

AT-HOME CHILDCARE PROVIDERS' PERCEPTIONS OF GARDENING WITH
CHILDREN

by

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Bachelor of Science, University of North Dakota, 2018

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for degree of

Master of Science

Grand Forks, North Dakota

August
2020

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ACKNOWLEDGEMENTS

I would like to acknowledge and thank my advisor, Dr. Desiree Tande, for her expert guidance, unceasing encouragement, and rock-solid support toward assisting me with completing this work. I also wish to express my sincere appreciation to the rest of my thesis committee, Dr. Anne Bodensteiner and Dr. Tanis Walch, for their guidance, knowledge, and input during this process.

The support and partnership of staff at Grand Forks Public Health, NDSU Extension – Grand Forks County, and Child Care Aware[®] of North Dakota was key to the success of this work.

Finally, thank you to all the faculty and staff at the Nutrition and Dietetics department at the University of North Dakota for providing knowledge, counsel, and opportunities to grow as an undergraduate and graduate student.

DEDICATION

To my family for their support and inspiration. Growing up on a farm provided the most wonderful backdrop for living, learning, gardening, cooking, and eating, for which I am eternally grateful.

ABSTRACT

Children do not consume recommended amounts of fruits and vegetables, which has been correlated with negative health consequences. Gardening with children has been shown to positively impact children's consumption of these foods. While research investigating gardening with children exists, much of this has been conducted with teachers and children in schools, and limited research has been conducted with childcare providers and preschool-aged children. Little research has been conducted about this topic with in-home childcare providers and the children under their care. This pilot study utilized a cross-sectional mixed methods research design through an online survey instrument. A convenience sample of in-home childcare providers were invited to complete the survey, which questioned participants knowledge, attitudes (perceptions), and practices (behaviors) surrounding gardening with children. In-home childcare providers noted more benefits than barriers to gardening with children. Reported benefits included role modeling, introducing new foods, increased willingness to eat fruits and vegetables, teaching children where food comes from, bonding with children, offering sensory experiences, sharing the gardening experience with children's families, and improved communication. Reported significant barriers were gardening knowledge deficit and grants or funding for kid-sized tools and garden supplies. Providing gardening resources and education is important for in-home childcare provider site gardens to be successfully implemented and sustained.

Keywords: gardening, childcare, perceptions and attitudes, chronic disease management

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CHAPTER 1: INTRODUCTION

Background

While there are numerous health benefits from consuming fruits and vegetables, which contain vitamins, minerals, fiber, and phytonutrients important for growth and maintenance of body functions, children are not consuming adequate amounts in their daily diet. By providing increased exposure to and easier access to fruits and vegetables, adults can help children to improve their consumption. State and local agencies can play an important role in the public's health by providing gardening training and resources to in-home childcare providers, who serve as key care providers and role models for children. The purpose of this study is to explore the perceptions of in-home childcare providers surrounding the benefits and barriers to gardening with young children under their care.

Statement of the Problem or Significance of the Problem

Children who get less than 30 minutes per day of moderate activity should be consuming 1 to 2 cups of fruit and 1 to 3 cups of vegetables depending on their age, sex, and physical activity level; children who are more physically active may need a greater amount (USDA, 2020a; USDA, 2020b). However, a significant proportion of children are not consuming the recommended amounts. Of children aged 1-3 years, 23.9% of males and 25% of females are not consuming the recommended amount of fruit and 85.0% of males and 85.2% of females are not consuming the recommended amount of vegetables (NCI, 2020). The percentages of children consuming fewer fruit and vegetable serving recommendations increases as age increases. Of high school students nationwide, 8.5% met fruit recommendations and 2.1% met vegetable

recommendations (Moore, Thompson, & Demissie, 2017). Improving fruit and vegetable consumption will provide immediate health benefits for children, such as the addition of under consumed nutrients to their diets, and reduce the incidence of chronic disease experienced later in life, such as cardiovascular disease, hypertension, type 2 diabetes, and some cancers (USDHHS & USDA, 2015). Since eating habits formed in childhood are likely to track into adulthood, it is beneficial to help young children to learn about and develop preferences for fruits and vegetables through positive, low-pressure experiences, such as gardening (Due, et al., 2011). To generate a healthful food environment, fruits and vegetables need to be accessible and affordable. Low financial status and low education levels are barriers to vegetable consumption, particularly for households with incomes below 185% of the poverty level (Lin & Mentzer Morrison, 2016). Childcare providers are positioned to provide children with repeated exposures to fruits and vegetables that they may not receive at home. By providing gardening resources and education, state and local organizations can help to eliminate financial and knowledge roadblocks that may be hindering childcare providers from providing healthful food environments for children.

Purpose and Research Questions

The goal of this study was addressed through the following aims: 1) to identify childcare providers' perceived benefits to establishing a home garden, 2) to identify child care providers' perceived barriers to establishing a home garden, and 3) to determine gaps in current research on effective methods of training in-home childcare providers in home gardening.

CHAPTER 2: REVIEW OF LITERATURE

Introduction

The following information introduces the community in which the study was completed as well as identified issues. Demographically, Grand Forks' racial distribution is predominantly white (86.9%) with smaller percent of African American (3.7%), American Indian (2.9%), Asian (3.0%), and Hispanic or Latino (3.6%) (United States Census Bureau, 2017). Grand Forks County has a higher number of families and children in poverty than the state average and the median household income and per capita income is also lower than the state average (Miller & Pinks, 2018). Higher rates of poverty and low-economic status are deterrents to consumption of health-promoting foods, such as fruits and vegetables (Lin et al., 2016). In 2016, the food insecurity rate in Grand Forks County was 10.4% overall and 10.9% for children (Feeding America, 2016). Efforts to increase consumption are important, as current research has established that children do not consume the recommended amount of these foods.

The percent of children aged 1-3 years with fruit intakes below recommendations is 25% for females and 23.9% for males; this increases for vegetables with 85.2% of females and 85.0% of males not meeting minimum recommendations (NCI, 2020). For children aged 4-8 years, 41.5% of females and 39.6% of males do not reach fruit recommendations, while 94.8% of females and 94.5% of males do not reach vegetable intake recommendations (NCI, 2020). State estimates for North Dakota find 5.5% of high school students are consuming the recommended amount of fruit and 1.0% are consuming the recommended amount of vegetables (Moore et al., 2017). Instilling healthful nutrition habits must be encouraged early in life since fruit and

vegetable consumption is believed to promote a healthy weight and reduce chronic disease later in life.

Top behavioral concerns in Grand Forks County include ischemic heart disease, cerebrovascular disease, diabetes, and obesity; of these, obesity (males and females), diabetes (males), and cerebrovascular disease (males) is higher than the state and national average (Institute for Health Metrics and Evaluation, 2016). Obesity has been identified as one of the top concerns in the Community Health Profile and establishing community gardens is one of the implementation activities listed in the plan for reducing the rates of obesity in adults and children (Grand Forks Public Health & Altru Health System, 2017). Although there are community gardens located in Grand Forks, implementing manageable, square-foot gardens at childcare sites will allow a greater number of children to experience the benefits and rewards of gardening. Due to the identified income disparities, it is important to provide easy access to gardening and encourage interactive learning experiences with vegetables. One avenue to promote vegetable consumption for those at nutritional risk is the Farm to Childcare program which provides in-home childcare providers an economically feasible option to grow vegetables at their childcare site.

The Farm to Childcare program, administered through the partner agencies of Grand Forks Public Health and NDSU Extension of Grand Forks County, is an example of a program created to address the rates of chronic disease in Grand Forks County. It is a community-based program that supplies childcare providers with a 3 x 3 square-foot wooden garden box, soil, seeds, plants, and a children's story book titled *Eating the Alphabet* by Lois Ehlert. The providers are also given a gardening planning guide, educational materials, and an assigned Gardening Coach who follows up monthly from May through August. Giving childcare

providers these tools and support through the growing season allows them to learn skills so they can continue growing fresh produce with the children. The main goal of the Farm to Childcare program is to increase children's consumption of vegetables, which has been correlated with decreased rates of chronic diseases. The target population for the program are in-home childcare providers in Grand Forks, since supporting the childcare providers may increase self-efficacy and the likelihood of gardening with young children under their care in future seasons.

Many studies have targeted school-aged children, but less have looked at preschool-aged children and fewer yet have studied in-home childcare providers. Nationally, 61% of children attend some type of childcare regularly, with 7.6% of preschoolers receiving childcare in a non-relative provider's home (Laughlin, 2013). In 2019 in the state of North Dakota, 70.7% of children aged 0-5 had all parents in the labor force, meaning 45,377 children aged 0-5 potentially needed child care due to parents in the workforce (Child Care Aware of North Dakota, 2019a). In 2019 in Grand Forks County, 74.9% of children aged 0-5 had all parents in the labor force meaning 4,277 children aged 0-5 potentially needed childcare (Child Care Aware of North Dakota, 2019b). These statistics demonstrate that a large percentage of young children are under the care of providers other than their parents or primary caretakers. Research has shown that a garden-based intervention increased preschooler vegetable and fruit intake in a childcare center setting (Namenek Brouwer & Benjamin Neelon, 2013). There is a need to understand childcare provider perceptions of the benefits and barriers of implementing gardens at their in-home childcare sites before employing the most successfully impactful and wide-reaching gardening programming that will increase fruit and vegetable intake among preschool-aged children to improve their health and reduce their risk of chronic disease.

Summary of Literature

The following review included research studies that included teacher or childcare provider perceptions of gardening with children. From the articles analyzed (n=14), there were a mix of quantitative (n=1), qualitative (n=9), and mixed methodology (n=4). Article types can be defined as preschool/childcare center (n=3), childcare/teacher mix (n=1), primary school (n=3), elementary school (n=3), middle school (n=1), and school-wide (preschool through 12th grade; n=3). The tables below outline common themes identified through current research and have been divided into nutrition-related benefits, non-nutrition-related benefits, and barriers to gardening with children.

Table 2.1

Nutrition-Related Benefits of Gardening Identified in the Studies

NUTRITION-RELATED BENEFITS	STUDY
Encouraging healthy eating habits	(Ahmen et al., 2011; Dawson et al., 2013; Greer et al., 2019; McMillen et al., 2019)
Increased access to and interest in fruits and vegetables	(Wright et al., 2013)
Exposure to fruits and vegetables / widening food preferences	(Davis & Brann, 2017; Huys, et al., 2017; McMillen et al., 2019)
Increased willingness to try fruits and vegetables	(Davis & Brann, 2017; Huys, et al., 2017; Kupolati, et al., 2015)
Gardens provide food that children consume onsite	(Davis & Brann, 2017; Wright, et al., 2013)
Extra food is sent home with children	(Wright et al., 2013)
Gardening with children at the school teaches them how to grow their own garden at home	(Kupolati et al., 2015)
Increased understanding of where food comes from	(Davis & Brann, 2017; McMillen et al., 2019)

Table 2.2

Non-Nutrition-Related Benefits of Gardening Identified in the Studies

NON-NUTRITION-RELATED BENEFITS	STUDY
Physical activity	(Ahmen et al., 2011; Davis & Brann, 2017; Dawson et al., 2013; Greer et al., 2019; McMillen et al., 2019; Passy, 2014)
Sensory experiences (touching, smelling, etc.)	(Davis & Brann, 2017)
Connection to the natural environment	(Davis & Brann, 2017; Dawson et al., 2013)
Connection to local customs	(Ahmen et al., 2011)
Sharing the garden experience with children’s families	(Davis & Brann, 2017; Dawson et al., 2013; McMillen et al., 2019)
Improved communication	(Dawson et al., 2013; Passy, 2014)
Children learn responsibility	(Dawson et al., 2013)
Teachers can teach many subjects and ideas in one space	(Ahmen et al., 2011; Feille, 2013; Jaeschke et al., 2012 McMillen et al., 2019; Passy, 2014; Wright et al., 2013)

Benefits of Gardening with Children

Childcare providers in a center felt that fruit and vegetable consumption was very important for young children because it provided them with important nutrients such as vitamins, minerals, variety in the diet, promoted independence in eating, and promoted digestive health (Davis & Brann, 2017). Regarding consumption, one provider noted that “younger children don’t have preconceived notions of what it might taste like”, “they just tend to try it. Just exposure is a

big things. Just continuously exposing it, sometimes doing it a little differently” (Davis & Brann, 2017, p. 3). Nutrition-related benefits to gardening in the childcare setting included gardens providing healthy food for consumption at the childcare facility, increasing exposure to and willingness to try F/V among children, and increased knowledge about food and where it comes from (Davis & Brann, 2017). Non-nutrition-related benefits that were discussed included encouragement of physical activity, gardens encouraged a connection to the natural environment, providing enjoyment for children (such as sensory experiences), incorporating gardening activities into other areas of learning, teaching responsibility, and sharing the gardening experiences with the families of the children (Davis & Brann, 2017).

