

Oral health practices of state and non-state-funded licensed childcare centers in Wisconsin, USA

Dana Scheunemann, Michael Schwab, Vasileios Margaritis

School of Health Sciences (PhD in Public Health Program), College of Health Sciences, Walden University, Minnesota, USA

Corresponding author (email: <vasileios.margaritis@waldenu.edu>)

Dr. Vasileios Margaritis, College of Health Sciences, Walden University, 100 Washington Ave. South, Suite 900, Minneapolis - 55401, Minnesota, USA.

Abstract

Objectives: To determine whether there is a difference between state-funded childcare centers and non-state-funded centers in Wisconsin, USA, with regard to their oral health practices. **Materials and Methods:** This is a cross-sectional study using an internet-based survey. The participants were licensed childcare centers in Wisconsin, USA. Of the 1265 eligible childcare centers invited (centers providing day time care to children aged 2–5), 322 chose to participate. The main outcome measures were the practice of tooth brushing as a routine classroom activity, any educational practice related to oral health, any screening and referral practice related to oral health issues, and any practice related to dental emergencies. Mediating variables were profit status, center location, center affiliation, years of operation, licensed capacity, and child to staff ratio. **Results:** Of the 322 participating centers, 28 centers were classified as state-funded and 294 as non-state-funded. Logistic regression analysis revealed non-state-funded centers were three times [odds ratio (OR): 3.01; 95% confidence interval (CI): 1.23, 7.41] more likely to have some kind of oral health practice and five times (OR: 5.18; 95% CI: 2.17, 12.50) more likely to provide oral health education. However, state-funded centers were five times (OR: 5.09; 95% CI: 1.99–13.06) more likely to have tooth brushing as a routine classroom activity. **Conclusion:** There is a difference between the oral health practices of licensed childcare centers in Wisconsin. An increase in oral health practices of state-funded centers is warranted and could make a significant difference in the oral health of young children.

Key words: *Childcare practices, early childhood caries, oral health, oral health practices, preschool children, state-funded childcare centers*

INTRODUCTION

Dental caries is the most common chronic disease among children in the United States.^[1] In children younger than 6, the term early childhood caries (ECC) is used to describe dental caries.^[2] The United States National Health and Nutrition Examination Survey (NHANES) conducted from 1999 to 2004 is the most recent NHANES in which sufficient data exists to evaluate the oral health status of preschool

children. This survey revealed that 28% of children aged 2–5 had ECC, with children of lower socioeconomic status (SES) most affected.^[3] Between 55%^[4] and 61%^[5] of preschool children in the United States receive childcare outside of the home on a regular basis. Children who live below the poverty level spend more hours in childcare than those above the poverty level.^[5]

The traditional prevention of ECC focuses on the

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home, addressing parental and child behavior in the home environment. However, experts in the field of oral health have recognized the potential impact that childcare centers can have on the oral health of preschool children, since over half of the preschool children receive childcare outside of the home on a regular basis. In 2011, the American Academy of Pediatric Dentistry issued a policy statement encouraging childcare centers to address institute oral health through practices.^[6] The statement recommends several aspects of addressing oral health. These aspects include evaluation of current procedures, education, emergency preparedness, screening and referral, and classroom activities. The 3rd edition of *Caring for our Children: National Health and Safety Performance Standards*, published by the American Academy of Pediatrics, the American Public Health Association, and the National Resource Center for the Health and Safety in Child Care and Early Education,^[2] provided similar recommendations to those of the American Academy of Pediatric Dentistry.

Legislation to support the recommendations of these professional organizations does not exist. Kim *et al.*^[7] evaluated whether or not states had regulations related to oral health policies in childcare centers. Specifically, they looked at the labeling, storage, maintenance, and availability of a toothbrush, along with recommendations for tooth brushing, oral health screenings, and maintaining a list of the children's dental contacts. Kranz and Rozier^[8] also evaluated state oral health regulations in early education and childcare centers. These researchers looked at screening and referral, classroom activities, and education. The results of these studies indicated that overall, a majority of states fail to provide comprehensive oral health policies and practices. In Wisconsin, the only oral health regulation is for the proper storage and maintenance of tooth brushes without any mention of their use.

