active play opportunities, b) portable play equipment availability, c) delivery of daily fundamental movement skills (FMS), d) having at least 50% of staff trained in promoting child PA the past five years, and e) having written PA and small screen recreation (SSR) policies.

Results: Although 98% (95% CI 96-99) of childcare services provided active play opportunities for at least 25% of their daily opening hours, only eight percent (95% CI 5-11) of services fully implemented all policies and practices; with no service characteristic associated with full implementation. Long day care service had twice the odds of having a written PA policy (OR 2.0, 95% CI 0.7-5.8), compared to preschools (adjusted for service size, socioeconomic disadvantage, and geographical location).

Conclusions: Improvements could be made to childcare services' operations to support the promotion of child PA.

So what?: To ensure benefits to child health, childcare services require support to implement a number of PA promoting policies and practices known to improve child PA.

Keywords: childcare, physical activity, policy, practice, implementation

Introduction

Physical activity is a major protective factor against the development of non-communicable diseases such as cardiovascular disease, stroke, diabetes and some cancers ⁽¹⁾. Physical activity, defined as ‘any bodily movement produced by skeletal muscles that requires energy’ broadly includes movement concepts such as body, space, effort and relationship ⁽²⁾. Early childhood is a key developmental period for the establishment of healthy lifestyle behaviours, including physical activity ⁽³⁾. As such, ensuring children are sufficiently active is essential for future chronic disease prevention ⁽⁴⁾. Australian physical activity guidelines recommend that children under five years of age accumulate at least 180 minutes of physical activity including 60 minutes of moderate to vigorous physical activity (MVPA) each day ⁽⁵⁾. However, similar to research findings in other countries ⁽⁶⁾, less than 20% of Australian children under 5 years currently meet this recommendation ^(7, 8).

To realise the health benefits of physical activity in children ⁽³⁾, environments where children spend a substantive amount of their time need to be supportive of physical activity ^(9, 10). In Australia, 54% of 2 and 3 year olds, and 42% of four year olds attend formal childcare, spending an average of 18 hours per week in such care ⁽¹¹⁾. As such, childcare services are a recommended setting for the implementation of initiatives to increase child physical activity levels as they provide broad reach to a large proportion of young children for prolonged periods. Encouraging child physical activity while in care is consistent with the philosophy of the childcare sector ⁽¹²⁾ and supported by staff as they believe this to be part of their professional role and responsibility ⁽¹³⁾. In addition, childcare services also have existing infrastructure (e.g. indoor and outdoor space, equipment) and program delivery structures (e.g.

curriculum) to facilitate the implementation of policies and practices to increase child physical activity ⁽¹⁴⁾. The implementation of physical environments that facilitate activity are also consistent with government approaches to regulation, assessment and quality improvement for the early childhood education and care setting released in 2012.

Importantly, a recent meta-review that synthesised the findings of 16 systematic reviews ⁽¹⁵⁾ identified several centre-based childcare policies and practices that were associated with higher levels of child physical activity in care. These included the implementation of practices such as the provision of planned structured active lessons, sufficient outdoor spaces, availability of physical activity equipment, and the existence of physical activity policies, together with relevant educator qualifications and training ⁽¹⁵⁾. As such, regulatory guidelines for the childcare setting ⁽¹⁶⁾ and best practice recommendations ⁽¹⁷⁻¹⁹⁾ recommend the routine implementation of physical activity promoting policies and practices in childcare services.

Several national and international studies have previously described childcare service implementation of such evidence-based policies and practices. The most recent population-based survey in Australia was undertaken with 104 Western Australian childcare services in 2015, and assessed a limited number of physical activity promoting policies and practices ⁽²⁰⁾. The study reported that just 16% of services had a physical activity policy, 52% had adequate portable indoor play equipment, and 37% provided sufficient opportunity for children to achieve the recommended 180 minutes of daily physical activity ⁽²⁰⁾. In New South Wales (NSW), previous research reported inconsistent implementation of PA and nutrition policies and practices across childcare services in 2006-13 ^(21, 22).

