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ESTABLISHING SUSTAINABLE COMMUNITY GARDEN INTERVENTIONS WITH AID
FROM HEALTH PROMOTION ORGANIZATIONS

Rachel Joann Buenemann

62 Pages

Community garden interventions provide policy, system and environmental change at the community level to establish health behaviors, which act in contest to obesity risk factors. Limited research examines factors, which influence the sustainability of community garden interventions. Therefore, in this study, a sample of 10 Midwestern community gardens associated through funding from a health promotion organization in 2013, collected data through the interviewing and surveying of 10 garden administrators and surveying of 12 garden volunteers. The study identified garden benefits perceived by garden administrators and volunteers to include contributions to social justice, continued education, enhanced social cohesion, increased access to food, community outreach publicity, improved environment aesthetics, increased physical activity and psychological stress relief. The study found none of the interviewed garden administrators had specific plans or models in place related to intervention sustainability. However, garden administrators identified factors, which increased stress to garden interventions, including the unavailability of resource needs: land access, fiscal funding, leadership and volunteer labor forces; as well as the occurrence of unexpected barriers, which increased the strain on resources. Researchers concluded health promotion organizations might facilitate access to needed resources and provide training for intervention sustainability planning.

KEYWORDS: Community Based Intervention, Community Gardens, Health Promotion
Organization, Policy, Systems, Environmental Change Strategy, Sustainability

ESTABLISHING SUSTAINABLE COMMUNITY GARDEN INTERVENTIONS WITH AID
FROM HEALTH PROMOTION ORGANIZATIONS

RACHEL JOANN BUENEMANN

A Thesis Submitted in Partial
Fulfillment of the Requirements
for the Degree of

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2017

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ESTABLISHING SUSTAINABLE COMMUNITY GARDEN INTERVENTIONS WITH AID
FROM HEALTH PROMOTION ORGANIZATIONS

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CONTENTS

	Page
ACKNOWLEDGMENTS	i
CONTENTS	ii
TABLES	iv
CHAPTER I: COMMUNITY GARDENS OF MCLEAN COUNTY	1
Introduction	1
Methodology	4
Sample	4
Procedures	4
Instrumentation	5
Administrators' Survey and Interview	5
Volunteers' Survey	5
Data Analysis	6
Results	7
Defining Community Gardens	9
Perceived Benefits of Community Gardens	13
Sustainability	17
Resources	17
Unforeseen Obstacles	27
Potential to Improve Intervention Sustainability	28
Recorded Phenomena	29
Discussion	32

Defining Communities	32
Benefits	32
Intervention Sustainability	33
Land Access as an Obstacle	34
Potential of Health Promotion Organization Aid	36
Limitations	36
Conclusion	38
CHAPTER II: EXTENDED LITERATURE REVIEW	40
Community Garden Benefits	40
Community-Based Interventions: Policy, Systems and Environmental Change Strategy	45
Intervention Sustainability	46
Strategies for Improved Intervention Sustainability	48
Conclusion	50
REFERENCES	51
APPENDIX A: GARDEN ADMINISTRATORS' SURVEY	57
APPENDIX B: GARDEN ADMINISTRATOR INTERVIEW QUESTION GUIDE	59
APPENDIX C: GARDEN VOLUNTEER SURVEY	61

TABLES

Table	Page
1. General Characteristics of Community Garden Interventions	8
2. Defined Communities of Interviewed Community Gardens	11
3. Garden Volunteers' Perceived Benefits While Volunteering at Community Gardens	16
4. Succession Plan of Interviewed Community Garden	21
5. Perceived Barriers to Garden Participation by Volunteers Working in Community Gardens	23
6. Volunteer Structure Implemented by Community Gardens	24
7. Motivation to Participate in Community Gardens by Volunteers Working in Community Gardens	26

CHAPTER I: COMMUNITY GARDENS OF MCLEAN COUNTY

Introduction

Diets comprised of high calorie low nutrient foods contribute with other factors to increased rates of obesity in America. The Center for Disease Control and Prevention (2015) reports 36.5% of American adults classify as obese. Obesity is associated with significant health conditions such as malnutrition, iron-deficiency anemia, heart disease, type II diabetes, osteoporosis, diverticular disease and some cancers (Health People 2020, 2014). These conditions affect the quality of life of individuals, families and communities. A community's physical and social environment play a role in health behaviors, which increase or limit risk for obesity related chronic illness. Health behaviors may relate to food selections, activity levels or community efficacy in facing health or local political challenges. The intervention theory of policy, systems and environmental (PSE) change strategy describes these environmental factors. This theory supports change at the community level. Community level change influences the development of healthful lifestyle selections and inspires cooperation among locals to overcome community issues. Healthy People 2020 (2014) endorses PSE change strategy interventions in pursuing solutions for nutrition and weight status concerns.

A common example of a PSE change strategy intervention is community gardens. Community gardens may be planned by local agencies or arise from the community level. Growing literature supports community gardens as an innovative environmental intervention for combating issues of poor diet, weight gain and food insecurity for hosting communities (Fulford & Thompson, 2013; Litt et al., 2011; Poulsen et al., 2014; Yang et al., 2012). However, community gardens commonly encounter a lack of intervention sustainability. Intervention sustainability is defined in this study as the ability to extend the duration of the intervention

beyond the limits of its initial funding to provide continued services and empower the community's adoption of health improving activities. Prematurely ending community interventions are associated with relapses of the community's health behavior improvements (Shediac-Rizkallah & Bone, 1998). In response to this issue, health promotion organizations have shown interest to intercede to improve the intervention sustainability of community gardens.