Research has shown that there is a difference between the non-oral health policies and practices of childcare centers primarily serving children of lower SES and those primarily serving children of higher SES.^[9-15] What is unclear is whether there is a difference in oral health practices of centers serving children of higher and lower SES. Two studies were located that evaluated the oral health practices of childcare centers,^[16,17] but only one evaluated SES.^[17] Gartsbein *et al.*^[17] found that there was no difference in the oral health practices and SES. However, that study used an indirect method to determine SES, as the authors evaluated the SES of the neighborhood in which the center was located and not the SES of the children attending that center. The objective of the current study was to determine whether

there is a difference between Wisconsin state-funded childcare centers and non-state-funded childcare centers and their oral health practices.

MATERIALS AND METHODS

The study population for this cross-sectional study consisted of all licensed childcare centers in the state of Wisconsin that provided day time care to children aged 2–5. Head Start accredited centers (these centers promote the school readiness of young children from low-income families through local programs) were excluded, as these centers are required to address oral health. A list of eligible centers was obtained from the Wisconsin Department of Children and Families website.^[18] Prior to the data collection process, ethical approval was obtained from the Walden University Institutional Review Board; the approval number is 02-27-14-0072622. In March 2014, an invitation letter was sent to 1320 eligible center directors. In addition to an informed consent document, the letter provided information on how to take the survey using an online survey service within the next 2 weeks. A reminder letter was mailed to those center directors who did not respond to the initial request. At the beginning of April, the author (DS) phoned the centers that had not responded to the two mailings. During the mailing and telephone phases, it was determined that 55 centers did not meet the eligibility requirements, leaving the final population under study at 1265 centers. A total of 344 centers eventually agreed to participate in the study, of which 322 provided useable data for analysis.

Of these 322 childcare centers, 28 were determined to meet the criteria for state-funded as set forth by Nadel *et al.*^[14] who defined a childcare center as state-funded if at least 66% of children are reported to receive some form of subsidies. In this study, Wisconsin Shares^[19] was the subsidy program of interest.

In our data analysis, IBM SPSS Statistics 21 was used. Initially, we used descriptive statistics to determine the demographics of each study group. In addition, descriptive statistics were used to determine the percentage of centers from each group that had any of the four oral health practices. Chi-square was used to determine whether there was an association between funding status, state-funded or non-state-funded, and the four oral health practices. Chi-square was also used to analyze the association between the four oral health practices and the mediating variables: Profit status, center location, center affiliation, years of operation, licensed capacity, and child to staff ratio. In addition, Chi-square was applied to determine whether there was an association between any of the mediating variables. For those practices that were found to be significantly

associated with funding status, logistic regression analysis was used to determine an odds ratio (OR). Included in the logistic regression model were those mediating variables found to be associated in the Chi-square analysis for that particular practice.

RESULTS

Table 1 provides the descriptive statistics for both state-funded and non-state-funded childcare centers. Half of both state-funded and non-state-funded types of centers reported having a nonprofit status. All of the state-funded centers and a majority of non-state-funded

centers (84%) were classified as being in an urban area. The most often reported years of operation by both state-funded and non-state-funded were 21 years or greater (25% and 34%, respectively) and 6–10 years (25% and 17%, respectively). The most often reported licensed capacity by both state-funded and non-state-funded centers was 51–100 children (54% and 43%, respectively). The proportion of state-funded centers employing more than the required staff to child ratio was 79%, while for non-state-funded centers it was 66%. A majority of the state-funded centers (68%) reported being independent, with the second most common answer (11%) being part of a national chain. A majority (58%) of the non-state-funded centers also reported being independent, but the second most common answer was church-based (20%).