Since the conduct of these studies, there have been critical changes to the regulatory environments of Australian childcare services that may have an impact on the implementation of physical activity promoting policies and practices. This includes the introduction of new licensing and accreditation standards for the sector in 2017 ⁽²³⁾ as well as, continued investment by the NSW state government that enables childcare services to prevent excessive weight gain by creating environments supportive of physical activity and healthy eating ⁽²⁴⁾. In addition, there has been rapid progress in the evidence-on the types of physical activity promoting practices associated with improved child activity in care ⁽¹⁵⁾. Given substantial evidence of differences in physical activity levels by socio-economic status ⁽²⁵⁾ and geographic location ⁽²⁶⁾, assessment of the implementation of physical activity promoting policies and practices by such characteristics is needed. An updated assessment of childcare implementation, examining a wider range of policies and practices, is therefore warranted to provide a better understanding of the current physical activity environments of childcare services to inform health promotion efforts in the future.

This study aimed to describe the prevalence of evidenced-based physical activity promoting policies and practices implemented in a sample of Australian centre-based childcare services. A secondary aim was to investigate associations between implementation of policies and practices and service characteristics, including type of service (preschool or long day care service); service size; geographic location; and socioeconomic status of the surrounding community, to examine whether the tailoring of future intervention efforts in this setting may be needed.

Methods

Study design

A cross-sectional study (prevalence study whereby the exposure and the outcomes are measured at the same point in time ⁽²⁷⁾) was conducted with childcare services located in one region in NSW, Australia. Ethics approval to conduct the study was obtained from the Hunter New England Health Human Research Ethics Committee (reference 06/07/26/4.04) and the University of Newcastle Human Research Ethics Committee (reference H-2008-0343). The study is reported in accordance with the Strengthening the Reporting of Observational studies in Epidemiology (STROBE) guidelines for cross-sectional studies ⁽²⁸⁾.

Sample and recruitment

All centre-based childcare services (including preschools and long day care services) located within the Hunter New England Local Health District of NSW, Australia (n=364) were invited to participate in a computer assisted telephone interview (CATI). A list of all centre-based childcare services located in the study region was obtained from the government licencing authority and served as the study sample. These include long day care services, that are open for eight or more hours per day for five days per week, enrolling children from six weeks to six years, and preschools that are open for less than eight hours per day with children aged 3 to 5 years enrolled ⁽²⁹⁾. Services that catered exclusively for children with special needs, those that only opened occasionally (where children attend care for short periods of time), NSW Department of Education and Communities services, family day care, and mobile services, were excluded from the study. Childcare services were sent a study information statement and an invitation to participate. Two weeks following, nominated supervisors were contacted by a

CATI interviewer via telephone to confirm eligibility and request verbal consent to participate in the study. In Australia, nominated supervisors are certified, hold a diploma in early childhood education and/or three years' experience and oversee day to day operations. Their responsibilities for educational programs, supervisions and safety of children, entry and exit of premises, food and beverages, medication administration, sleep and rest, excursions and staffing are liable under the Law and Regulations⁽³⁰⁾.

Data collection

Interviews occurred between May to July 2017 and were undertaken as part of routine data collection conducted by the local health promotion unit (a department tasked by the NSW Ministry of Health to conduct health promotion service delivery including to early childhood education and care services). Each telephone interview took approximately 20 minutes and participants were able to complete the interview in multiple sittings if preferred. Survey items previously validated and used by the research team ⁽³¹⁻³³⁾ were amended to reflect the new accreditation standards and evidence-based recommendations. The items were administered by trained CATI interviewers using standardised protocols. Prior to the commencement of data collection, a member of the research team provided training to four CATI interviewers on how to administer the interview questions. Interviewer adherence fidelity to training protocols were monitored throughout the survey period. More specifically, this included the use of log sheets and notes within the interview program highlighting any potential deviations. The research assistant also met with a statistician weekly to monitor the data and where the anomalous trends were identified, this was addressed with the interviewers immediately.