Respondents from Early Childhood Education Services (Australia) linked wellbeing (encouraging healthy eating habits, self-help, self-care, caring for the environment), belonging (teamwork, ownership/purpose, connectedness to the earth and school), contribution (ideas, plants, tending to the garden, producing food for themselves and classmates, caring for the environment, learning alongside classmates), communication (verbal and non-verbal), and exploration (making sense of the world and developing working theories, trying new fruits or vegetables, exploring soil, plants, and insects, observing growth and life cycles, noticing and describing happenings, learning fine and gross motor skills, and gaining confidence and control of their bodies) to gardening (Dawson, Richards, Collins, Reeder, & Gray, 2013). Some respondents thought the garden reinforced their school’s support of environmental sustainability, enhanced strong links between home/community and the school, and encouraged healthy eating (Dawson et al., 2013).

Head Start teachers identified benefits of gardens being that children could safely explore and teach one another (sharing, cooperation, working together), teachers could teach many

subjects and ideas in one space, and students could experience the joy of physical activity (McMillen, Swick, Frazier, Bishop, & Goodell, 2019). Teachers also mentioned that they could incorporate nutrition education and where vegetables come from, and anecdotally some students had tried vegetables that they have been previously unwilling to consume due to this increased exposure to fruits and vegetables widening their food preferences (McMillen et al., 2019).

A survey of childcare providers and teachers showed that 64% of respondents rated the garden as very effective or extremely effective in increasing access to fruits and vegetables and 76% thought that the gardens were very effective or extremely effective in increasing children's interest in fruits and vegetables (Wright, Friese, Carrel, & Meinen, 2013). Participants integrated the garden into their lesson plans about science, nutrition education, health, math, language, art, and social science, and they used the produce to cook meals for the children, used produce as snacks for children and as part of lesson plans, and also sent extra produce home with children (Wright et al., 2013).

Primary school teachers perceived some effects on knowledge about vegetables among children who worked with the school garden and that it was a potential means for some children to have a first introduction with vegetables (Huys, et al., 2017). Teachers viewed children's attitudes towards vegetables as improved because more children were willing to taste them when they had grown them themselves. Primary school teachers viewed the development of school vegetable gardens positively because when children participated in vegetable gardening, they were happy to eat the food prepared with the vegetables from the garden (Kupolati, Gericke, & MacIntyre, 2015). They also thought that students should be given the "chance to learn about vegetable gardening at school so that they could practice at home, plant their own vegetables, and eat them (Kupolati et al., 2015, p.6). Primary school teachers reported that the garden

allowed the students to undertake their own investigations or to experience things that they only learned in the abstract in the classroom, for example growing sunflowers rather than painting them (Passy, 2014). The teachers were able to link math, science, and literacy projects to the garden (Passy, 2014). They noted students, including those with behavioral issues in the classroom, had more meaningful interactions with peers outside during gardening activities and that many students had formed new friendships that they may not have within the more structured classroom setting (Passy, 2014).

Elementary school teachers discussed the benefits of their school garden being experiential learning (hands-on experience), opportunities for lower income students (safe outside play time, healthy food), cultural relevance, and students “loving it” (Greer, Rainville, Knausenberger, & Sandolo, 2019). The school had a garden club where students from a variety of grades could attend an after-school meeting to complete garden activities led by a teacher sponsor (Greer et al., 2019). Elementary teachers remembered their initial excitement of wanting to utilize the school garden and they valued the skills that the students learned as they used the garden (Feille, 2013). These teachers hoped that when their colleagues saw how successful they had been at going outside and implementing the garden into their curriculum, they would want to follow suit (Feille, 2013). Follow-up studies were not conducted to determine if teachers who successfully implemented gardening into their class inspired other teachers to begin this practice.

The results found from elementary school teachers aligned with the benefits perceived by middle school teachers. Teachers of middle school children identified the benefits of school-based gardening as improved diet and physical activity, an extension of the classroom, nutrition and health education, experiential education, catalyst for gradual change of cultural norms around food cultivation and consumption, demonstrated connections between academic subjects

and real-world applications, promoted social skills, and provided connections to local cultural traditions (Ahmed, Oshiro, Loharuka, & Novotny, 2011).

A group of preschool to twelfth grade teachers identified their garden as being primarily beneficial for teaching subjects, such as nutrition, science, environmental studies, and math (Jaeschke, Schumacher, Cullen, & Wilson, 2012).

Regardless of children's age, childcare providers and teachers report many benefits to gardening with them. Nutrition-related benefits reported through multiple studies included encouraging healthy eating habits, increased access to and interest in fruits and vegetables, exposure to fruits and vegetables and widening food preferences, increased willingness to try fruits and vegetables, increased understanding of where food comes from, and gardens providing food for children to consume onsite. Non-nutrition related benefits reported by multiple studies include physical activity, connection to the natural environment, improved communication, children sharing the gardening experience with their families, and teachers' ability to teach many subjects and ideas in one space. These studies of teachers and childcare providers did not include research specific to in-home childcare providers. While there are numerous benefits to gardening, there are also challenges that arise.

Barriers to Gardening with Children

Table 2.3 below summarizes common themes of barriers to gardening with children that have been identified through current research.

Table 2.3*Barriers to Gardening Identified in the Studies*

BARRIERS	STUDY
Lack of time	(Ahmen et al., 2011; Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Feille, 2013; Graves et al., 2016; Greer et al., 2019; Jaeschke et al., 2012; Passy, 2014; Wright et al., 2013)
Gardening knowledge deficit	(Davis & Brann, 2017; Graves et al., 2016; Greer et al., 2019; Jaeschke et al., 2012; McMillen et al., 2019; Wright et al., 2013)
Lack of financial support	(Burk et al., 2019; Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Greer et al., 2019; McMillen et al., 2019; Wright et al., 2013)
Lack of curriculum, especially one that ties the garden to the high-stakes testing requirements	(Ahmen et al., 2011; Burt et al., 2018; Davis & Brann, 2017; Feille, 2013; Greer et al., 2019)
Lack of volunteer, parent, staff or administration support	(Burk et al., 2019; Davis & Brann, 2017; Dawson et al., 2013; McMillen et al., 2019; Wright et al., 2013)
Lack of staff/teacher participation and/or staff turnover	(Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Wright et al., 2013)
Lack of space for a garden	(Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Wright et al., 2013)
School programming takes a break in the summer	(Greer et al., 2019; McMillen et al., 2019)

Common challenges for childcare providers included lack of resources such as curriculum, knowledge, financial support, and volunteer support, lack of staff support or participation, lack of time for gardening activities, and environmental challenges such as weather, pest issues, and low garden yield (Davis & Brann, 2017). Although childcare settings may be diverse between urban and semi-rural settings, few childcare providers reported having no space for gardening (Davis & Brann, 2017). While some childcare sites may have been

awarded grant funding for gardening, others may not know about funds for childcare providers and want to learn more (Davis & Brann, 2017). Some providers may have no gardening tools or may have tools for older children or adults, but not tools appropriately sized for young children (Davis & Brann, 2017). Childcare providers who had no gardening program noted that lack of funding, time, and space for the garden were the factors preventing them from establishing one (Davis & Brann, 2017). Respondents from Early Childhood Education Services (Australia) who did not currently have a garden identified barriers of garden initiation as a lack of funding, space, staff turnover, time, and needing staff support (Dawson et al., 2013). These studies looking at childcare centers did not include research surrounding the effectiveness of existing gardening training methods for the providers.

Head Start teachers identified barriers as teacher's comfort level with gardening knowledge (teacher knowledge and skills related to gardening), administrative support (financial resources; supplies to create preschool garden spaces, child sized tools, and general supplies to set up various centers to encourage exploration and discovery; parent or community volunteers to help with the workload), and safety (allergy-free, plant safety knowledge, e.g. what to do if a child ate a potato plant leaf) (McMillen et al, 2019). This study with Head Start teachers did not identify the effectiveness of gardening training methods for the teachers at the center. Another barrier for Head Start is that if the program ends in June, the children may miss the end of the growing cycle for certain vegetables (McMillen et al., 2019).

A survey of childcare providers from facilities and school teachers showed that barriers to starting a garden were time, lack of funding, lack of support from administrators/directors, lack of space for a garden, lack of assistance from teachers or providers, lack of support or assistance from parents, and lack of gardening knowledge (Wright et al., 2013). Participants in

this study completed a gardening training workshop. One web-based follow-up was completed with the majority of respondents indicating that they planned to continue their educational-setting gardens (Wright et al., 2013).

Primary school teachers in Belgium thought children were more willing to try vegetables but did not expect a long-term change in the vegetable consumption pattern of the children, primarily because parents were not involved in gardening but also because children did not know the importance of eating vegetables, did not use the school garden long enough, did not spend enough time in the school garden, and did not consume enough vegetables because of the low harvest (Huys, et al., 2017). Repeat exposures have been found to positively affect the willingness of children to try foods that they dislike (Chung & Fong, 2018) and children's preferences may carry on into adolescence and adulthood (Northstone & Emmett, 2008), however, follow-up studies did not occur to see if these children willingly consumed garden produce in subsequent growing seasons. In England, primary school teachers concern about gardening was the hard work: the physical labor of gardening, planning lessons around gardening, encouraging children, volunteers, and parents to engage with the garden – all of which require considerable time and energy (Passy, 2014).

Elementary school teachers discussed a barrier of their school garden being summer maintenance, as no children or parents are there regularly and volunteers may not be reliable (Greer et al., 2019). Another barrier is an emphasis on student testing scores and preparing students for the tests, which detracts from non-essential programming like school gardening (Greer et al., 2019). Teachers mentioned that assistance to develop their gardening skills was needed (when and how to water, how to plan garden layouts for small spaces, what types of plants to plant where, and how to treat diseases in garden plots), as well as lesson plans (a series

of school garden lesson plans that are tied to the curriculum), and garden donations (seeds, plants, soil, wood, free labor, etc.) (Greer et al., 2019). Elementary teachers not having enough time during their class period was a barrier, as was having a curriculum that connected content to the garden when high stakes testing requirements need to be met (Feille, 2013). They had to work hard initially and be creative to move lessons outside into the garden and depending on the teacher and the subject, the garden could be seen as a supportive tool or a barrier (Feille, 2013). Elementary school teachers in a STEM school saw barriers to incorporating gardening into their classrooms being time (plants take time to grow and time is very limited), managing the classroom (students may or may not be interested and teachers may have little experience with gardening and plant biology), and low levels of confidence with gardening (Graves, Hughes, & Balgopal, 2016).

One study focused specifically on middle school teachers (Ahmed et al., 2011). They identified a lack of time, requiring kids to be sitting down to be learning, and needing to “teach to the tests” as a barrier to utilizing their school gardens (Ahmed et al., 2011). Some of these results are consistent with studies examining primary and elementary schools, while the requirement to be seated to learn may be unique to this age-group and their teachers. More research with middle school teachers is needed to corroborate these results.