A Midwestern county health promotion organization, the McLean County Wellness Coalition (MCWC), interceded in 2013 to promote the establishment or continued operation of 17 community gardens by awarding one-time grants ranging from \$250 to \$500. The goal of the intercession was to increase the availability of fresh produce, provide sources of healthy activity, educate the public on topics of nature and provide opportunities for social connection (McLean County Wellness Coalition, 2014).

In the first growing season following the awarding of the grant, the researchers Lanier, Schumacher & Calvert of Illinois State University (2015), conducted a qualitative study upon the 17 MCWC funded gardens. The results of the study found community gardens were perceived to provide a variety of benefits to key stakeholders (garden volunteers, garden communities and garden host-organizations) such as increased garden knowledge, increased community connectivity, improved health factors and increased physical activity. However, this study was not able to report on long-term benefits of community gardening for key stakeholders, as data collection was not continued for successive growing seasons. Further, this research lacked input from garden volunteers. The study relied on secondary data collection methods, interviewing garden administrators and recording their perceptions of the benefits gardens provided to the volunteers and the community. The potential to fill the gaps in research and explore the

intercession needs related to intervention sustainability inspired this research study. The exploration of the volunteers perceived benefits of community garden programs allows health promotion organizations to distribute resources effectively to local interventions. This research is important, as resource needs may shift from a focus of garden development and education to long-term maintenance and volunteer retention support over time. For example, garden plot location selection and planting dates may hold little significance to an established garden. While soil enrichment strategies or publicity for events may be relevant.

Seeking explanations of factors influencing garden intervention sustainability from administrators of both ended and operating gardens allows health promotion organizations to develop intervention tools to increase intervention sustainability. Community garden interventions address multiple risk factors for the prevention or management of disease conditions within the community, supporting the investment in tools to improve operation models.

The purpose of this study was to explore opportunities for a health promotion organization to affect intervention sustainability in 10 rural Midwestern community gardens. The research questions which guided this study included:

1. What do garden administrators and garden volunteers perceive as benefits of community gardens?
2. How do garden management techniques change outcomes of a community garden program?
3. How do health promotion organizations assist community organizations with developing policy, systems and environmental change through community garden programs?

Methodology

Sample

A convenience sample of garden administrators and garden volunteers recruited from the 17 MCWC grant receiving community gardens defined the inclusion parameters of this study. The garden administrators' response rate was 58.8% (n=10) and the garden volunteers' response rate was 12, with an average of 1.2 volunteers per garden. Recruitment initialized through the contact information provided in the MCWC grant applications. When the provided contact information was not current, researchers utilized additional MCWC resources including community networking. Garden volunteers received selection based on their involvement with the community gardens sampled in this study. Snowball sampling through garden administrators established contact with garden volunteers. Researchers requested garden administrators distribute an email invitation to participate in the study with a link to the online survey. In addition, researchers visited sampled gardens on community workdays to recruit garden volunteers, distributing printed copies of invitations to participate in the study and a paper survey.

Procedures

Data collection occurred in an isolated period utilizing a cross-sectional survey. Researchers distributed email invitations to garden administrators of the MCWC grant funded gardens to participate in completing the Garden Administrators' Survey (Appendix A). Informed consent was obtained on the first page to gain access to the survey. At the end of the survey, garden administrators were asked to schedule an interview with study researchers. Interviews took place at the garden sites or a convenient community location such as a library or restaurant using the Garden Administrator Interview Question Guide (Appendix B). Informed consent was

again obtained prior to beginning the interview. Detailed notes and audio recording occurred during the interview and were later transcribed. Garden volunteers received invitations to complete the Garden Volunteers' Survey (Appendix C) through emails forward by their community garden administrators. Three garden volunteers were also recruited during garden site visits by the primary researcher. Informed consent was obtained on the first page of the survey to gain access to the survey. Compensation of a \$5.00 gift card was provided to each of the 12 garden volunteers who completed the volunteer survey.

Instrumentation

Administrators' Survey and Interview

The purpose of the Garden Administrators' Survey was to gather operation data for each garden site including years of operation and community amenities. The survey contained four questions, a combination of open and close-ended. The purpose of the Garden Administrator Interview Question Guide was to document garden practices, garden-neighborhood interactions, impact of the community garden on volunteer participants and resource needs of the garden from health promotion organizations. The interview contained 14 open-ended questions.

Volunteers' Survey

The purpose of the Garden Volunteers' Survey was to gather demographic information, explore perceived gardening benefits, explore gardening motivations and identify levels of community connectivity. The survey contained 15 questions, a combination of open and close-ended. The garden administrator and garden volunteer surveys were adapted from previous studies on community garden benefits (Armstrong, 2000; Lanier, Schumacher & Calvert, 2015) and were reviewed by MCWC members for construct and face validity.