Table 1: State-funded and non-state-funded childcare centers - characteristics (percentage in parentheses)

	State-funded centers n (%) =28	Non-state-funded centers n (%) =294
Profit status		
Nonprofit	14 (50)	149 (51)
For-profit	13 (46)	144 (49)
Not reported	1 (4)	1 (0)
Center location		
Urban	28 (100)	247 (84)
Rural	0 (0)	36 (12)
Unable to determine	0 (0)	11 (4)
Years of operation		
0-5	5 (18)	47 (16)
6-10	7 (25)	51 (17)
11-15	2 (7)	36 (12)
16-20	6 (21)	47 (16)
21 or greater	7 (25)	101 (34)
Not reported	1 (4)	12 (4)
Licensed capacity		
0-50	7 (25)	112 (38)
51-100	15 (54)	125 (43)
101-150	5 (18)	38 (13)
151-200	1 (4)	12 (4)
201 and greater	0 (0)	7 (2)
Above staff to child ratio		
Yes	21 (79)	193 (66)
No	5 (18)	98 (33)
Not reported	1 (4)	3 (1)
Center affiliation		
Church-based	2 (7)	59 (20)
Hospital-based	0 (0)	6 (2)
College/university	1 (4)	14 (5)
Worksite-based	0 (0)	4 (1)
Local chain	2 (7)	13 (4)
National chain	3 (11)	15 (5)
Independent	19 (68)	169 (58)
Other	1 (4)	11 (4)
Not reported	0 (0)	3 (1)

The number and percentage of centers having any oral health practice, tooth brushing as a routine classroom activity, education, screening and referral, and dental emergencies are provided in Table 2. A greater percentage of the state-funded centers reported tooth brushing as a routine classroom activity. However, a greater percentage of the non-state-funded centers reported having any of the four oral health practices and an educational practice related to oral health. Both state-funded and non-state-funded centers had similar percentages of any screening and referral practices as well as any practice related to dental emergencies. Bivariate analysis and Chi-square revealed a weak but significant association ($P = 0.03$, Cramer's $V = 0.13$) between funding status and having any oral health practice. Chi-square analysis also revealed a moderate significant association ($P = 0.00$, Cramer's $V = 0.27$) between funding status and tooth brushing as a routine classroom activity, as well as a moderate significant association ($P = 0.01$, Cramer's $V = 0.20$) between funding status and having any educational practice related to oral health. No significant association was found between state-funded or not and having any screening and referral practice ($P = 0.12$) or any practice related to dental emergencies ($P = 1.0$).

Prior research has indicated several mediating variables which must be accounted for in studies of childcare centers. They are profit status,^[9,14,20] center location,^[13-15] years of operation,^[21] and child to staff ratio.^[13,21,22] Other variables which may account for variations in center practices are licensed capacity and center affiliation.

Chi-square was used to determine whether there was an association between any of the four oral health practices and the mediating variables. The only mediating variable found to be associated was years of operation ($P = 0.02$, Cramer's $V = 0.20$), and this was included in the logistic

regression model. For any oral health practice related to tooth brushing as a routine classroom activity and the mediating variables, years of operation ($P = 0.08$, Cramer's $V = 0.14$) and center affiliation ($P = 0.06$, Cramer's $V = 0.18$) were trending toward significant. These were included in the logistic regression model, as authors have argued that a cut-off point of $P < 0.05$ may not be appropriate, more so $0.05 < P < 0.10$.^[23] For any educational practice related to oral health and the mediating variables, years of operation ($P = 0.00$, Cramer's $V = 0.20$), capacity ($P = 0.03$, Cramer's $V = 0.13$), location ($P = 0.08$, Cramer's $V = 0.12$), and center affiliation ($P = 0.00$, Cramer's $V = 0.22$) were all associated. However, bivariate analysis revealed an association between years of operation with capacity and affiliation. In addition to years of operation, capacity was also associated with location. Affiliation was associated with all of them. Years of operation had the strongest association with education; therefore, it was selected as the mediating variable. Since location was not associated with years of operation, it was also included in this model.