Research examining the use of gardens for education has included childcare providers and teachers from preschool through secondary school. Preschool to twelfth grade teachers identified time and training as barriers to gardening success (Jaeschke et al., 2012). In another school-wide survey, the most significant barriers listed in order of importance were time (class time, staff training time), staff (no volunteers, staff disinterest), funding (lack of funding, unawareness of funding sources, poor allocation of funding), curriculum (teachers not supporting

curriculum across-the-board while other teachers jumped right-in, garden integration into school curriculum design), and space (lack of space for gardening, water access, tool storage, garden care during summer season while school is not in session) (Burt, Luesse, Rakoff, Ventura, & Burgermaster, 2018). In a nationwide survey of schools, participants (the greatest proportion being teachers) reported the single greatest barrier to success was not time, but rather, a lack of funding but when barriers were grouped by domain, school community interest and volunteers were most commonly reported (Burk, Lindel, Wang, Burgermaster, & Fera, 2019). Rural regions also had a negative impact on success score as compared with being located in an urban area but, positively, race/ethnicity was not related to garden success (Burk et al., 2019).

The barriers most frequently reported by childcare providers and teachers include lack of time, gardening knowledge deficit, lack of financial support, lack of curriculum, lack of volunteer support, lack of staff participation or staff turnover, lack of space, and no school in the summer during the growing season. Barriers have not been identified for in-home childcare providers. It is important to address these barriers for childcare providers and teachers to successfully implement a gardening program for children.

Discussion

These findings show that providers recognize the importance of gardening with young children. Childcare providers felt that increasing children's exposure to fruits and vegetables had a plethora of nutrition-related and non-nutrition-related benefits. They reported that gardening with children helped to instill and strengthen healthy eating habits. While childcare providers may be offering the mandated servings of fruits and vegetables (as recommended by the Child and Adult Care Food Program nutrition guidelines), children are not choosing to eat all that they are offered. Gardening with children may help to increase the amount of fruits and vegetables

tried or consumed from those that providers are offering. Excess produce may be sent home with children, potentially improving the diet of the children's families. In addition, as children learn about gardening and where food comes from, they may be excited to tell their family about what they have learned. In this way, gardening with children positively impacts a greater number of people. Gardening with children is beneficial to their physical and mental health, as it encourages physical activity and teaches them about local customs and responsibility for living things. Gardening also allows children to have sensory experiences, to practice their fine motor skills, and to improve communication skills as they explore the natural environment. While the benefits of gardening with children are many, there are barriers that need to be addressed for garden programs to remain feasible.

Of the barriers commonly cited, time, knowledge, and finances are common. The perception of time and effort is subjective and depends on the size of the garden. This perception of time and effort is also subject to the childcare provider's attitude and judgement of gardening, which will be impacted by their level of garden knowledge and experience. One of these studies looked at an effective method of training childcare providers from facilities and teachers, but it did not include an analysis of whether that method was impactful for in-home childcare providers (Wright et al., 2013). Supplies and adequate support from partner agencies can help can allow childcare providers to become engaged without feeling overwhelmed and set appropriate time expectations for themselves. Gardens can be created with relatively few resources (Wright et al., 2013). Having local champions available, such as Extension agents or Master Gardeners, to encourage, support, and guide childcare providers is important for success (Wright et al., 2013). Sources of gardening information, training, and curriculum, as well as funding sources are available and childcare providers may not be taking advantage of these due

to unfamiliarity of these programs. This research reveals that creating effective training methods and increasing awareness of gardening resources for childcare providers is important to increase the implementation and long-term success of gardening programs.

There is a current gap in understanding of childcare providers' perceptions of barriers and benefits to gardening with children. It is important to understand childcare provider's perceptions of gardening in order to gain their support and utilize their feedback to design and implement successful gardening programming at these sites, which will increase fruit and vegetable consumption among young children and improve their current health as well as reduce their risk of future chronic disease. Additionally, given the relationship between economic barriers and chronic disease, additional research is needed to identify the most effective programming that provides garden information, training, curriculum, supplies, as well as funding sources so that childcare providers can implement long-lasting health-promoting activities for the young children under their care.

Limitations of this current literature review include the number of participants in some studies being low and the insufficient number of studies including in-home childcare providers. This systematic review expanded to include teachers, since most research surrounding gardening has been conducted with children older than 3-5 years.

Conclusion

A substantial proportion of childcare providers and teachers identified more benefits than barriers to gardening with children and the most significant barriers are time, knowledge, funding, curriculum, support and space. Providers and teachers may need guidance to adjust their expectations regarding the amount of gardening knowledge required to make a garden successful. They will gain more experience each year as they go along, and they need not be

expert gardeners before they start to garden with children in order to have an impactful experience. Even with many years of gardening knowledge, there will be seasons where certain vegetables do not grow well due to environmental conditions, such as climate, pests, or disease. It is best to dig in and go with the flow, this is part of the fun of gardening. For the future, much more research is needed in the area of in-home childcare providers perceptions of gardening with young children under their care.

CHAPTER 3: METHODOLOGY

Purpose and Research Aims

The purpose of this study was to explore the perceptions of in-home childcare providers surrounding the benefits and barriers to gardening with the young children under their care. An online survey allowed the researchers to collect demographic, quantitative, and qualitative data from providers. Data analysis explored provider's perceptions surrounding fruit and vegetable consumption and the benefits and barriers surrounding gardening with children at their childcare site.

The specific research aims for the stated goal were as follows:

1. Identify childcare providers' perceived benefits to establishing a home garden.
2. Identify childcare providers' perceived barriers to establishing a home garden.

Research Design

This pilot study utilized a cross-sectional mixed methods research design through an online survey instrument, which a convenience sample of participants were invited to complete. Survey questions determined provider's knowledge, attitudes (perceptions), and practices (behaviors) surrounding gardening with the children under their care.

Following Institutional Review Board approval, childcare providers learned about their opportunity to participate in this study through an email blast and one follow-up sent out from Child Care Aware[®] of North Dakota to their Grand Forks County licensed in-home childcare providers. The participant consent form and email invitation are available in Appendix A and B, respectively. A subset of participants who self-enrolled in the Farm to Childcare program will be

invited to participate in a post-survey at the end of the gardening season in July through email correspondence from the principal investigator.

Participants

The subject population was licensed in-home childcare providers in Grand Forks county (N=97) and a sub-set of that population who have self-enrolled in the Farm to Childcare gardening program (n=7). Child Care Aware® of North Dakota agreed to email the survey to the licensed in-home child care providers in Grand Forks County. The Farm to Childcare program is a gardening program ran through the partner agencies of Grand Forks Public Health and North Dakota State University Extension Service (NDSU Extension). It is advertised through Child Care Aware® of North Dakota to Grand Forks County licensed childcare providers and offers a limited number of mini-grants to childcare operators to join a summer gardening program.

The University of North Dakota (UND) researchers administered the survey while the Farm to Childcare program is considered a parallel activity being administered separately by partner agencies. Grand Forks Public Health and NDSU Extension are the partner agencies who are providing the supplies and support for the Farm to Childcare program for the sub-sample of seven in-home childcare providers who have self-selected into this program. Through the Farm to Childcare program, the in-home childcare providers received a square-foot garden box, soil, supplies (seeds, plants, fencing, tomato cage, children's story book) in May as well as gardening support via email, phone call, and Facebook from a garden coach from May through September. This thesis project is limited to the first phase of this research project, the cross-sectional, online survey that went out to 97 potential participants in May. Results from the sub-sample participating in the Farm to Childcare program will be published elsewhere.

Survey Instrument

The 97 participants were invited to complete an online survey which was created by the researchers. The list of questions was designed to learn about in-home childcare providers knowledge, attitudes (perceptions), and practices (behaviors) of gardening with the children under their care. Select questions were inspired from the structured interview questions asked of childcare providers by Davis and Brann (2017). The survey began with demographic questions and then asked quantitative (Likert scaled) questions and qualitative questions about attitudes of produce consumption. It then moved on to the main topic with a mix of quantitative and qualitative questions surrounding their perceptions of gardening, including benefits or barriers. Ten questions were yes/no with an “other” option, allowing participants to type in additional information that they wished to share. The twenty-seven-question survey (see Appendix C) was designed to be completed in a relatively short amount of time to encourage participation by busy childcare providers.

The participants being invited to complete the survey in May had the opportunity to do so from May 20-May 31. The survey was estimated to take 10 to 20 minutes to complete. The survey was conducted online-only through Qualtrics (Qualtrics, LLC, 2020). Participants were not met in person. Participants who completed the survey were eligible to enter into a drawing for a chance to win one of two *Eating the Alphabet* board books and one \$15 gift card to a local garden center in Grand Forks. Once the survey had closed, a drawing was completed. The three winners were contacted via email and prizes were subsequently mailed.

Data Management and Analysis

Through the survey, identifying information was limited so the survey could be matched for participation of the Farm to Childcare sub-sample for analysis beyond the work of this thesis.

The responses were anonymized prior to analysis replacing participant name and childcare name with a participant number.

The data was collected and stored in Qualtrics (Qualtrics, LLC, 2020), which requires a username and password to access. The data was then downloaded from Qualtrics (Qualtrics, LLC, 2020) into UND's OneDrive, which also requires a log in and password. The original data was converted to a participant number in the analysis file so data would become anonymized for analysis. Original data will be stored in username/password protected UND Qualtrics (Qualtrics, LLC, 2020) and username/password protected UND OneDrive for the mandatory period of three years after the study has concluded and data have been analyzed.

Data analysis was completed through the Statistical Package for the Social Sciences (SPSS, 2019). Descriptive statistics were completed for quantitative questions, including measures of central tendency and frequencies. Qualitative questions were summarized manually by grouping answers to each question, then repeated ideas were identified and indicated through color-coding (see Appendix D).

CHAPTER 4: RESULTS

Introduction

Previous research has established that children do not consume adequate fruits and vegetables, and that childcare providers can positively impact the consumption of these foods, which may improve children's health. Gardening intervention studies have been conducted with teachers and childcare providers; however, specific studies have not been completed with the population of in-home childcare providers. To increase the prevalence of gardening with children at in-home childcare provider sites, research was conducted with this population to determine their perceived benefits and barriers to gardening with the children under their care.

The purpose of this study was to explore the perceptions of in-home childcare providers surrounding the benefits and barriers to gardening with the young children under their care. An online survey allowed the researchers to collect demographic, quantitative, and qualitative data from providers. Following demographic results, the next sections show provider's perceptions surrounding fruit and vegetable consumption and the benefits and barriers surrounding gardening with children at their site.

Findings

The survey was emailed by Child Care Aware[®] of North Dakota to 97 providers. Out of the 97 providers who were sent the email invitation, one email was returned as undeliverable and one email generated a "mailbox full" response, leaving 95 potential respondents. Nineteen participants elected to complete the survey, resulting in a 20% completion rate. In Table 4, the median time for completion of the survey was 8 minutes, less than our estimated time of 10-20

minutes to complete the survey. With seven questions in this pilot study being qualitative in nature, the time range for completion was relatively wide. The range was great with the longest time being 87 minutes from initiation to completion and the shortest being less than two minutes.

Table 4.1

Survey Duration in Minutes

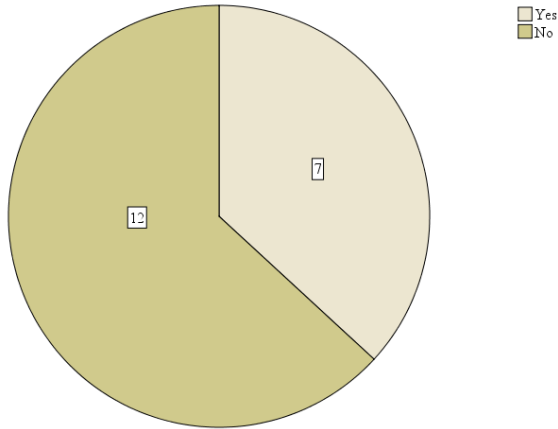
N	Valid	19
	Missing	0
Mean		17.3412
Median		8.2667
Mode		No Mode
Std. Deviation		24.13705
Variance		582.597
Range		85.43
Minimum		1.78
Maximum		87.22

Demographic Questions

Out of 19 participants, 7 were currently enrolled in the Farm to Childcare program offered through Grand Forks Public Health and NDSU Extension Grand Forks County (Figure 4.1). Thus, all seven participants who self-selected into the Farm to Childcare program completed the online survey along with 11 other providers who did not choose to participate in the program in 2020.