Data Analysis

Data from garden administrator interviews, garden administrator surveys and garden volunteer surveys were used to generate the results of this study. All interviews were audio-recorded and transcribed. All coding, sorting and comparing of the data during the analysis process took place in three steps. Initially, the primary researcher utilized open coding by topic to label concepts and define categories. Topics were influenced by the study's research questions and existing literature. Next, the interviews were explored for additional themes and categories through analytical coding. Finally, the interview material was searched for discrepant evidence and negative cases to add variation and depth of understanding to reported results. Following the coding of all transcripts, preliminary reports were generated of the material assigned to each code. Two researchers completed the review and coding of data in the analysis process. Quantifiable data of the garden volunteer survey was descriptively analyzed and frequencies reported (Teig et al., 2009).

Results

The findings of this study report upon categories of the perceived benefits of community gardening, risk factors affecting the sustainability of community garden interventions, opportunities for health promotion organizations to aid community garden interventions and phenomena identified in garden administrator interviews. The original wording of interview/survey sample quotes featured in text and tables has been retained. This was done as this study is an important opportunity for garden administrators and volunteers to present factors influencing community garden operations and intervention sustainability. As defined by this study, garden administrators are the primary contact and operational manager of all community garden liaisons. Hosting organizations, as defined by this study, are the patron of the community operating the garden. These organizations provide vital resources such as land, funding or volunteers. Examples of hosting organizations include churches, community centers or local businesses. As defined by this study, garden volunteers are the day to day operators of the community garden and members of the defined community. The sampled gardens discussed hereafter are described by general characteristics in Table 1. They are identified throughout the result tables by assigned letter A-J.

Table 1. General Characteristics of Community Garden Interventions

Gardens	#of Years of Garden Operation	Hosting Organization Description	Descriptive Characteristics
A	8	Local 4-H Club	Gardeners hold regular meetings. Cooperative work days planned.
B	4	University Club	Cooperative work days planned. Some activities completed cooperatively by gardeners. Gardeners hold regular meetings.
C	3	Neighborhood Organization	Located in a low-income area. Cooperative work days planned.
D	7	Neighborhood Organization	Garden has improved attitudes of residents about the neighborhood.
E	3	School	Garden includes a sitting area, with bench(es). Some activities completed cooperatively by gardeners. Cooperative work days planned.
F	13	Community Center	Located in a low-income area. Garden includes a sitting area, with bench(es). Some activities completed cooperatively by gardeners. Cooperative work days planned. Garden has led to other neighborhood issues being addressed.
G	Ended after 1 year	Youth Education Center	Located in a low-income area. Cooperative work days planned. Some activities done cooperatively. Garden has improved attitudes of residents about the neighborhood. Garden site no longer operating.
H	4	Church Group	Garden site is in jeopardy.
I	5	Public Service Organization	Located in a low-income area.
J	3	Residential Care Center	Gardeners hold regular meetings. Cooperative work days planned. Garden has improved attitudes of residents about the neighborhood. Garden includes a sitting area with bench(es).

Defining Community Gardens

Gardens of this study were established within a variety of communities. The gardens were classified in Table 2 by their type of community base and type of intervention mission. Four of the gardens operated within interest-based communities, represented by a mutual culture or shared experience among members, who were unified under a common mission. Six of the gardens operated in place-based communities represented by ties among members due to geographical closeness, familiarity and co-resource dependence. Gardens also followed various missions. Six gardens supported social service missions, implemented through the community garden membership donating all or part of their plot's produce to food insecurity causes. The remaining gardens conducted missions of neighborhood connectivity (enhancing volunteers' investment in the community) or local food provision (addressing concerns of local food insecurity).

Gardens were observed to support targeted populations with their selected service missions. Nine gardens selected an underprivileged or low-resource target population, with trends highlighting child populations and food insecure populations. Seven gardens dedicated some manner of programming to children. A place-based garden administrator discussed how hosting children's programming attracted community families and skilled volunteers. "I believe this master gardener is working (with us) because she came to a meeting, and I talked to her about the importance of vegetable gardening for our children, and I think it struck a nerve with her." The garden administrator predicted the selection of highly motivating service populations, such as children, grants higher rates of support and involvement from communities and volunteers. Four gardens reported increased volunteer interest and participation with the use of a

specific mission. Missions included the offering unique planting varieties, educational opportunities, service populations or resource services.