Measures

Interviews were completed by one nominated supervisor per service who reported on behalf of their childcare service. Nominated supervisors reported on the service operational characteristics (i.e. service type (preschool or long day care service), number of children enrolled, number of staff, opening and closing times, postcode) and current implementation of physical activity promoting policies and practices. The policies and practices examined in this study were identified as being: i) associated with improved child physical activity in care (as informed by systematic reviews) ⁽¹⁵⁾; ii) recommended by international and national best practice guidelines ^(17, 18); and iii) local health service priorities in the study region ⁽³⁴⁾.

Specifically, the survey items assessed the following seven policies and practices:

1. Service scheduling of $\geq 25\%$ of opening time for physically active play (including indoor and outdoor free-play and educator-led activities)
2. Service provision of accessible portable play equipment both indoors and outdoors
3. Service provision of enough quantities and types of portable play equipment for all children who regularly use them
4. Service scheduling time for daily fundamental movement skills activities for 3 to 5 year olds
5. Existence of a written physical activity policy with required elements
6. Existence of a written small screen recreation policy with required elements
7. Service has at least 50% of staff that have received training (by an external agency or other trained staff) in promoting child physical activity in the past five years

A detailed description of the items and measures is provided in Supplementary Table 1 in the appendix.

Data analyses

All analyses were performed using the statistical software SAS v9.3 (SAS Institute Inc., Cary, NC, USA) and statistical level was set at 0.05. Descriptive statistics were used to describe service operational characteristics and implementation of the physical activity policies and practices. The prevalence of services implementing each individual policy and practice, and all seven policies and practices were reported as percentages with 95% confidence intervals, and according to service operational characteristics. In the association analyses, childcare services were grouped by the following: 1) service type - preschool or long day care service; 2) service size - dichotomised as ≥ 80 or < 80 children enrolled; 3) socioeconomic status (SES) of the surrounding community - childcare services with postcodes ranked in the top 50% of NSW postcodes based on their SES were categorised as being located in “higher SES areas,” while those in the lower 50% were categorised as being located in “lower SES areas” using the 2016 socio-economic indexes for Australia ⁽³⁵⁾; and 4) geographic location - childcare services were categorised as “regional/remote” (those located in inner/outer regional, remote, and very remote areas) or “major cities” (those areas in regional cities) based on their postcode using the Accessibility/Remoteness Index of Australia ⁽³⁶⁾. For each individual policy and practice and the summation of all, chi-square analyses were performed to assess differences by the above service operational characteristics. All four service operational characteristics were then entered into multivariate logistic regression models, to identify which characteristics were significantly associated with implementation after adjusting for each other.

Results

Sample

Of all the services invited to participate, 45 refused, four could not be contacted, and three were ineligible (two were preschools under the NSW Department of Education and Communities, and one a mobile service). The nominated supervisors of 309 services (85.6%) provided consent to participate in the study and completed the telephone interview.

Service operational characteristics

Nominated supervisors of childcare services reported a median enrolment of 89 children, with almost all (96%) being open 5 days each week (Table 1). Seventy-four percent were open for eight hours or more each day, with 106 operating as preschools and 203 as long day care services. Forty-seven percent of participating services were located in regional/remote areas and 60% were located in lower socio-economic areas.

Physical activity policies and practices

Overall, 98% (95% CI 95.8-99.1) of services reported providing opportunities for physical activity for at least 25% of their daily opening hours (Table 2). Almost all services (95%, 95% CI 92.2-97.0) reported having sufficient portable physical activity equipment that were accessible for children indoors and outdoors. Sixty-nine percent (95% CI 63.7-74.1) of participating services reported having sufficient types and quantities of such equipment. Daily fundamental movement skill activities were delivered by 64% (95% CI 58.4-69.1) of services. Sixty nine

percent (95% CI 63.7-74.1) of services reported having educators who had attended training on promoting child physical activity in care in the past five years. Thirty-nine percent (95% CI 33.4-44.3) of services reported having a written physical activity policy (that included all recommended elements) and 26% (95% CI 21.3-31.1) of services reported a written small screen recreation policy with all required elements. Eight percent (95% CI 5.3-11.3) of services implemented all seven physical activity policies and practices.