Figure 4.1

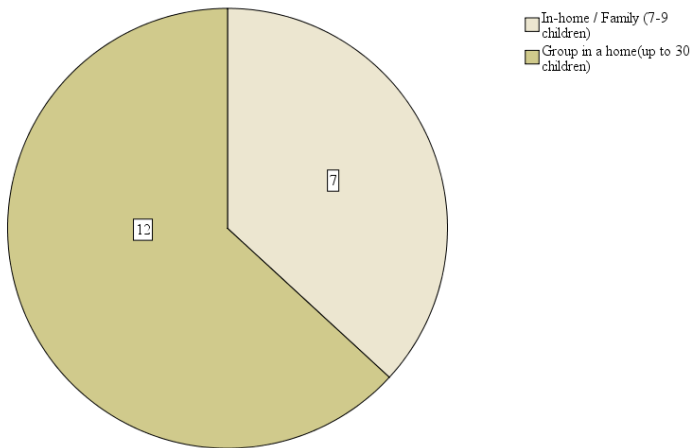
Participant Enrolled in the 2020 Farm to Childcare Program



Participants reported their childcare as in-home/family, group in a home, facility, or childcare center. The majority of participants reported their childcare classification as group in a home, with 12 of 19 participants selecting this option; the remaining participants self-selected as in-home childcares (Figure 4.2). No participants selected group in a facility (up to 30 children) or childcare center (30+ children).

Figure 4.2

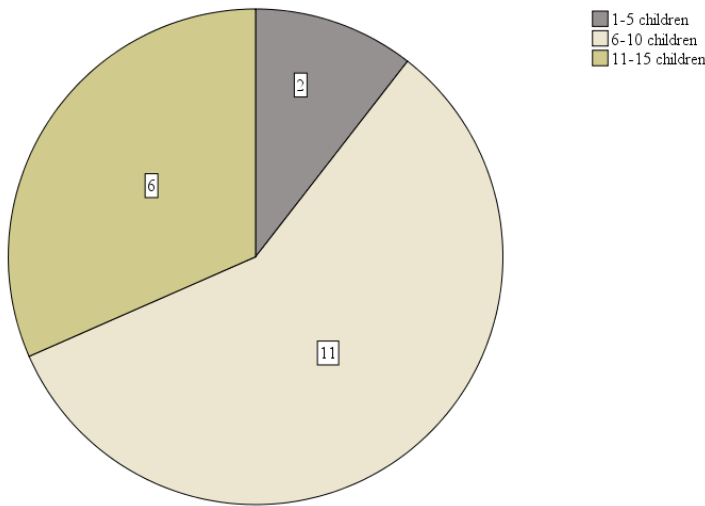
Participant Childcare Classification



The number of children typically cared for on a daily basis at the childcare sites was most frequently 11-15 children (11 of 19 participants), with fewer sites caring for 6-10 children, and the least being 1-5 children (Figure 4.3). The majority of providers in this survey are caring for 6 or more children per day in the summer (17 of 19 participants).

Figure 4.3

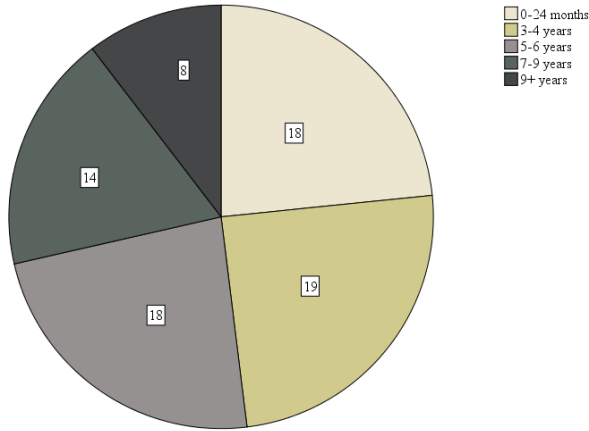
Number of Children Cared for on a Daily Basis at the Childcare in the Summer



Participants were asked to select each age range for the children at their site. The age ranges of the children at the childcares in the summer was diverse, ranging from birth -24 months to 9 or greater years of age. Ages 0-24 months, 3-4 years, and 5-6 years were similar in reported frequency, while ages 7-9 and 9+ years were less frequently reported by participants (Figure 4.4).

Figure 4.4

Frequency of Reported Age Ranges of the Children Attending Childcare in the Summer

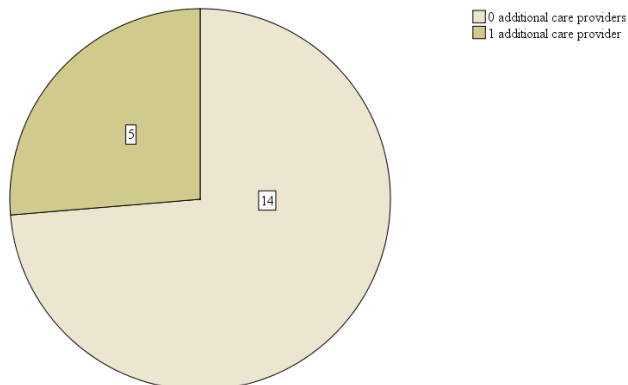


Note: Respondents selected all age ranges applicable to their childcare during the summer.

Most participants provided childcare independently. The majority of participants (14 of 19) did not have additional care providers helping at their childcare (Figure 4.5). Five participants did have 1 additional care provider assisting them in the summer. The number of additional care providers needed is dependent on the number of children at a particular age. No participants reported more than one additional care provider in their childcare.

Figure 4.5

Additional Care Providers Employed by In-home Childcare Site in the Summer

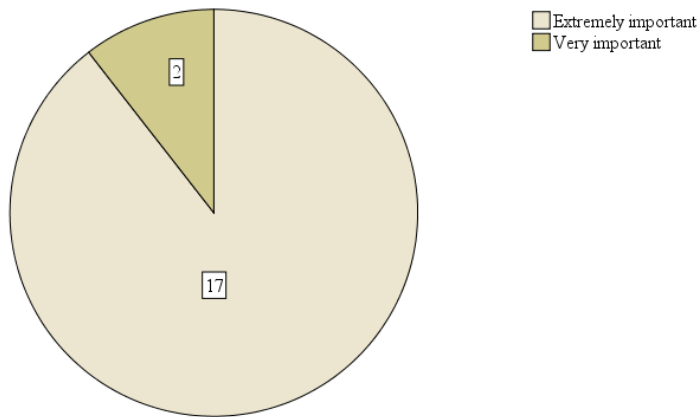


Quantitative Questions

All participants reported that fruit and vegetable consumption was extremely or very important for children (Figure 4.6). Seventeen of the 19 participants selected extremely important and 2 participants selected very important. No participants reported fruit and vegetable consumption for children being moderately important, slightly important, or not at all important.

Figure 4.6

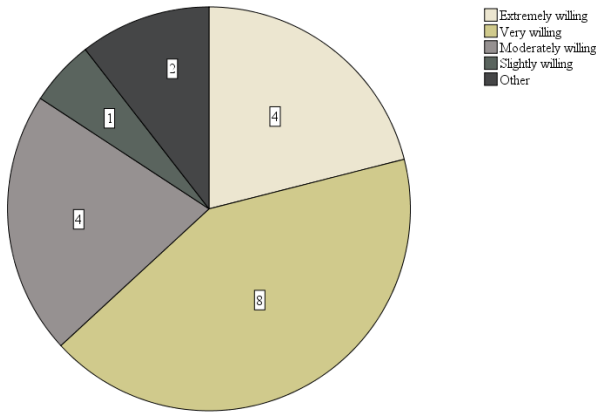
Participant Rating of Importance of Fruit and Vegetable Consumption for Children



Regarding serving fruits and vegetables to children, 8 of 19 of participants selected that the children at their site were very willing to eat them (Figure 4.7). Four of 19 participants selected the children at their site were extremely willing to eat fruits and vegetables and 4 of 19 selected moderately willing. Finally, 1 participant selected slightly willing and 2 participants selected “other”. The two other responses were “They are usually willing to try something at least once” and “It depends on the vegetables offered. Vegetables that they’ve had repeated exposure get a much better reception from the kids under 5.” The majority, 12 of 19, reported children were very or extremely willing to eat fruits and vegetables.

Figure 4.7

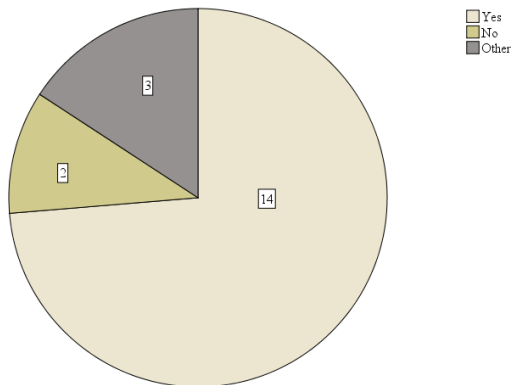
Willingness of Children to Eat Fruits and Vegetables Served to Them at the Childcare



Fourteen of 19 participants reported using garden activities that involve growing fruits or vegetables with children (Figure 4.8). Two participants did not report using garden activities and 3 participants selected “other”. The three “other” responses included “We just started our garden yesterday”, “We will be starting next week!”, and “We have a small indoor greenhouse. A majority of our plants are not intended to be eaten (though they are nontoxic). A few months ago we attempted to grow carrots, but our greenhouse developed an aphid problem.”

Figure 4.8

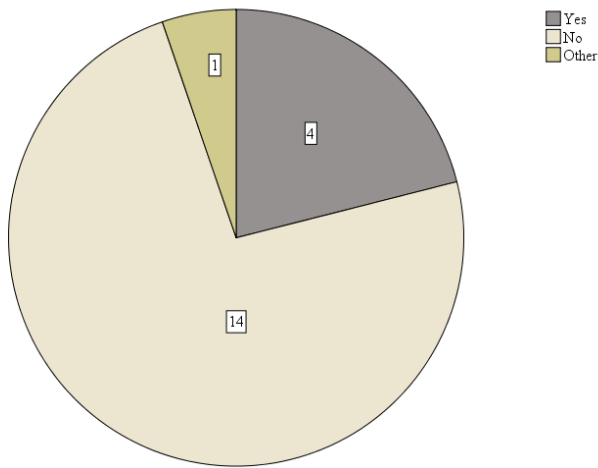
Usage of Gardening Activities that Involve Growing Fruits or Vegetables with the Children



Most participants, 14 of 19, had no previous training or courses in gardening (Figure 4.9). Four participants did have previous training. One participant selected “other”, noting “My grandma taught me and I did some gardening in high school.”

Figure 4.9

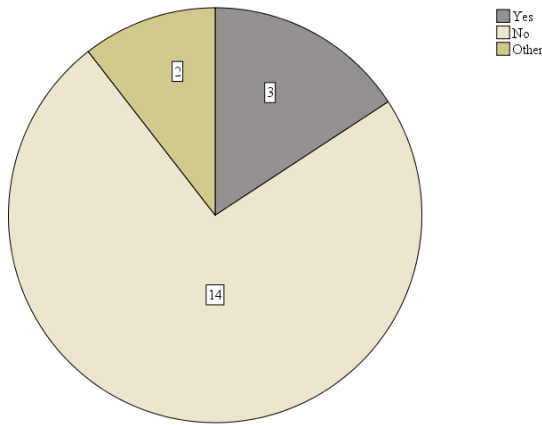
Participant Participation in Previous Training or Courses in Gardening



Fourteen participants did not use a gardening curriculum at their childcare and 3 participants did use one (Figure 4.10). Two participants selected “other”, citing “We will be starting up again next week!” and “We have a small indoor greenhouse and a few small nontoxic house plants that my kids help care for.”