Table 2. Defined Communities of Interviewed Community Gardens

Gardens	Community Type	Community Quote	Mission Type	Mission Quote
A	Place	“So we went to the village and the kids presented to them, asking for any place in town where there is a tract of land where we could put a garden in. And this what they gave us. This is a town lot.”	Food Supply to Food Pantry (Social Service)	“Nine years ago we started the food pantry and we had lots of kids involved in gardening. And one of the things we were missing at the food pantry was fresh fruits and vegetables. ...And anyways we said well let's maybe try and start a garden.”
B	Place	“That was something nice about the old location, it was only 3½ blocks from Glen School.”	Commerce, Food Insecurity, Student Research, Educational Outreach (Social Service)	“The idea was 50% we would use to make money so we could pay our managers, and the other half we would donate.”
C	Interest	“He (the landowner) believed if they were to do anything, it should be given back to the community. In the sense of a community garden, we are a bit different, everything that we grow is given to the shelter.”	Food Insecurity in Homeless and Children (Social Service)	“There just needs to be more food present for them at a lower cost. I know I can't put a tomato and cucumber in front of every one of those kids but, we will make a difference where we can.”
D	Interest	” I decided when I met the Wetstines. They are into organic farming. I read a lot about how organic foods are beneficial for your health. I talked to them and they gave me a nice area to start gardening.”	Accessibility to Familiar Foods (Social Service)	“I also felt there was a large need for the African community to eat foods that they eat at home, so I started growing vegetables and amaranth.”
E	Interest	“I first became involved when for a graduate leadership project, we were handed the garden over from previous interns.”	Food Insecurity, Educational Outreach (Social Service)	“The purpose was just to donate the produce to anyone who needs it.”
F	Place	“Since this is a community center the thought was that you needed to have a community garden.”	Food Insecurity in Families (Local Food-Insecurity)	“We perceived an issue of seeing families who attended here walking up to the gas station and coming back with boxes of fruit drinks and chips and stuff and we are thinking, well that is not what we would like to see; we wish they had better options.”

(Table Continues)

Table 2. Defined Communities of Interviewed Community Gardens

Garden	Community Type	Community Quote	Mission Type	Mission Quote
G	Place	“The garden was left at the old facility (when the preschool moved). (The garden is) no longer being operated, (the) old facility (was located) by unit housing.”	Educational Outreach (Social Cohesion)	“The main manager/teacher wrote for the grant, tended it, and included the kids.”
H	Interest	“We started out with one smaller plot, and we were growing vegetables for the congregation. Then we had extras.”	Personal Food Source, Food Insecurity (Social Service)	“We like fresh vegetables; when we lived in Wisconsin, we grew our own garden; we both had some experiences with gardening, and we thought it would be a nice thing to do, as we got deeper into it, and saw how difficult it is for people with fixed income to afford fresh produce, we thought, well what a great thing to do.”
I	Place	“We have a resident gardening program through life enrichment.”	Life Enrichment (Social Cohesion)	“It connects to all of those eight dimensions of wellness. We made the case for how therapeutic it would be for the residents to be able to execute these things and by the participation that we have that has been proven.”
J	Place	“Yes, we have six plots and the space along prairie street which the art center owns the property those are available to people from the community.”	Gardening Space, Personal Food Source (Local Food-Insecurity)	“So I figured, given the economic disparities between our central mission; and the availability of property, and the needs of the community, it made sense to me.”

Perceived Benefits of Community Gardens

Benefits associated with categories of social justice, continued education, enhanced social cohesion, increased access to food, increased host-organization publicity, aesthetic improvement of community environments, increased physical activity and psychological stress relief were gleaned from administer interviews and volunteer surveys. The most frequently reported benefits of community gardens by garden administrators were increased access to food, opportunities to provide social justice and continued education or enhancement of skills.

A community garden's provision of access to food was stated as a benefit by all garden administrators. The administrator of an interest-based garden specifically associated increased access to familiar or culturally significant produce with greater consumption of vegetables, due to the community's knowledge of how to prepare and utilize the produce. Specific produce varieties were cultivated by four gardens in acknowledgement of served communities preferences or specific needs. The administrator of an interest-based garden indicated the provision of novelty produce varieties was a benefit to their service population of food insecure children. "They are adding radishes and produce (to meals) kids may not have seen before. (Kids) may try and may like it. That is the main benefit I see." Exposure to various produce increases acceptability to new fruits and vegetables as expressed by the garden manager.

Social justice services operated through community garden interventions was identified as a benefit by five garden administrators. Social justice received description as the potential to serve others to enhance social equality. The administrator of an interest-based garden stated, "I like the knowledge of knowing that I am making contributions to someone who doesn't have the luxury of shopping at Schnucks or Hy-Vee, or something like that. To buy fresh produce because, man, that stuff is expensive. To know that the food is going to someone who can really

needs it.” Personal satisfaction and self-accomplishment or affirmation were similar benefits associated with social service aspects of community garden interventions.

Educational opportunities or skill enhancement experiences enacted through garden tasks were described as a benefit by seven administrators. The administrator of a place-based garden shared, “We provide it (education) to the children during the after-school enrichment program and throughout the summer. We usually educate the parents about twice a year, during our parent meetings.” Education programs with a focus on children were featured at seven gardens.

An increase in the duration of physical activity was the most frequently reported benefit of community gardening among volunteers. One volunteer stated, “I have enjoyed the exercise and the time spent outside. Working in the community garden has been a fun way to meet new people and learn new things about gardening.” Further, 41.6% of surveyed volunteers selected enhanced social cohesion, increased fruit and vegetable consumption, continued education or enhancement of skills and improved support to adopt health behaviors benefits they experienced from community gardening.

Garden administrators observed enhanced community involvement with local projects and increased social interaction among community members following participation in garden programs. The administrator of a place-based garden associated with a food pantry elaborated,

They can go and sit. While they are sitting, they are getting to know one another. ‘Oh I have this, or have you tried this, and lalala.’ (They) just find the need for some psychological help, I guess, among one another. ‘I’ve been through that; I’ve just been through a divorce. Oh, I’ve been through that too; this is what has happened with me.’... We weren’t hoping that, but it has happened. It is a nice network for them. Some of them raise some of their things (garden produce). They might have tomatoes, or they have planted zucchini. They are trying to plant a garden too. (They say,) ‘I’m going to have so much; I’m going to bring it up here (to the pantry).’ They share with each other and they are so happy to be able to share with each other.