Service operational characteristics associated with the implementation of physical activity policies and practices

In the univariate analyses, long day care services (compared to preschools) had statistically significant higher odds of having a written physical activity policy (OR 1.9, 95% CI 1.1-3.1, $p=0.01$) and a written small screen recreation policy (OR 2.0, 95% CI 0.1-3.6, $p=0.02$) (Table 3). Thirty-two percent of larger services had a written small screen recreation policy compared to 20% of smaller services (OR 1.9, 95% CI 1.1-3.3, $p=0.02$). There were no significant differences in the implementation of any of the policies and practices by service SES or geographic location in the univariate analyses (Table 3). In the multivariable logistic regression analyses, long day care services had double the odds of having a written physical activity policy compared to preschools (OR 2.0, 95% CI 0.7-5.8), when adjusted for socio-economic status, geographic locality and service size. None of the examined service characteristics was associated with implementation of all seven policies and practices in the multivariable regression (see Table 4).

Discussion

This study investigated the current implementation of physical activity promoting policies and practices in childcare services in Australia, together with examination of service operational characteristics associated with implementation. The study found that implementation of evidence-based physical activity policies and practices in the region is variable. However, there was little variability in the prevalence of policy and practice implementation by service characteristics.

Encouragingly, almost all services (98%) reported scheduling $\geq 25\%$ of their opening hours for physically active play time and providing access to portable play equipment while indoors and outdoors. Most services (64%-69%) reported having sufficient types and quantities of portable play equipment, providing daily fundamental movement skills activities, and having educators trained in physical activity. Such rates of implementation are higher than previously documented in a similar survey of childcare nominated supervisors in the region in 2013 ⁽²²⁾. The findings suggest that changes to accreditation standards and ongoing investment in physical activity promotion in this setting by federal and NSW government may have yielded further improvements in implementation.

However, only 39% of services reported having a written physical activity policy and 26% a written small screen recreation policy, rates similar to New Zealand childcare services ⁽³⁷⁾. Additionally, just 8% of services reported implementing all seven policies and practices assessed in the study, suggesting that there remains scope for support to implement a broader range of physical activity promoting policies and practice. Challenges with implementing physical activity

promoting policies and practices such as having daily fundamental movement skills sessions have consistently been documented in Australia ^(21, 38) and internationally ^(39, 40) ; due to implementation predominantly being reliant on staff knowledge and skills ⁽⁴¹⁾. The lack of comprehensive physical activity and screen time policies could be due to beliefs that such policies are not important to support child activity or a lack of time and/or knowledge to review and update policies so they are consistent with recent changes in guidelines. Given the high turnaround documented in the early childhood profession ⁽⁴²⁾, implementation support strategies that address such beliefs, skills and knowledge gaps in an ongoing manner are required if the implementation of these policies and practices is to be further enhanced. While our study found that approximately 70% of childcare services reported that over half of their educators had been trained in PA in the last 5 years, it appears that attendance at training online (provided as part of a State-wide healthy eating and physical activity program for the early childhood sector) may be insufficient to produce comprehensive changes to implementation of service practices. The purpose of the online training was to deliver educational modules to two educators per service ⁽⁴³⁾. The training covered six health promoting key messages including how to promote physical activity in early childhood settings and sought to further reinforce knowledge and skills development of educators. In contrast, the majority of services report being able to implement environmental/structural (e.g. 95% have sufficient portable equipment) practices. Hence it is possible that future efforts to identify other environmental practices associated with child activity may be a promising way of supporting childcare services with improving their environment.

Few service characteristics were found to be associated with the implementation of physical activity promoting policies and practices. In the multivariable logistic regression analyses, long day care services had significantly higher odds of having a written physical activity policy. This could be due to the staged introduction of the National Quality Framework⁽¹⁶⁾ which was introduced to long day care services prior to preschools. It is possible that the different operational characteristics, including service size and opening hours, may have accounted for these differences as well. Future studies examining potential reasons for such differences are needed to understand the differential implementation amongst service types. The lack of significant associations with service socio-economic and geographic characteristics found here is reassuring, and suggests that current efforts to support implementation may be having a similar impact across childcare services. Such findings are in contrast with previous studies conducted in the region which found variances in daily fundamental movement skills provision by geographical location and socioeconomic areas⁽²¹⁾. This suggests that the built in focus on equity in state and national obesity prevention programs is essential to support population health improvements to child physical activity.