Logistic regression analysis was conducted to determine the OR between funding status and having any oral health practice, funding status and tooth brushing as a routine classroom activity, and funding status and any educational practice related to oral health. Results of this analysis have been presented in Table 3. For being non-state-funded and having any oral health practice, the model included the mediating variable, years of operation. The reported OR was 3.01 [95% confidence interval (CI): 1.23, 7.41]

Table 2: Oral health practices in Wisconsin childcare centers according to the type of center

Variable	Centers	Percentage
State-funded childcare centers (n=28)		
Any oral health practices	19	68
Tooth brushing as a routine classroom activity	13	46
Any educational practice related to oral health	11	39
Any screening and referral practice related to oral health	1	4
Any practice related to dental emergencies	4	14
Non-state-funded childcare centers (n=294)		
Any oral health practices	249	85
Tooth brushing as a routine classroom activity	63	21
Any educational practice related to oral health	162	55
Any screening and referral practice related to oral health	4	1
Any practice related to dental emergencies	49	17

with a corresponding $P = 0.02$. Thus, non-state-funded centers are three times more likely to have any oral health practice, when compared to state-funded centers.

For being state-funded and having tooth brushing as a routine classroom activity, the reported OR was 5.09 (95% CI: 1.99, 13.06) with a corresponding $P = 0.00$.

Table 3: Logistic regression analysis of factors potentially affecting oral health practices according to the childcare center

	95% CI			P
	Odds ratio	Lower	Upper	
Any oral health practice				
State-funded				
Yes (reference)	N/A	N/A	N/A	N/A
No	3.01	1.23	7.41	0.02
Years of operation				
0-5 (reference)	N/A	N/A	N/A	0.03
6-10	0.40	0.18	0.89	0.03
11-15	0.90	0.38	2.17	0.82
16-20	2.01	0.55	7.37	0.29
21 or greater	1.81	0.62	5.33	0.28
Tooth brushing practice				
State-funded				
No (reference)	N/A	N/A	N/A	N/A
Yes	5.09	1.99	13.06	0.00
Years of operation				
0-5 (reference)	N/A	N/A	N/A	0.15
6-10	2.27	0.98	5.29	0.06
11-15	1.21	0.49	2.95	0.68
16-20	1.32	0.48	3.67	0.59
21 or greater	2.42	1.07	5.44	0.03
Affiliation				
Church-based (reference)	N/A	N/A	N/A	0.53
Hospital-based	5.19	0.87	30.94	0.07
College/university	2.70	0.68	10.77	0.16
Worksite-based	0.00	0.00	N/A	1.00
Local chain	1.43	0.34	6.03	0.63
National chain	0.00	0.00	N/A	1.00
Independent	1.16	0.54	2.48	0.70
Other	0.28	0.03	2.54	0.26
Don't know/prefer not to answer	3.62	0.19	67.38	0.39
Educational practice				
State-funded				
Yes (reference)	N/A	N/A	N/A	N/A
No	5.18	2.17	12.50	0.00
Years of operation				
0-5 (reference)	N/A	N/A	N/A	0.00
6-10	0.20	0.10	0.44	0.00
11-15	0.57	0.26	1.25	0.16
16-20	1.33	0.45	3.96	0.61
21 or greater	0.78	0.34	1.81	0.57

CI=Confidence interval

This means that state-funded childcare centers were five times more likely to have tooth brushing as a routine classroom activity, when compared to non-state-funded centers. For being non-state-funded and having any educational practice related to oral health, the reported OR was 5.18 (95% CI: 2.17, 12.50) with a corresponding $P = 0.00$. Thus, non-state-funded centers are five times more likely to have any educational practice related to oral health, when compared to state-funded centers. Logistic regression was not done on having any screening and referral practice related to oral health or having any practice related to dental emergencies, as no association was found in the bivariate analysis.