The discussion held by the service population of this garden suggests the potential for gardens to enhance social bonding, to relieve psychological stressors in the participants lives, and model

reciprocity within in-need communities. Members of the service population adopted a model of reciprocity to share produce amongst themselves in times of surplus.

When selecting benefits for a served population, garden volunteers most frequently chose access to food and enhanced support to adopt health behaviors. One volunteer stated, “I know that my efforts are helping lower income families get fresh food which can be difficult on a budget.” Volunteers considered gardens to provide a financial benefit to members of the served population who were receiving food aid. A complete report of benefits and frequency of selection by garden volunteers is featured in Table 3.

Table 3. Garden Volunteers' Perceived Benefits While Volunteering at Community Gardens

Benefits most frequently perceived by volunteers for volunteers (N=12) (%)	Volunteer Quote of Perceived Benefits
Increased Physical Activity (50)	"I have enjoyed the exercise and the time spent outside."
Fostered Sense of Giving Back to Community (41.6)	"It is a nice get-away, as well as rewarding to donate the produce to those in need."
Learned to Build/Tend a Garden (41.6)	"Working in the community garden has been a fun way to meet new people and learn new things about gardening."
Increased Sense of Wellness and Belonging to Community (41.6)	"The benefits I have from gardening is sociality with other persons."
Increased Fruit or Vegetable Consumption (41.6)	"Healthier eating habits. Lower bad cholesterol."
Fostered Support Towards Healthy Living (41.6)	"Healthy food. Exercise. Enjoying nature."
Benefits most frequently identified by volunteers for service population (N=12) (%)	Volunteer Quote of Perceived Benefits for Service Population
Alleviate Hunger/Food Insecurity (41.6)	"I know that my efforts are helping lower income families get fresh food which can be difficult on a budget."
Increased Fruit or Vegetable Consumption (41.6)	"Fresh food, providing more food."
Fostered Support Towards Healthy Living (33.3)	"Health benefits for underprivileged."

Sustainability

Community garden administrators reported completing limited planning for intervention sustainability. Only one garden administrator described having previously researched sustainability models or strategies.

We were talking about how to make it sustainable, what was the model going to be to make it sustainable. So, there was a lot of conversation, monthly meetings, going back and forth trying to get it established. ... Last year, the horticulturist and I sat down together to really talk about a community garden model and how we need to develop it into a transitional program, where there is going to be community ownership. Right now we don't have the public base, we don't have contact with the public base that would come and take ownership.

To this intent, no other administrators had investigated plans to sustain their gardens. Throughout the course of the interviews, garden administrators identified factors which increased intervention hardships or increased risks towards not obtaining community garden sustainability. Primary conclusions included the lacking of key operation resources and the occurrence of unexpected obstacles to the operation.

Resources

Land, funding, leadership and volunteer labor forces were major themes in identifying key resources for intervention operations. Land is a primary resource, providing a base of operations for garden communities. Gardens acquired sites through multiple methods. Seven gardens were allotted land from hosting organizations. Two gardens were rented land from for-profit land owners. One garden was allotted land from a public municipality. However, issues retaining this access to land occurred. Issues among interviewed gardens stemmed from the relocation of a hosting organization's base of operation and the end of rental agreements with for-profit landowners. The disconnection of a garden community with their land presents multiple consequences. These may include the disconnection of interventions from their

established communities and the disruption of current programs, such as education outreach, cultivation methods and for-profit produce sales. The administrator of a place-based garden described the consequences of their organization's land relocation. "The preschool has changed facilities as of 2014. The garden was left at the old facility and is no longer being operated." This garden's need to establish a new garden site was deemed too great of a financial and labor cost. Therefore, after only its first year of operation, the intervention discontinued their garden program. Garden programs with greater control over land experienced fewer barriers to program growth and maintenance. The reliance on landowner lenience for plot access presented a risk to community garden intervention sustainability for multiple gardens.

Funding is a necessity for community gardens to afford supplies and other expenses. Six gardens depended on community donated funds such as grant funding from various proprietors. Two gardens sought independent donations from local corporations. Two gardens utilized retail funds from produce yields sold in various markets. Nine of the 10 sampled gardens which pursued funding utilized more than one funding source. The use of multiple funding sources appeared pertinent to intervention sustainability. The administrator of a place-based garden described his experience when the garden lost a projected funding source. "We had about 150 pounds of asparagus we were going to sell with Legacy, and we had to dig it all up. So we were never able to fulfill that contract." The garden considered adapting to this loss of funding by downsizing their offering of social services and increasing the portion of produce yields retailed for revenue.

Two of the surveyed gardens struggled with funding deficits. As described by one administrator, "We are not at a point where we are making a lot of money and can pay someone a wage." Both funding deficit gardens utilized the retail funding method. Retail or cooperative

retail included local vending at farmer's markets and co-op grocery stores. This funding method allowed revenue from produce yields to fund community garden programs. The administrator of one of the gardens described the co-op relationship. "We have joined the Legacy of the Land: Farm Co-op. So, there are 17 farmers in this co-op and they are anxiously waiting for the Green Top Grocery to open. And, when Green Top opens the Legacy farmers will have that as an outlet." Retail funding methods appear to have potential as a strategy for intervention sustainability as a renewable funding source.