Strengths of this study include the high participation rate (>80%), large sample size and sampling of all centre-based childcare services within one large and diverse health district in NSW. Nevertheless, the study findings need to be interpreted in light of several limitations. Assessing practice implementation by self-report could have resulted in social desirability bias⁽⁴⁴⁾ which may have led to an overestimation of the prevalence reported. However, a previous validation study has shown that organisational representatives can provide accurate data on their organisation's policies and practices, with high agreement observed between data

collected via self-report and that of direct observation ⁽³³⁾. While all services within the region were approached, the study was conducted in a nonmetropolitan region of NSW. Although the demographic profile of the Hunter New England region ^(45, 46) approximates that of the broader NSW population ⁽⁴⁷⁾, the policies and practices of childcare services located in major metropolitan areas may differ to that of the study sample. Lastly, a number of evidenced-based practices were not examined in this study including providing opportunities for free-play, time spent outdoors, size of the outdoor play area and educator role modelling due to survey length and participant burden. Future studies should include assessment of such practices to provide a more comprehensive picture of the modifiable environments of centre-based childcare services. Also, studies should consider assessing practices that influence child activity for infants and toddlers.

Conclusion and implications

This study highlights that centre-based childcare services continue to have sub-optimal implementation of a number of physical activity promoting policies and practices. Future strategies focusing on changing practices that require less reliance on educator knowledge and skills may be a tenable strategy to effect change.

Further investment in supporting childcare services with implementing evidence-based physical activity policies and practice is needed to achieve the potential of childcare services to improve child physical activity.

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Tables

Table 1: Operational characteristics of childcare services

	N (%)
Number of children enrolled, median (SD)	89 (50.2)
Open 8 hours or more each day	228 (73.8)
Open 5 or more days per week	295 (95.5)
Long day care service†	203 (65.7)
Preschool‡	106 (34.3)
Located in regional /remote areas	144 (46.6)
Located in major city	165 (53.4)
Located in lower socio-economic area	183 (60.2)
Located in higher socio-economic area	121 (39.8)

†Long day care services enrol children from birth to 5 years of age and are generally open for 8 or more hours per day.

‡Preschools cater primarily for children aged between 3 and 5 years of age and are usually open for less than 8 hours per day.

SD, standard deviation.

Table 2: Prevalence of childcare service implementation of physical activity (PA) policies and practices

PA policies and practices	N = 309 % (95% CI)
1. Service provides active play time for 25% or more of operating hours	98.1 (95.8-99.1)
2. Service provides access to portable PA equipment indoors and outdoors	95.2 (92.2-97.0)
3. Service provides enough types and quantities of portable PA equipment	68.9 (63.7-74.1)
4. Service has daily fundamental movement skills sessions (3-5 years)	63.8 (58.4-69.1)
5. Service has a written policy, procedure or guideline encouraging PA with required elements	38.9 (33.4-44.3)
6. Service has a policy, procedure or guideline restricting small screen recreation (SSR) with required elements	26.2 (21.3-31.1)
7. Service has at least 50% educators that have accessed professional development (by an external agency or trained staff) in PA in the past 5 years	68.9 (63.7-74.1)
Implementation of all 7 policies and practices	7.8 (5.3-11.3)

Table 3: Association of childcare services adopting physical activity (PA) promoting practices with service type, service size, locality and disadvantage (n=309)