DISCUSSION

The purpose of this quantitative study was to explore the relationship between state-funded childcare centers, as measured by the percentage of children utilizing the state subsidy program Wisconsin Shares,^[19] and the oral health practices of these childcare centers. State-funded centers were more likely to have tooth brushing as a routine classroom activity with an OR of 5.09 (95% CI: 1.99, 13.06). However, non-state-funded centers were more likely to have any oral health practice (OR: 3.01, 95% CI: 1.99, 13.06) and any educational practice related to oral health (OR: 5.18, 95% CI: 2.17, 12.50). These results support the hypothesis that there are differences in the oral health practices of childcare centers that primarily serve children of lower SES.

This is in disagreement with the results of Gartsbein *et al.*^[17] To the best of our knowledge, only Gartsbein *et al.* investigated SES in relation to oral health policies and practices, as far as US and Canadian childcare centers are concerned. Gartsbein *et al.* found that the income level of the neighborhood in which the center is located was not associated with the oral health policies and practices of that center. On this basis, the authors maintained that SES was not associated with oral health policies and practices. The conflicting results could be explained by the method in which the SES status of the childcare center was determined. Gartsbein *et al.* used an indirect method; evaluating the SES status of the neighborhood and not the specific center. It is possible that a center located in a lower-income neighborhood would not fit this study's criterion of being state-funded. Furthermore, Gartsbein *et al.* looked at one large city, Toronto, whereas this study evaluated an entire state. In addition, the sample population was different, which may also explain the conflicting results.

The most recent US NHANES to address oral health in children revealed that 28% of children aged 2–5 had ECC, with the major burden falling on children living

in lower SES environments.^[3] The prevalence of ECC has increased by 15% in a 10-year time frame. Childcare centers serving lower-income children are less likely to have any one of the four oral health practices as well as any educational practice related to oral health. Oral health education of preschool children has been found to improve the oral hygiene habits of both the children receiving the education and their parents.^[24]

Bivariate analysis for having any screening and referral practice and having a practice related to dental emergencies did not reveal any significant association between the funding status and either practice. Among state-funded centers, seven had a screening practice and three had a referral practice, but only one had both. Among non-state-funded centers, 29 had a screening practice and 17 had a referral practice, but only 4 had both. This is an important finding considering that 31% of children aged 2–4 did not have a preventative dental visit in 2010.^[25] Kenney *et al.*^[26] found that 32% of children living in environments of <100% federal poverty level (the income level at which the US government determines what a household requires to meet its basic needs) did not have a preventative dental visit in the previous year.

A nonsignificant finding for dental emergencies is explained by the similar percentage of centers in each group having this practice: For state-funded, it was 14% and for non-state-funded, it was 17%. This low percentage is disconcerting considering that in this study, 60% of directors reported that at least one child in the previous year had an oral injury while receiving care at their center. Andersson^[27] reported that of all injuries in children, 17% are oral injuries. Flores *et al.*^[28] indicated that proper care of the injury influences the outcome. Thus, without a formal practice, prompt proper care may not be obtained.

Interestingly, state-funded centers were more likely to have tooth brushing as a routine classroom activity. It is unclear as to whether this would remain true if there was a larger state-funded sample size, and this was a limitation to this study. Another limitation was the study design itself, which was cross-sectional. Cross-sectional studies only look at one point in time and the ability to assert casual inference is difficult. However, addressing mediating variables identified in the literature did decrease the possibility of other factors influencing the dependent variable. Of the 1265 eligible centers contacted, 322 provided useable data, giving a response rate of 25%. Non-response bias may impact this study.

CONCLUSION

Despite the limitations, this study revealed that there was a difference in some oral health practices

between those centers serving low SES children and those serving higher SES children. More specifically, non-state-funded centers were more likely to have some kind of oral health practice and to provide oral health education. However, state-funded centers were more likely to have tooth brushing as a routine classroom activity. Policy makers are encouraged to consider drafting advance legislation that would require childcare centers, especially those serving children living in low SES environments, to have comprehensive oral health practices. In the absence of legislation, childcare centers should consider voluntarily implementing comprehensive oral health practices to improve the oral health status of children attending childcare centers.

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Conflicts of interest

There are no conflicts of interest.

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