Single and multi-person management teams composed the leadership structures of community gardens. Six gardens had a single garden administrator with minimal leadership support from other hosting organization members. Four gardens had two or more garden administrators involved in garden operations. To emphasize this point, the administrator of an interest-based garden described the garden's distribution of leadership responsibilities, among a multi-member team.

I have a friend; she is the director of the Facebook publications and pictures. I have my son be in charge of the finances. I handle the management, and me and my son handle the finances. Then I can focus on producing and marketing. It is overwhelming doing everything. Often you end up doing not so well.

The garden administrator acknowledged that the use of multi-person leadership teams may prevent stress or wear upon program leadership, increasing an individual leader's longevity in the role.

Leadership continuity composes a crucial resource for community garden interventions, suggesting leadership resignation as a risk to intervention sustainability. Three main justifications for leader resignation included the restriction of time administrators could dedicate to the garden, physical inability to maintain the garden due to age, or the administrator's graduation from the garden's affiliative community or hosting organization. Graduation

scenarios were described to include schools, community groups and employment positions. Succession planning from one garden leader to another following an administrator's resignation varied in the sampled gardens. Thoroughness of succession planning varied dependent on the amount of hosting organization support, the amount of community support and the long-term plans of the garden intervention. Leadership succession plans were not wholly developed for many of the gardens, with a select few having intentions as to how a succession plan may appear. Succession planning concepts reported by specific gardens are recorded in Table 4.

Table 4. Succession Plan of Interviewed Community Garden

Gardens	Succession Plan	Succession Quote
A	Future Club Leader	“Hopefully as other come into the 4-H club, they will want to take over some of that. My kids are out now.... I am the leader of the regional 4-H club. But I have 10 project leaders and they really do help.”
B	Future Faculty	“There could be somebody within ARC, who may want to be a faculty advisor or be a campus advisor that could happen with ARC. In terms of the succession planning away from me and towards someone else, I don’t think we are there yet.”
C	No Plan/ Paid Position Successor	“No, I don’t. It would have to be. I do it because I want to do it. There are people I work with who understand, that the summer is a bit of a slower time for me anyways, so it is something I can easily handle to do. However, if you bring in the next person and they don’t want to do it. It may not continue.”
D	No Plan	“I have my son be in charge of the finances. I handle the management, and me and my son handle the finances. Then I can focus on producing and marketing. It is overwhelming doing everything. Often you end up doing not so well.”
E	Future Interns	“Every year, when there is a new intern class, two interns will take over the garden. In our program, we have a leadership project; they will fill out a survey about their interest, that is how the selection process goes.”
F	Paid Position Successor	“The garden management is worked into the job description of my job. It has got to be part of our DNA. At this point, it is not up for discussion it is a given that there will be a garden.”
G	No Plan	“The previous garden manager, a teacher is no longer working with the preschool. ... We would be interested in starting one in the future at our current space; we would just need someone with an interest. I would have to take a poll. I think there would be interest.”
H	No Plan/ Community Organization Collaborations	“We are an aging congregation and we are some of the younger members. There are not youth waiting in the wings. Everyone is so busy. There are a couple of people who have talked about coming out to help and that is about as far as it has gotten. One individual in particular, I can start, hinting towards. They just retired, kind of give him a hard time about that, to guilt him into contributing. “-8 “I would also suggest to try to get involved with younger people like middle school and high school on up. Get them involved so that down the road they start thinking about their own gardens, and what they eat for health reasons.”

(Table Continues)

Table 4. Succession Plan of Interviewed Community Gardens

Gardens	Succession Plan	Succession Quotes
I	Paid Position Successor	“We made the case for how therapeutic it would be for the residents to be able to execute these things and by the participation that we have that has been proven. So, for that reason, I believe that it would stay within the life enrichment department.”
J	Paid Position Successor	“It has been nice to be able to see that level of participation and again there is no overhead for us. We own that property. And it is not as though we are going to do anything with it in the foreseeable future. It is just advantageous for us to build good will.”

An issue with an insufficient volunteer labor force was encountered by six gardens due to the limitations with specific communities. Communities’ limitations toward volunteering included time constraints due to multiple jobs or commitments, physical limitations of range of motion, scheduling conflicts and extended distances from the homes to garden site. Community garden volunteers described barriers to participation, as reported on Table 5. Gardens responded to barriers to participation and insufficient volunteer labor forces with different methods as reported in Table 6. Four gardens left garden maintenance specifically to the community volunteers. Four gardens collaborated with community volunteers in garden maintenance, contributing partial host-organization staff labor. Two gardens designated host-organization staff labor in completely maintaining the garden.