Figure 4.10

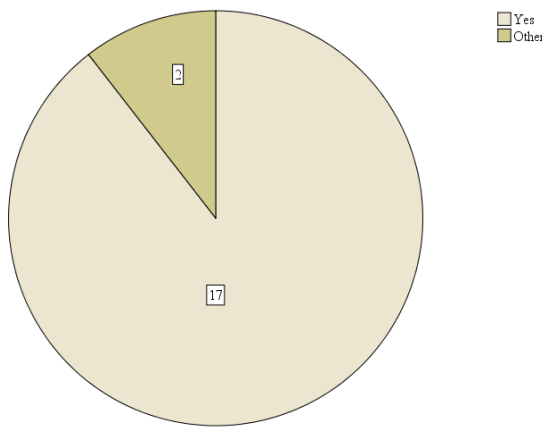
Participant Usage of a Gardening Curriculum at their Childcare



The majority of participants, 17 of 19, did have the space to set up a garden at their childcare (Figure 4.11). The two “other” responses were “we have a large garden out back” and “We have limited space, as we rent our home and must limit the changes we make to it.” No participants reported no space available.

Figure 4.11

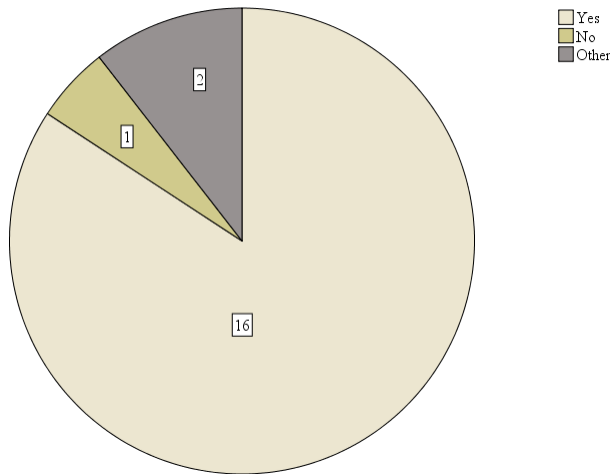
Space Available at Participant’s Childcare Site for a Garden



All the participants selected “yes”, they did have the time needed to set up and maintain a garden at their childcare. Sixteen of 19 participants did know what tools or supplies were needed to set up and maintain a garden at their childcare, while one did not (Figure 4.12). The two “other” responses were “I have some like seeds, plants, hoe, tiller, etc. I will need gloves for everyone, a fence and some small tools” and “I think. Lol.”

Figure 4.12

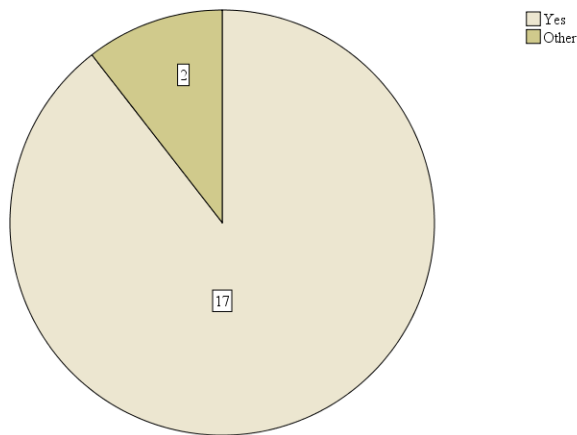
Participant Knowledge of Tools or Supplies Required to Set Up and Maintain a Garden at their Childcare



The majority of participants, 17 of 19, noted they currently have access to or believe they would be able to get the tools and supplies that are required to set up a garden at their childcare (Figure 4.13). Two participants selected “other” and one commented, “We got supplies from the grant the kids are excited.” No participants reported no access to gardening tools and supplies to maintain a childcare garden.

Figure 4.13

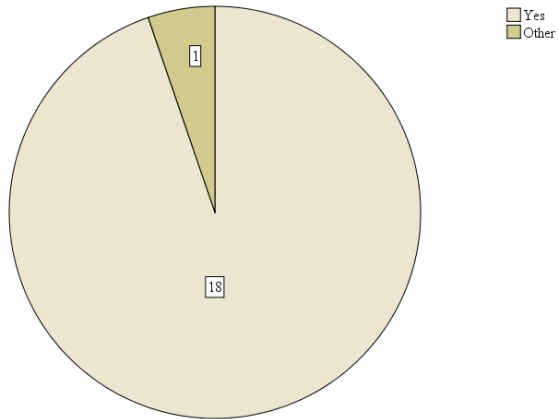
Participant Access to Tools and Supplies Required to Set Up and Maintain a Garden at their Childcare



All participants selected “yes” when asked if they believed that the children at their childcare would enjoy a gardening experience (figure not provided). Additionally, when asked if the parents of the children would be in favor of a gardening program, 18 participants selected “yes”; one participant selected “other” and commented “They love when I share the produce!” (Figure 4.14). No participants responded “no” when asked if they believe that the parents of the children at their childcare would enjoy a gardening experience.

Figure 4.14

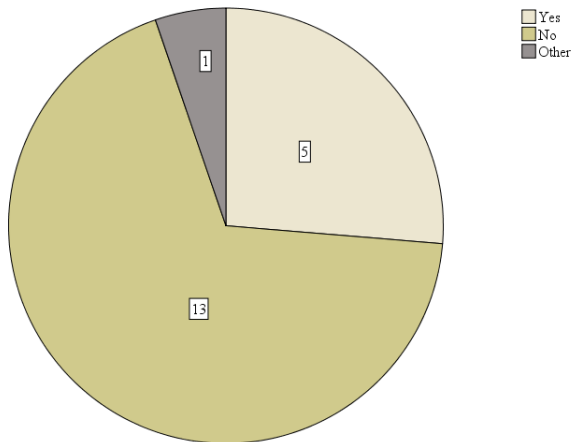
Participant Belief that the Parents of the Children at their Childcare Would Enjoy a Gardening Program



Thirteen of 19 participants were not familiar with gardening training programs or gardening resources in their area, while 5 participants were familiar with these (Figure 4.15). One participant selected “other”, noting “I look to youtube since I am not familiar with local resources.”

Figure 4.15

Participant Familiarity with Gardening Training Programs or Gardening Resources in their Area



Qualitative Questions

Participants were asked to describe their experiences and perspectives related to eating fruits and vegetables and gardening.

Survey question: How would you describe your role in the children's eating behaviors?

The themes associated with childcare provider's role in children's eating behaviors were role modeling, offering choices/variety, and introducing new foods.

Survey question: Tell me anything else important to you about children eating fruits and vegetables. Themes identified from provider's responses included fruits and vegetables being important because they help children to grow/be healthy, presentation and access to fresh fruits and vegetables, and exposing children to gardening.

Survey question: If you do use a gardening curriculum, or have used one in the past, describe your experience with that gardening curriculum/curricula. Curricula identified was the Farm to Childcare program which two participants planned to reuse from last year (2019).

Survey question: What are some of the factors that might prevent you from having a garden? Themes identified as those preventing participants from having a garden included location/space and animal pests.

Survey question: What do you believe are some of the benefits to having a garden in a childcare setting? Themes identified include children learning where food comes from, emotional connection, teaching the children the skill of gardening, and increased willingness to try foods when children grow them.

Survey question: What resources would be helpful in implementing more gardening activities at your childcare? Identified themes are tools/kids tools, books, grant funding, and gardening information/resources.

Survey question: Tell me anything else important to you about gardening with children in a childcare setting. Themes identified from participants responses include bonding and teaching children/learning.

Additional details about the participant responses and qualitative data analysis are available in Appendix D.

Conclusion

The outcomes of this study with in-home childcare providers shows that they view fruit and vegetable consumption for children as extremely or very important and children are frequently extremely, very, or moderately willing to eat them. Although the majority of providers have not had formal training or courses in gardening, do not utilize a gardening curriculum, and are not aware of gardening training programs or gardening resources in their area, they do utilize gardening activities that involve growing fruits or vegetables with the children. Most providers know what tools or supplies are required to set up and maintain a garden at their site and they either have or would be able to obtain the tools and supplies necessary for gardening. They believe that the children under their care and the parents of the children would be in favor of a gardening program at their childcare site.

CHAPTER 5: DISCUSSION

Introduction

This study conducted with in-home childcare providers revealed similarities and differences from current research, none of which has focused solely on the in-home childcare provider population. This group exhibited diversity with the numbers of children cared for per site, ages of children per site, and number of care providers per site. The majority of participants were utilizing gardening activities involving growing fruits and vegetables at their sites with the children. All of the providers indicated that the children at their site would enjoy a gardening experience.

Benefits of Gardening with Children

Nutrition-related benefits. Participants reported that fruit and vegetable consumption was extremely important or very important for children. They reported that fruits and vegetables were important for children's growth and development as well as long-term health. They also felt that fresh produce added interest to meals as well as adding nutrient balance. Consistent with existing research, they indicated that their role as childcare providers included role modeling the consumption of healthful foods, offering choices and/or variety, and introducing new foods to children (Ahmen et al., 2011; Davis & Brann, 2017; Dawson et al., 2013; Greer et al., 2019; Huys, et al., 2017; McMillen et al., 2019). Role modeling does have a positive impact on children's consumption of healthy foods (Lipps Birch, Itkin Zimmerman, & Hind, 1980), as does reinforcing the experience with positive language (Hendy & Raudenbush, 2000). These providers have an influential impact on children's food preferences, especially for children aged

2-5 years as they are growing rapidly during this age and developing a great amount of their food preferences (Birch, 2008). Additionally, providers have children's health in mind and there is research correlating increased consumption of fruits and vegetables with reduced risk of hypertension, coronary heart disease, stroke, cancer, certain eye diseases, dementia, osteoporosis, asthma, chronic obstructive pulmonary disease, and rheumatoid arthritis (Boeing, et al., 2012). Eating fruits and vegetables during childhood can be an important tool in the prevention of chronic disease throughout the life cycle.

Children's willingness to eat the fruits or vegetables they were served varied between providers. A majority indicated that children were very willing to try fruits and vegetables, responses were tied for extremely willing and moderately willing to try fruits and vegetables, and one respondent indicated that children were slightly willing to try fruits and vegetables. One participant noted that "They are usually willing to try something at least once" and another noted that "It depends on the vegetables offered. Vegetables that they've had repeated exposure get a much better reception from the kids under 5." Increased willingness to try fruits and vegetables due to gardening with children has been noted in previous research (Davis & Brann, 2017; Huys, et al., 2017; Kupolati, et al., 2015). This increased willingness may stem from increased familiarity with the fruit or vegetable through the activities of gardening, particularly if the gardening activities are structured (Somerset & Markwell, 2009). As with previous research, providers noted that gardens provide the food that children can consume at the site (Davis & Brann, 2017; Wright, et al., 2013) and when children help to grow the food, they are more likely to consume it, even if it is a food that is new to them. Additionally, gardens frequently produce an overabundance of food and this extra food is sent home with the children, so they are able to share something with their family and friends that they helped to grow (Wright et al., 2013).

A benefit of gardening is that it increases understanding of where food comes from (Davis & Brann, 2017; McMillen et al., 2019). Providers stated that they thought children seeing plants grow and where they come from was important. Since “kids can see food does not come from just the store.” Some providers mentioned that gardening with children teaches them how to grow their own garden at home which will enable them to “provide food for themselves in the future”, as noted in other research with teachers (Kupolati et al., 2015).

Non-nutrition-related benefits. Physical activity is commonly cited in research but was not indicated as a benefit by participants in this study (Ahmen et al., 2011; Davis & Brann, 2017; Dawson et al., 2013; Greer et al., 2019; McMillen et al., 2019; Passy, 2014).

Sensory experiences, including touching and smelling are important for children (Davis & Brann, 2017). One provider noted that they “love the idea of helping them learn through doing” and that being “hands on” in the garden is beneficial for the children. Another commented “The practice of pouring from a small water glass has had a good impact on their fine motor skills.” These responses indicate that some providers value opportunities to incorporate sensory experiences at their site.