	Service type			Service size			Locality			Disadvantage		
Service policies and practices	Long day Care N=203	Preschool N=106	P-value	>80 enrolled	≤80 enrolled	P-value	Major Cities	Regional / remote	P-value	Higher SES	Lower SES	P-value
	% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)		% (95% CI)	% (95% CI)	
1. Service provides active play time for 25% or more of operating hours	97.0 (93.6-98.6)	100 (97.2-100.0)	0.95	96.6 (93.6-99.5)	99.3 (98.1-100.0)	0.13	98.8 (97.1-100.0)	97.2 (94.5-99.9)	0.33	96.0 (92.1-99.9)	99.0 (97.7-100.0)	0.10
2. Service provides access to portable PA equipment indoors and outdoors	94.1 (90.0-96.6)	97.2 (92.0-99.0)	0.24	92.5 (88.2-96.8)	97.4 (94.8-99.9)	0.06	96.4 (93.5-99.3)	93.8 (89.8-97.7)	0.29	95.0 (90.6-99.3)	95.1 (91.3-98.1)	0.95
3. Service provides enough types and quantities of portable PA equipment for all children who regularly use them	67.5 (61.0-74.0)	71.7 (63.0-80.4)	0.45	69.4 (61.9-76.9)	68.6 (61.2-76.0)	0.89	67.9 (60.7-75.0)	70.1 (62.6-77.7)	0.67	69.7 (60.6-78.8)	67.8 (61.4-74.2)	0.74
4. Service has daily fundamental movement skills sessions (3-5 years)	63.6 (56.9-70.2)	64.2 (54.9-73.4)	0.92	64.6 (56.9-72.4)	62.8 (55.0-70.5)	0.73	66.7 (59.4-73.9)	60.4 (52.4-68.5)	0.25	65.7 (56.3-75.1)	63.4 (56.8-70.1)	0.70

5. Service has a written policy, procedure or guideline encouraging PA with required elements	43.8 (37.0-50.7)	29.3 (20.4-38.1)	*0.01	38.1 (30.2-46.0)	40.5 (32.7-48.4)	0.67	40.0 (32.5-47.5)	37.5 (29.6-45.5)	0.65	34.3 (24.9-43.8)	41.0 (34.2-47.8)	0.27
6. Service has a policy, procedure or guideline restricting small screen recreation (SSR) with required elements	30.5 (24.2-37.0)	17.9 (11.8-26.3)	*0.02	32.0 (24.4-39.6)	19.6 (13.3-26.0)	*0.02	27.9 (21.0-34.8)	24.3 (17.3-31.4)	0.48	20.2 (12.3-28.2)	29.3 (23.0-35.5)	0.09
7. Service has at least 50% educators that have accessed professional development (by an external agency or trained staff) in PA in the past 5 years	65.5 (58.9-72.1)	75.5 (66.5-82.7)	0.07	67.4 (59.7-75.0)	72.6 (65.4-79.7)	0.33	66.7 (59.4-73.9)	71.5 (64.1-78.9)	0.36	69.7 (60.6-78.0)	69.3 (62.9-75.6)	0.94
Implementation of all 7 policies and practices	9.4 (6.1-14.2)	4.7 (2.0-10.6)	0.16	9.5 (4.8-14.3)	6.5 (2.6-10.5)	0.34	7.3 (3.3-11.3)	8.3 (3.8-12.9)	0.73	4.0 (0.1-7.9)	9.8 (5.7-13.8)	0.09

*significant at a two-sided p<0.05 level

Table 4: Results of multivariate logistic analyses for service characteristics associated with services implementation of all seven examined physical activity (PA) policies and practices

Policy/ practice	Variable		Odds ratio	P
			[95% confidence interval]	
Implementation of all 7 policies and practices [†]	Service type	LDC vs preschool	1.99 (0.68-5.82)	0.21
Implementation of all 7 policies and practices [‡]	Disadvantage	Upper half vs Lower Half	0.41 (0.13-1.26)	0.12
Implementation of all 7 policies and practices [§]	Locality	Major cities vs regional/remote	0.97 (0.41-2.34)	0.94
Implementation of all 7 policies and practices [¶]	Size	≥80 vs <80 children enrolled	1.22 (0.50-2.99)	0.67

*significant at a two-sided $p < 0.05$ level

[†]Controlled for disadvantage, locality, size

[‡] Controlled for service type, locality, size

[§] Controlled for service type, disadvantage, size

[¶] Controlled for service type, disadvantaged, locality