Table 5. Perceived Barriers to Garden Participation by Volunteers Working in Community Gardens

Barrier for Participation	Number of Participants Identifying with Barrier(N=12)	Volunteers' Quotes
Time Commitment	8 (61.5)	“Scheduling can sometimes be an issue, but with other people working in the same, garden the schedule is usually not a big problem. Sometimes it is a little inconvenient to drive across down to get to the garden too.”
Weather Conditions	4 (31)	“It has been hot.”
Excursion of Physical Labor	3 (23)	“I don’t like to sweat”
Garden Location	2 (15.4)	-Identified by close ended question-
Lack of Volunteer Organization	2 (15.4)	-Identified by close ended question-
Lack of Reward Motivation	1 (7.7)	-Identified by close ended question-

Table 6. Volunteer Structure Implemented by Community Gardens

Gardens	Labor Force Type	Labor Source Types	Labor Force Quote
A	Community	Families and Children	"I have a lot of families, new families this year, which have never gardened; I've had 4 new families this year come to the garden, as they are new to the garden this year. As they become involved in the garden, they may take it as a project in 4-H as well, to learn how to garden."
B	Community and Organization Staff	Students, Faculty	"We sort of have three sources. We pay people. We have interns, and we have volunteers."
C	Community and Organization Staff	Community Members, Community Service Workers	"When people have done wrong and need to do 600 hours of community service or 100 hours of community serve. There are certain people who would rather be gardening than inside cleaning. We always have the opportunity to pull from community service."
D	Staff Organization	Family-Staff, Customers, Volunteers	"My son is tilling. My husband is mowing the grass, and I am pulling the weeds, just the three of us."
E	Community	Students, Volunteers	"There are two garden interns- and we are the leaders. Throughout the year we recruit other volunteers to work with us, whether it is watering, planting, harvesting."
F	Community and Organization Staff	Community Members, Staff, Children	"Currently it is just been managed by staff. Staff who have increasingly limited time and resources. The goal as to sustain it. "
G	Community and Organization Staff	Families, Children, Staff	"There were planting days in the spring and other volunteers included children families in the program and the spouses of staff."
H	Community	Community Members	"Our volunteers are a retired couple and ourselves."
I	Staff Organization	Community Members, Staff	"We care for the plants as staff throughout the week, but once a week we try to have a designated time that the residents do something with the beds as opposed to daily. "
J	Community	Community Members	"We posted a sign, and within a week people were actively planting."

The high turnover of volunteers results in a high rate of successive recruitment and training. Garden administrators expressed this relationship contributed to a loss of community cohesion and invested garden education resources. “It is tricky and it’s hard to train students each time (academic year) in a new skill. So, it’s a little (frustrating). They have to learn to grow the food and water it. They have generally never done that.” Prevention of high rates of turnover through a targeted selection of volunteers or use of retention strategies was a goal discussed by two administrators.

Garden administrators initiated volunteer recruitment techniques to initially attract volunteers including networking amongst community programs, nurturing relationships of reciprocity amongst community members or programs, publicizing intervention outcomes, marketing to volunteer motivations (Table 7) and developing intervention programming to fulfill volunteers perceived benefits. Garden administrators implemented volunteer retention techniques to retain volunteers including maintaining smaller garden plots to require less volunteer effort, positioning plots in highly accessible locations, customizing intervention programming to the community interests or needs, providing continual education workshops, and hosting community events at garden sites. At eight of the gardens, a form of volunteer incentivization for participation took place. Incentives for participation included fiscal rewards, academic or project credits in a school or program, and access to garden produce.

Table 7. Motivation to Participate in Community Gardens by Volunteers Working in Community Gardens

Motivation for Participation	Number of Participants Identifying with Motivation (N=12) (%)	Volunteer Quotes
Enjoy Nature/Open Spaces	10 (77)	-Identified by close ended question-
Access to Exercise	8 (62)	“Helping others by providing them with healthy food and exercise for myself.”
Food Source for Low Income Household	7 (54)	“Feeding the hungry and needy population.”
Access to Organic Food	6 (46)	“We were invited by them, they said come get organic and here we are. Organic is the best.”
Healthy Activity	6 (46)	-Identified by close ended question-
Mental Health Benefits	5 (38)	-Identified by close ended question-
Fresh Food is/Tastes Better	5 (38)	“To ensure those who do not have access to fresh produce are given the opportunity to have it at no cost. “
Good Children’s/Family Activity	3 (23)	“Because it healthy food and past good time in family.”
Traditional/Cultural Practice	1 (7.6)	“I worked in a community garden previously, and would like to continue to gain experience.”
Income Supplement	0 (0)	-Identified by close ended question-

Unforeseen Obstacles

Unforeseen obstacles to garden operations create strains on the limited resources available to community interventions. Six garden administrators described unforeseen experiences they had encountered or overcome, which presented obstacles to garden operation. These experiences included conflicting schedules of volunteer forces, adapting the land of a new garden site for garden purposes, relocating a garden intervention site, establishing lines of communication with a served population, replacing a diminishing host organization volunteer base and recycling a contaminated planting environment. The garden administrator of an interest-based garden, described how the diminishing membership of the hosting organization depleted their garden's volunteer base.

The first year we had where you could plant your own plots. We also had a large area as a community plot. A couple of people took their own plot. But then the next year, we expanded and just went to one plot. A couple people left our church. The individual plots were something new for our church. We went through a minister change and lost some members intermundane. We have a new minister now for a year and it will be kind of slow. We will have to see what happens.