Sharing the garden experience with children’s families is seen as an important component of gardening with children (Davis & Brann, 2017; Dawson et al., 2013; McMillen et al., 2019). This group of providers indicated that they believed the parents of the children would be in favor of a gardening program, with one provider commenting “They love when I share the produce!” It may be motivating to providers and the children they care for to share a gardening experience with the children’s parents or primary care providers.

Improved communication can occur between children at the site and between children and their caregiver through gardening (Dawson et al., 2013; Passy, 2014). Providers see

gardening activities are “fostering a respect for nature” and “fostering a respect for life.”

Gardening activities also build relationships between in-home childcare providers and children. Providers mentioned that “we are all learning together”, “it is a bonding experience that some kids may not be able to experience at home or anywhere else”, and “I love the bond it brings between me and them.”

Providers are teaching the children about gardening and through this, children learn responsibility by caring for another living thing, which is supported in other research (Dawson et al., 2013). Helping plants grow also instills a sense of pride and teaches them the “benefit of hard work and dedication.” Gardening helps to connect children to the natural environment (Davis & Brann, 2017; Dawson et al., 2013). Providers mentioned that children are “learning the cycle of life of a plant and why it is important to life” and “caring for live plants is helping to foster a respect for life.”

Although it was noted by several studies that teachers can teach many subjects and ideas in one space (Ahmen et al., 2011; Feille, 2013; Jaeschke et al., 2012; McMillen et al., 2019; Passy, 2014; Wright et al., 2013), this was not a benefit investigated through the survey instrument or specifically reported by participants in the open-ended questions of this study. However, through responses, it was noted that providers are teaching multiple ideas, such as how plants grow, caring for living things, and how consuming fruits and vegetables contributes to the children’s growth and health.

Barriers to Gardening with Children

Lack of time is the most cited barrier to gardening with children (Ahmen et al., 2011; Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Feille, 2013; Graves et al., 2016; Greer et al., 2019; Jaeschke et al., 2012; Passy, 2014; Wright et al., 2013). Interestingly, in one

question specifically asking about time, all the providers indicated that they did have the time needed to set up and maintain a garden at their childcare site, revealing that this was not a concern for this group. One participant commented that “the time it takes to harvest the vegetables can get hard when it needs to be done at a certain time.” This indicates that, overall, time is not an issue for these providers except under specific circumstances. The size of the garden will impact the amount of time needed to maintain it. Several of the participants are enrolled and two were previous enrollees in the Farm to Childcare program, which provides a 3x3 square-foot garden box. Another participant noted their use of containers for their garden due to space constraints. When compared to school and childcare facility gardens mentioned in previous studies, which may be large in size, container gardens and small square-foot gardens require considerably less time, possibly leading to the participants noting that they did have enough time to set up and maintain a garden at their site.

While a lack of space for a garden is frequently cited as a barrier in research (Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Wright et al., 2013), this was not a barrier for these providers. One participant noted that they had “limited space” and needed to “limit changes” they made to the property due to renting their home, but they were able to implement a square-foot garden box with the Farm to Childcare program. One other provider mentioned having a lack of space but still growing fruits and vegetables in containers which they still “enjoyed immensely.” This provider’s experience demonstrates how successful gardens can be created with few resources and relatively little space. These findings should be replicated in urban, in-home childcare provider sites.

Gardening knowledge deficit is another frequently cited barrier to gardening with children (Davis & Brann, 2017; Graves et al., 2016; Greer et al., 2019; Jaeschke et al., 2012;

McMillen et al., 2019; Wright et al., 2013); however, even though the majority of these study participants indicated that they had not had any previous training or courses in gardening, they were utilizing gardening activities with the children at their site. Participants may have been enrolled in the Farm to Childcare program in the previous 2019 growing season, however, that data point was not measured. One participant noted that they had learned from their grandmother and did some gardening in high school, but they did not indicate if they had taken a class to learn about gardening or if this was an informal setting, for example an after-school activity with peers. While some participants wanted additional educational materials to learn more about gardening, their perceived lack of knowledge was not a hindrance to gardening with children.

The majority of providers indicated through “yes” or “other” they did have the tools or supplies needed to set up and maintain a garden, with one participant selecting “no.” One participant who selected “other” stated they “thought” they knew what tools or supplies were required. Although much gardening is done by hand, this participant may realize there are tools they do or don’t need for themselves or their children with additional hands-on gardening experience. Additionally, the majority of participants selected “yes” or “other” and indicated that they currently had access or would be able to get access to needed tools and supplies; no providers selected “no.” Some providers did comment that tools, such as watering cans; books; and grant funding for tools and supplies, such as plants or seeds, would help them to implement more gardening activities at their childcare. Others cited no additional resources are necessary or that information would be most helpful for them. A lack of child-sized tools and general supplies has been cited in research with other sites that care for preschool children (Davis & Brann, 2017; McMillen, Swick, Frazier, Bishop, & Goodell, 2019).

One barrier common to this group and groups in previous research is the lack of knowledge surrounding gardening training programs or gardening resources in their geographical area. While online resources are available through Internet searches or social media platforms, these participants could benefit from knowing local Extension agents or Master Gardeners in their area, who could provide personalized support and encouragement (Wright et al., 2013). Three participants indicated that how to videos, packets of information, or “any information, instructions, tips, and advice” would help them to implement more gardening activities at their site. The Cooperative Extension System, a nationwide system of community-based educators, with agents able to disseminate informational materials that are accurate and designed to be applicable for all experience-levels of gardeners. Agents in some parts of the U.S. may even be able to visit a childcare site to provide assistance for a particularly troubling issue. One barrier mentioned by a participant in this study that was not seen in other research was having been advised that food grown in a home garden could not be served to the children at their childcare site. Although this is not the case, a local gardening expert could have helped to clarify this miscommunication. Other participants noted issues such as their garden being unsuccessful the previous year due to its location and moving it to a different location for this growing season, the ground being too wet to till when they wanted, and garden damage from wild animals (rabbits, deer). These are issues that an Extension agent, Master Gardener, or professional at a local garden center could help with, however the participants would need to have knowledge of these support systems.

Along with gardening resources or training programs being a barrier, a lack of financial support is a common issue (Burk et al., 2019; Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Greer et al., 2019; McMillen et al., 2019; Wright et al., 2013). One participant did list

cost as a barrier to initiating gardening with children. In a separate question asking about resources, two participants mentioned that grants or funding would be helpful to purchasing more plants and supplies but did not indicate that they were unable to initiate a garden without it.

When considering gardening curricula, the age range for the children needs to be accounted for, and in this survey the age range for children at these sites varied considerably. This is more likely to occur in the summer months due to school being out of session and school-aged children not having reached an age to stay at home alone safely. A curriculum in this setting would need to be attractive for children of diverse age groups and easily implemented with one provider, as the majority of these providers did not employ additional care providers at their site. A lack of curriculum is frequently cited as a barrier to successfully gardening with children (Ahmen et al., 2011; Burt et al., 2018; Davis & Brann, 2017; Feille, 2013; Greer et al., 2019). While the majority of participants had incorporated gardening activities with the children, most were not using a gardening curriculum at their childcare. This indicates that in-home childcare providers are successfully initiating and incorporating gardening activities without utilizing a formal curriculum. However, a formal gardening curriculum may ease the burden of creating activities for children and some providers noted that they would like videos, books, packets, or “any information, instructions, tips and advice” to help implement more gardening activities at their childcare. Gardening curricula for childcare providers should consider the diversity of age groups, especially during the summer, when this education experience is most likely to occur, and variability of types of childcare sites and environments where providers offer children education and care.

As noted previously, school programming taking a break in the summer is a barrier for schools (Greer et al., 2019; McMillen et al., 2019), but this could be a benefit for in-home

childcare providers who may have a greater number of children in the summer, including additional school-aged children. School-aged children attending in-home childcare sites would be able to partake in a gardening experience from May through August, which is much of the growing season in this geographical region. For teachers, the summer break may increase the time needed for them to maintain the garden. Fewer volunteers and staff may be available to help and parents may not be able to set up a regular schedule to bring their children to the garden.

A lack of volunteer, parent, staff or administration support is a barrier (Burk et al., 2019; Davis & Brann, 2017; Dawson et al., 2013; McMillen et al., 2019; Wright et al., 2013) as is lack of staff participation or staff turnover (Burt et al., 2018; Davis & Brann, 2017; Dawson et al., 2013; Wright et al., 2013). Contrary to existing research, the providers in this survey did not indicate that these were barriers to gardening with children. This difference may be because other research focused on schools and childcare centers/facilities as opposed to in-home childcare providers. More research is needed to determine if this is a typical barrier for some types of childcare sites and not others. Of the participants that have an additional care provider, it is unknown if the additional care provider is hired year-round or just for the summer and how this may impact gardening benefits or barriers.

While barriers do exist for this sample of in-home childcare providers, their responses indicated that, for most, these barriers were outweighed by the benefits and they placed importance on the activity of gardening with the children at their childcare sites.

Limitations of the Study

Small sample size is a limitation of this study, as it was conducted in a Midwestern, rural county with a small number of in-home childcare providers caring for 30 or less children per site. Out of 97 licensed in-home providers, we received 1 “undeliverable” and 1 “mailbox is full”

response. Additionally, not counted in the total of 97 eligible participants were 4 licensed in-home providers that did not have email addresses, so they were not notified of the online survey. Before replicating this study on a larger scale, it would be advisable to learn how many participants did not utilize an email account and if alternative formats should be offered to participants, such as sending a paper copy of the survey via mail. Potential respondents may also prefer to learn about survey opportunities through options other than email, such as text message.

The survey was released on a Wednesday before the Memorial Day holiday, so providers may have been distracted with preparation for the holiday and elected not to take the survey at that time. Also, with COVID-19 pandemic and lockdown occurring in the spring of 2020, in-home providers had been sent many surveys to complete. This may have led to survey fatigue by time this survey was emailed to them, meaning the most motivated providers or those most interested in gardening may have been the ones choosing to complete it. The survey release date coincided with the end of the school year; with the COVID-19 pandemic, in-home childcare providers may have been preoccupied with finishing up academic activities at home for school-aged children while caring for younger children and would not have prioritized this survey.

The participants also may have elected not to participate in the survey due to lack of interest in gardening or the time estimated to complete this survey. The time of completion was estimated to take 10 to 20 minutes, while the median duration for participants was 8 minutes. Some participants were in the survey instrument for a longer period of time, up to 87 minutes, but this does not reflect active engagement, as they could have been interrupted and returned to the survey later to complete it.

Conclusions and Recommendations for Future Research

This study revealed in-home childcare providers in a Midwestern, rural county report more benefits than barriers to gardening with children at their sites. This may be due to their motivation to positively influence children's eating patterns and optimize learning opportunities for these children who may be spending a considerable amount of time under their care.

Following this pilot study, future studies should include a stronger study design, for example incorporating a control group and utilizing validated survey questions. Asking additional demographic questions may add strength to the results, including how long the provider has worked as a childcare provider, the age of the provider, and the location of the at-home childcare site being rural versus urban. Adding an optional comment line to each option of Yes/No/Other questions would allow participants to select any of these options, rather than being forced to select "other" if they felt it was important to add additional comments related to that particular question. From evaluating the comments that accompanied several of the "other" selections, they would likely have been classified as a "yes/no" answer if a comment option had been provided. To the author's knowledge, there is no existing validated survey examining this problem with in-home childcare providers; this is a first step toward hypothesis generation and a validated survey.

Significant studies exist investigating teachers gardening with school-aged children and those results can help to inform research with preschool children; however, they cannot be generalized to this unique population of in-home childcare providers. Further research efforts to determine and describe behaviors, practices, and knowledge are key to development and training of future in-home childcare providers as successful gardeners. To this author's knowledge, this is the first study to examine the experience of in-home childcare providers gardening with children

from the in-home childcare provider's perspective. Closing this knowledge gap through additional research with this population is important. Many young children spend a substantial share of their day with childcare providers and gardening may be an effective and educational approach to encouraging children to consume more fruits and vegetables, a public health priority.

REFERENCES

- Ahmed, A., Oshiro, C., Loharuka, S., & Novotny, R. (2011). Perceptions of middle school educators in Hawaii about school-based gardening and child health. *Hawaii Medical Journal*, 70(7 Suppl 1), 11–15.
- Birch, L. L. (2008). Development of food acceptance patterns in the first years of life. *The Proceedings of the Nutrition Society*, 57(4): 617-24.
- Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., . . . Watzl, B. (2012). Critical review: Vegetables and fruit in the prevention of chronic disease. *European Journal of Nutrition*, 51(6): 637-663.
- Burk, K., Lindel, N., Wang, J., Burgermaster, M., & Fera, J. (2019). A nationwide snapshot of the predictors of and barriers to school garden success. *Journal of Nutrition Education & Behavior*, 51(10), 1139–1149.
- Burt, K., Luesse, H., Rakoff, J., Ventura, A., & Burgermaster, M. (2018). School gardens in the United States: Current barriers to integration and sustainability. *American Journal of Public Health*, 108(11), 1543–1549.
- Child Care Aware of North Dakota. (2019a). *The state of child care in North Dakota: North Dakota child care data reports, state child care profile data*. Retrieved from [ndchildcare.org: https://ndchildcare.org/data-pub/data.html](https://ndchildcare.org/data-pub/data.html)
- Child Care Aware of North Dakota. (2019b). *Child care data & profiles: Child care data by county, Grand Forks County*. Retrieved from [ndchildcare.org: https://ndchildcare.org/data-pub/county.html](https://ndchildcare.org/data-pub/county.html)
- Davis, K., & Brann, L. (2017). Examining the benefits and barriers of instructional gardening programs to increase fruit and vegetable intake among preschool-age children. *Journal of Environmental and Public Health*, 2506864.
- Dawson, A., Richards, R., Collins, C., Reeder, A., & Gray, A. (2013). Edible gardens in early childhood education settings in Aotearoa, New Zealand. *Health Promotion Journal of Australia: Official Journal of Australian Association of Health Promotion Professionals*, 24(3), 214–218.
- Due, P., Krolner, R., Rasmussen, M., Anderson, A., Trab Damsgaard, M., Graham, H., & Holstein, B. E. (2011). Pathways and mechanisms in adolescence contribute to adult health inequalities. *Scandinavian Journal of Public Health*, 39 (6 Suppl): 62-78.
- Feille, K. (2013). Getting outside: Three teachers’ stories of using the schoolyard as an integrated tool for elementary teaching. *Electronic Journal of Science Education*, 17(3).
- Grand Forks Public Health & Altru Health System. (2017, April). *Community health improvement plan & implementation strategy report*. Retrieved from [grandforksgov.com: http://www.grandforksgov.com/home/showdocument?id=19790](http://www.grandforksgov.com/home/showdocument?id=19790)

- Graves, L., Hughes, H., & Balgopal, M. (2016). Teaching STEM through horticulture: Implementing an edible plant curriculum at a STEM-centric elementary school. *Journal of Agricultural Education*, 57(3), 192–207.
- Greer, A., Rainville, K., Knausenberger, A., & Sandolo, C. (2019). Opportunities for school garden-based health education in a lower-income, diverse, urban school district. *American Journal of Health Education*, 50(4), 257–266.
- Hendy, H., & Raudenbush, B. (2000). Effectiveness of teacher modeling to encourage food acceptance in preschool children. *Appetite*, 34(1): 61-76.
- Huys, N., De Cocker, K., De Craemer, M., Roesbeke, M., Cardon, G., & De Lepeleere, S. (2017). School gardens: A qualitative study on implementation practices. *International Journal of Environmental Research and Public Health*, 14(12), 1454.
- Institute for Health Metrics and Evaluation. (2016). *US county profile: Grand Forks*. Retrieved from healthdata.org: <http://www.healthdata.org/us-county-profiles>
- Jaeschke, E., Schumacher, J., Cullen, R., & Wilson, M. (2012). Perceptions of principals, teachers, and school food, health, and nutrition professionals regarding the sustainability and utilization of school food gardens. *Journal of Child Nutrition & Management*, 36(2).
- Kupolati, M., Gericke, G., & MacIntyre, U. (2015). Teachers' perceptions of school nutrition education's influence on eating behaviours of learners in the Bronkhorstspuit District. *South African Journal of Education*, 35(2).
- Laughlin, L. (2013). *Who's minding the kids? Child care arrangements: Spring 2011*. Retrieved from United States Census Bureau: <https://www.census.gov/library/publications/2013/demo/p70-135.html>
- Lin, B.-H., & Mentzer Morrison, R. (2016). *A closer look at declining fruit and vegetable consumption using linked data sources*. Retrieved from United States Department of Agriculture, Economic Research Service: <https://www.ers.usda.gov/amber-waves/2016/july/a-closer-look-at-declining-fruit-and-vegetable-consumption-using-linked-data-sources/>
- Lipps Birch, L., Itkin Zimmerman, S., & Hind, H. (1980). The influence of social-affective context on the formation of children's food preferences. *Child Development*, 51(3): 856-61.
- McMillen, J., Swick, S., Frazier, L., Bishop, M., & Goodell, L. (2019). Teachers' perceptions of sustainable integration of garden education into head start classrooms: A grounded theory approach. *Journal of Early Childhood Research*, 17(4), 392–407.
- Miller, T., & Pinks, K. (2018, February). *Grand Forks Public Health: Grand Forks County community health profile*. Retrieved from North Dakota Department of Health: <https://www.ndhealth.gov/HealthData/CommunityHealthProfiles/Grand%20Forks%20Co>

- Moore, L., Thompson, F., & Demissie, Z. (2017). Percentage of youth meeting federal fruit and vegetable intake recommendations, Youth Risk Behavior Surveillance System, United States and 33 states, 2013. *Journal of the Academy of Nutrition and Dietetics*, 117(4): 545-533.e3.
- Namenek Brouwer, R., & Benjamin Neelon, S. (2013). Watch Me Grow: A garden-based pilot intervention to increase vegetable and fruit intake in preschoolers. *BMC Public Health*, 13: 363.
- NCI. (2020). *Usual dietary intakes: U.S. population, 2007-10*. Retrieved from National Cancer Institute, Division of Cancer Control & Population Sciences: <https://epi.grants.cancer.gov/diet/usualintakes/>
- Passy, R. (2014). School gardens: Teaching and learning outside the front door. *Education*, 3-13, 42(1), 23–38.
- Qualtrics, LLC. (2020). Provo, Utah, USA: SAP America Inc.
- Somerset, S., & Markwell, K. (2009). Impact of a school-based food garden on attitudes and identification skills regarding vegetables and fruit: A 12-month intervention trial. *Public Health Nutrition*, 12(2): 214-21.
- SPSS. (2019). *Statistical Package for the Social Sciences, Version 26*. Chicago, IL: IBM Corp.
- United States Census Bureau. (2017, July). *Quick facts: Grand Forks city, North Dakota*. Retrieved from Census.gov: <https://www.census.gov/quickfacts/fact/table/grandforkscitynorthdakota/>
- USDA. (2020a). *All about the fruit group*. Retrieved from United States Department of Agriculture, ChooseMyPlate: <https://www.choosemyplate.gov/eathealthy/fruits>
- USDA. (2020b). *All about the vegetables group*. Retrieved from United States Department of Agriculture, ChooseMyPlate: <https://www.choosemyplate.gov/eathealthy/vegetables>
- USDHHS & USDA. (2015). *Nutrition and health are closely related*. Retrieved from Dietary Guidelines for Americans 2015-2020 (8th edition): <https://health.gov/our-work/food-nutrition/2015-2020-dietary-guidelines/guidelines/introduction/nutrition-and-health-are-closely-related/>
- Wright, W., Friese, B., Carrel, A., & Meinen, A. (2013). Creating a sustainable model for establishing youth gardens in schools and childcare centers. *Journal of Child Nutrition & Management*, 37(2).

APPENDIX A

Consent Form to Participate in a Research Study

**UNIVERSITY OF NORTH DAKOTA
Institutional Review Board
Study Information Sheet**

Title of Project: Childcare Provider's Perceptions of Gardening

Principal Investigator: Erin Lauckner, erin.lauckner@und.edu

Advisor: Dr. Desiree Tande, 701-777-3751, desiree.tande@und.edu

Purpose of the Study:

The purpose of this research study is to explore the perceptions of in-home childcare providers surrounding the benefits and barriers to gardening with young children under their care.

Procedures to be followed:

You will be asked to answer 27 questions on an online survey.

Risks:

There are no risks in participating in this research beyond those experienced in everyday life.

Benefits:

This research might provide a better understanding of how childcare provider's perceive gardening. This information could help plan gardening programming or make existing services better.

Duration:

It will take about 10-20 minutes to complete the questions.

Statement of Confidentiality:

If this research is published, no information that would identify you will be included.

All survey responses that we receive will be treated confidentially and stored on a secure server. However, given that the surveys can be completed from any computer (e.g., personal, work, school), we are unable to guarantee the security of the computer on which you choose to enter your responses. As a participant in our study, we want you to be aware that certain "key logging" software programs exist that can be used to track or capture data that you enter and/or websites that you visit.

Right to Ask Questions:

The researcher conducting this study is Erin Lauckner. You may ask any questions you have now. If you later have questions, concerns, or complaints about the research please contact Erin Lauckner at erin.lauckner@und.edu or Desiree Tande at 701-777-3751 during the day.

If you have questions regarding your rights as a research subject, you may contact The University of North Dakota Institutional Review Board at (701) 777-4279 or UND.irb@UND.edu. You may

contact the UND IRB with problems, complaints, or concerns about the research. Please contact the UND IRB if you cannot reach research staff, or you wish to talk with someone who is an informed individual who is independent of the research team.

General information about being a research subject can be found on the Institutional Review Board website “Information for Research Participants” <http://und.edu/research/resources/human-subjects/research-participants.html>

Compensation:

If you choose to complete this survey in May, you are eligible to enter into a drawing for a chance to win one of two Eating the Alphabet board books and one \$15 gift card to All Seasons Garden Center in Grand Forks. If you are a participant in the Farm to Childcare program you will be invited to participate in this survey again in July and will not receive additional compensation at that time.

Voluntary Participation:

You do not have to participate in this research. You can stop your participation at any time. You may refuse to participate or choose to discontinue participation at any time without losing any benefits to which you are otherwise entitled.

You do not have to answer any questions you do not want to answer.

You must be 18 years of age older to participate in this research study.

Completion and return of the survey implies that you have read the information in this form and consent to participate in the research.

Please keep this form for your records or future reference.

APPENDIX B

E-mail Invitation from Child Care Aware® of North Dakota to In-Home Participants

Help Us Improve Our Gardening Program

Good afternoon,

Child Care Aware® of North Dakota has partnered with the Farm to Childcare project and below is an email, including a survey that we encourage you to complete.

Please email Erin Lauckner: erin.lauckner@und.edu with any questions. See below-

Hello Childcare Providers,

Your input is invaluable and needed to enhance our gardening programming. We are interested in your perceptions of gardening and experiences with gardening with the children at your childcare.

This voluntary survey is both computer and mobile-device friendly and estimated to take 10-20 minutes to complete. Participants are eligible to enter into a drawing for a chance to win one of two *Eating the Alphabet* board books and one \$15 gift card to All Seasons Garden Center in Grand Forks.

This link will take you to the survey: https://und.qualtrics.com/jfe/form/SV_cUPkhU8NGAwMtTv

Thank you,
~Erin

Erin Lauckner, RDN, LRD
Department of Nutrition & Dietetics
College of Nursing and Professional Disciplines
University of North Dakota
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Grand Forks, ND 58202-8237

APPENDIX C

Survey

Are you currently participating in the Farm to Childcare program offered through Grand Forks Public Health and NDSU Extension Grand Forks County?

Yes (1)

No (2)

Display This Question:

If Are you currently participating in the Farm to Childcare program offered through Grand Forks Publ... = Yes

Type your first name.

Display This Question:

If Are you currently participating in the Farm to Childcare program offered through Grand Forks Publ... = Yes

Type your last name.

Display This Question:

If Are you currently participating in the Farm to Childcare program offered through Grand Forks Publ... = Yes

Please type the name of your childcare, if different than your first and last name.

Select your childcare classification.

- In-home / Family (7-9 children) (1)
 - Group in a home(up to 30 children) (2)
 - Group in a facility (up to 30 children) (3)
 - Childcare center (30+ children) (4)
-

How many children are typically cared for on a daily basis at your childcare in the summer?

- 1-5 (1)
 - 6-10 (2)
 - 11-15 (3)
 - 16-20 (4)
 - 21-25 (5)
 - 26-30 (6)
 - 31+ (7)
-

What is the age range of the children at your childcare in the summer? (Select all that apply.)

0 to 24 months (1)

3 to 4 years (2)

5 to 6 years (3)

7 to 8 years (4)

9+ years (5)

Not counting yourself as the main care provider, how many additional care providers are employed at your childcare during the summer?

0 (1)

1 (2)

2 (3)

3 (4)

4 (5)

Page Break

How important do you feel fruit and vegetable consumption is for children?

- Extremely important (1)
 - Very important (2)
 - Moderately important (3)
 - Slightly important (4)
 - Not at all important (5)
-

When you serve fruits and vegetables, how willing are the children to eat them?

- Extremely willing (1)
 - Very willing (2)
 - Moderately willing (3)
 - Slightly willing (4)
 - Not at all willing (5)
 - Willing at times (6)
 - Other (7) _____
-

How would you describe your role in the children's eating behaviors?

Tell me anything else important to you about children eating fruits and vegetables.

Page Break

Do you currently use any gardening activities that involve growing fruits or vegetables with the children?

- Yes (1)
- No (2)
- Other (3) _____

Have you had any previous training or courses in gardening?

- Yes (1)
- No (2)
- Other (3) _____

Do you currently use a gardening curriculum at your childcare?

- Yes (1)
- No (2)
- Other (3) _____

Q13 If you do use a gardening curriculum, or have used one in the past, describe your experience with that gardening curriculum/curricula.

Do you have the space to set up a garden at your childcare?

- Yes (1)
 - No (2)
 - Other (3) _____
-

Do you have the time needed to set up and maintain a garden at your childcare?

- Yes (1)
 - No (2)
 - Other (3) _____
-

Do you know what tools or supplies are required to set up and maintain a garden at your childcare?

- Yes (1)
 - No (2)
 - Other (3) _____
-

Do you currently have access to or believe you would be able to get the tools and supplies that are required to set up a garden at your childcare?

- Yes (1)
 - No (2)
 - Other (3) _____
-

What are some of the factors that might prevent you from having a garden?

What do you believe are some of the benefits to having a garden in a childcare setting?

Do you believe the children your childcare would enjoy a gardening experience?

- Yes (1)
- No (2)
- Other (3) _____

Do you believe the parents of the children would be in favor of a gardening program?

- Yes (1)
- No (2)
- Other (3) _____

Are you familiar with gardening training programs or gardening resources in your area?

- Yes (1)
- No (2)
- Other (3) _____

What resources would be helpful in implementing more gardening activities at your childcare?

Tell me anything else important to you about gardening with children in a childcare setting.

Page Break

Childcare Provider Gardening Survey - Drawing Entry

Start of Block: Default Question Block

Q1 Thank you for completing the Childcare Provider Gardening Survey! If you would like to be entered into a drawing for a chance to win a prize, please enter your email address below.

First name: _____

Email address: _____

End of Block: Default Question Block

APPENDIX D

Qualitative Data: Participant Answers and Data Coding

How would you describe your role in the children's eating behaviors?

- A big role!!
- I try to set a good example for the kids to eat right so I teach them about gardening and healthy eating. They assist me in the garden.
- We always eat the same foods as the children which I feel like really helps them to try the foods.
- I do my best to help the children make healthy choices by offering a variety of fresh, frozen and canned fruits and vegetables.
- I offer a wide variety of foods so they are able to decide what they like and don't like. I let them choose but always encourage them to at least try the different foods.
- I believe I have a huge impact on children's eating behaviors in my daycare. A lot of the time kids will at least try new foods with me before they will with their parents.
- I eat what I feed the children to set a good example. I try to feed the children a wide variety of fruits and veggies
- The children are seeking [seeing] me eating fresh healthy veggies and fruits and want to try them also
- Role model, making sure they are offered a variety. I feed them most of their meals and snacks
- It is one of our goals to ensure that kids learn about and eat as many fruits and veggies as they will allow. Sometimes it is hard, but we offer varieties and try to make things "fun"!
- Important role as they eat what I eat they try new things because they follow by example.
- Important, kids follow other kids in eating habits. If one tries it and likes it most will follow.
- I offer a variety of fresh fruits & vegetables daily. I also eat the fruits & vegetables with my daycare children. I believe we as providers play a very important role with helping to establish nutritional eating habits in young children.
- I love when they try new things!! I set the example. Hopefully they follow my example! My role is to introduce them to foods they may never try otherwise!
- As a childcare provider, I'm very involved in the eating behaviors of the kids in my care. My influence begins with the decision to fresh vegetables, and continues through the interactions we have during meal time. I think a positive outlook makes a big difference.

Themes: (CHILDCARE PROVIDER'S ROLE) role modeling, offering choices/variety, introducing new foods

Tell me anything else important to you about children eating fruits and vegetables.

- They are healthy and good for them to help them grow big and strong.
- They help the children to grow and develop and they really add color to a lot of the meals.
- I have raised my children to enjoy fruits and vegetables before other snacks and am doing the same in my childcare program. I like to have fresh produce cut up and ready to serve. I also

will have a garden that we will tend to and the children will get to take the fruits of their labor home to share with their families.

- I think it's important for them to have a wide variety of foods to try so they aren't just eating the same things and can experiment with different tastes and textures.
- I love seeing kids try something new and liking it and asking for it. And I am a strong believer in a round balanced diet of all the food groups so that they can learn and grow up to the best of their ability.
- It's important for children to learn good eating habits at a young age to stay healthy and happy.
- The kids need the veggies and fruits. In this day and age of McDonald's and Burger King they eat homemade foods at my house.
- I want them to become good eaters, so they stay healthy throughout their life
- The kids really enjoyed our garden last year and this next week we are going to start our new one! They are pretty excited!
- It is very important to start their eating habits young of eating fruits and vegetables so they can get used to eating them and have a taste for them or develop a good taste for them. It is very important that they eat them as a child so they continue as a teenager and adult to eat them.
- I feel it's important to offer a variety of fruits & vegetables. Talk with the children about how the fruits & vegetables are grown, harvested, bought and prepared. We have fun reading stories, watching documentaries, planning meals and growing our own fruits & vegetables 😊
- We talk about good health and how important the foods are to our bodies and our minds.
- In my personal experience, I feel that young children have been more willing to eat a full serving of vegetables when I'm able to serve them raw.

Themes: (BENEFITS of F/V) f/v important b/c they help children grow/be healthy, presentation/access to fresh f/v raw, expose children to gardening,

If you do use a gardening curriculum, or have used one in the past, describe your experience with that gardening curriculum/curricula.

- We are planting the garden this week and they will help maintain it and enjoy the fruits and veggies and we will discuss how they are growing.
- We use some of the things we learned from last year with our garden like talking about bugs that help our garden, how the garden grows, and the book we received from the [Farm to Childcare] program
- I plan to use the tools and ideas that learned last year from "Garden Teacher 1" and "Garden Teacher 2" [Farm to Childcare program]. I also have many tools from SENDCAA that will assist in the teaching of the importance of fruits and veggies.
- I have not because I was told from my previous food program that I wasn't allowed to feed my daycare children from my garden due to it wasn't bought in a store so it wasn't CDC approved.
- I have had a garden in the past, taught them about suns and weeds and watering.
- We try to grow veggies and their favorite part is harvesting. Even if it is only a cucumber. They love to water the garden as well!

- My buddies are very into their succulent plant, and are always interested to see how our fern is growing. The practice pouring from a small water glass has had a good impact on their fine motor skills, and I believe that caring for live plants is helping to foster a respect for life in my little buddies.

Themes: Farm to Childcare curriculum

What are some of the factors that might prevent you from having a garden?

- Last year our garden didn't grow but we had it in a different location than this year.
- Finding the time to till the ground once it dries out since its been extremely saturated.
- Rabbits are the only problem I can see as of now. They ruined our garden last year and all of our neighbors.
- We have an over population of deer.
- Cost
- None
- The time it takes to harvest the food can get hard when it needs to be done at a certain time.
- I already have a garden for my family and since I do daycare at my home it is already here, I do not involve the daycare children due being told they couldn't eat the food.
- None
- As of right now my daycare kids and I have been growing our fruits & vegetables in containers. We don't have a huge variety due to space and equipment but what we do have, we enjoy immensely.
- None
- Our landlord is not willing to allow further changes to the yard beyond our Farm to Childcare Garden.

Themes: (**BARRIERS**) Location/space, animal pests – rabbits and deer

What do you believe are some of the benefits of having a garden in a childcare setting?

- Healthy home grown fruits and vegetables
- They get to actually watch them grow and see where they come from
- The children will be able to be proud of what they did and they get to share with their families and friends.
- They learn how to take care of plants and where their food is coming from and how it's made.
- letting kids see something they plant grow and then getting to eat it.
- Teaches children where their food comes from. They're more likely to try different things
- Teaches the kids where the food comes from
- More likely to try foods if they helped grow them
- It shows the children what hard work and dedication to something can provide. Plus, they LOVE seeing the difference from one day to the next in the growth of the plants and the fruit/veggies.
- Child can learn where there food comes from, how to grow fruits and vegetables, they will be able to learn how to provide food for themselves in the future
- They would see the food they have grown and they would be more willing to eat it that way.

- Learning the circle of life of a plant and why its important to life.
- Teaching the children how to plant, grow, harvest and prepare nutritional foods is a huge benefit. That information will stay with they always 😊. The children love tasting what we grow & prepare.
- So kids can see food does not come from just the store.
- Fostering a respect for nature in enrolled children, fostering a respect for life in enrolled children, intensifying focus/interest in fruits/veggies.

Themes: (BENEFITS) learning where food comes from, emotional connection, teaching children the skill of gardening, increases willingness to try foods when children grow them

What resources would be helpful in implementing more gardening activities at your childcare?

- Tools and how to videos
- Books about plants to learn from, kids tools for the garden
- An additional grant or funding of some type to get more plants and supplies
- Age appropriate books and maybe someone from a nursery visiting or a farmer.
- I'm not sure.
- children books
- Books, grants
- The Facebook page would be a great place to share activities
- I have all the assistance that I need at the moment, but I know that I can contact "Garden Teacher 1" and "Garden Teacher 2" if I have questions or concerns! They are great!
- Gardening tools and books for kids so they can understand what goes on. How all fruits and vegetables have seed in them that produce more and it keeps cycling.
- Books or packets
- Any information, instructions, tips and advice would help very much.
- A coach! Lol
- I'm hoping to include small watering cans in our gardening, so the children can all participate in watering the plants.

Themes: (OBSTICLES) tools/kid tools; books; grant funding; packets/ information; Separate question – majority were not familiar with resources in their area.

Tell me anything else important to you about gardening with children in a childcare setting.

- Teaches them responsibility and gives them a sense of pride in seeing it grow.
- We are teaching the children to be able to provide food for themselves and how to tend to the plants and take care of it. They get to be responsible for another living thing.
- I love the idea of helping them learn through doing. Being hands on and helping with the garden will really benefit them.
- Seeing their faces when they get to eat something they grew
- I love having our garden within our play area, so the kids check and water throughout the day.

- It is a bonding experience that some kids may not be able to experience at home or anywhere else...I am grateful and glad that I am able to share in this with them.
- I love the bond it brings between me and them as they get to see how big a little seed can grow and them helping pick.
- It a a great thing to learn.
- I love the time we spend outside with our containers garden. We are all learning together 😊
- I'd like to teach them preservation of crops!
- I don't have the best green thumb, so I'm just hoping our new plant friends can survive my attempts at gardening.

Themes: (BENEFITS) bonding, teaching children