The garden overcame this obstacle by altering the garden's plot structure from individual plots to a community to match the capabilities of decreased garden participation. Due to this experience, the garden administrator acknowledged the potential risk of maintaining a homogenous volunteer group, without stratification. In response to similar issues of understaffing, four gardens initiated heterogeneous volunteer pools with tiered levels of involvement. Another type of obstacle involves garden infrastructure or tools. A place-based garden became aware their planting beds were constructed with treated wood which was unsafe to use for growing produce due to the potential for chemicals to leach into the soil. "There was something in the treatment of the wood, that he indicated would be unsafe for consumption. At that point, what I did was think, 'really, well, what can we use the space for?'" Formerly we had purchased flowers for our dining room

tables. We thought it would be a great way to utilize that (the beds) and not have to go out and spend budget funds on flowers and they look beautiful.” This garden overcame this obstacle by refocusing the garden’s mission to include floral plantings in response to the planting environment’s limitation. The change in garden mission improved fiscal responsibility and benefits to the hosting organization, as floral planting better suited the community’s needs.

Potential to Improve Intervention Sustainability

Health promotion organizations have the potential to facilitate access to resources for local community interventions. Multiple administrators disclosed their appreciation of health promotion organizations distributing funding opportunities through email lists. In the 2013 grant distribution, the gardens required resources of materials, fiscal funding and land as discussed in Lanier, Schumacher and Calvert (2015). Though funding sources continued to be sought after by two garden interventions, utilization of funding has shifted from the purchasing of supplies to the employment of a labor force. An administrator expressed that equipment held a lower priority five plus years into operation.

There are equipment costs. I’m not saying its unimportant, but at this point it is not so much that equipment as the ongoing expense, (as much as) paying for the labor. Because gardening and producing food is so laborious. And you really do need that carrot of economics. Students can’t make it in college without summer work.

The administrator introduces that to continue garden operations, paid employees were necessary. Resources which would benefit garden operations were described by garden administrators to include: reliable sources of funding, publicity strategies to share messages of garden missions, programs and outcomes through technology and strategies to maximize planting yield including effective techniques to trellis/guide certain varieties of produce and techniques to build ergonomically safe gardens.

Recorded Phenomena

In addition to the risk factors of achieving community garden intervention sustainability, multiple phenomena of garden management techniques were observed through this study. Observed phenomena included the application of PSE change strategy in community garden interventions and the degree of intervention goal planning implemented by garden administrators. These phenomena will be discussed.

PSE change strategy was not identified as a major theme in garden planning or operations. However, positive effects associated with PSE change strategy were described by administrators. It was the cooperation and interaction of community members that prompted community activism and inspired the initiation of multiple gardens. For example, in a place-based garden, the community hosted a public event oriented to concerns of local food insecurity. The garden administrator described how this same topic of concern, over multiple years, continued to develop different events and interventions, addressing varied segments of the food insecurity and eventually developing into the current garden. Another garden in an interest-based community found its site served as a central location for a geographically dispersed, culturally united, community to discuss issues pertinent to them. As described by a volunteer of the garden, “It is organic. Also, we did this at home. For me, to know that I can do this here. Is an amazing. We know the value of eating corn that came from a garden that you know.” PSE change strategy suggests interaction and discussion among community members of shared issues inspires further change. Participants with this garden further expressed appreciation of the garden’s availability and a desire for more community garden sites closer to their homes.

Garden administrators identified a subset of policy which affected their garden operations. Seed saving laws were mentioned to have nearly inhibited garden outreach efforts by

a sampled garden. The garden had been obtaining seed from a seed library and considering opportunities to unite multiple communities through seed exchanges. However, this course of action was potentially endangered under current seed saving legislation. As stated by the administrator, “There is a seed saving law that made us a little nervous. It was a law on the books that made seed libraries, seed exchanges, illegal. The Illinois stewardship alliance did substantial advocacy work to have an exception put in for seed libraries and seed exchanges.” Laws which limit local agriculture create unnecessary resource confinement on community gardens. Continued assistance for local agriculture advocacy groups enhances public access to garden interventions.

Intervention management and leadership satisfaction may be influenced by the degree of goal planning completed by administrators. Garden administrators of three gardens expressed that lofty goal planning, beyond accomplishable realities, created frustration among the leadership if goals were not attained within one or two growing seasons. An administrator of a place-based garden described a barrier he experienced to mission progress.

I think something we have talked about, is having the ability to separate the management of the labor from the larger community garden aspect. I haven't had all the time I needed this past year. It was a real factor. That for me just wasn't possible... I didn't quite get to try everything I wanted and we have fantasies of it (the garden) being.

The start of more initiatives than is realistic to accomplish at one time, as seen with this garden, slows the progress of all initiatives. This garden's desire to implement community operated garden autonomy was not feasible at the current levels of volunteer involvement, ownership or resource availability. The inability to move forward with goals on the planned timeline further contributed to the abandonment of other garden initiatives and leadership frustration as described by the administrator.

A staff member is present if you want to come and work (volunteer in the garden). I feel that is the official stance. My unofficial stance is come if you like and harvest some vegetables. If you can, stay and pull some weeds, if not, I don't care.

The sweat equity strategy, intended for use by this garden, attempted to establish accountability among its participants and increased community engagement, per the garden administrator. However, the initiative was no longer enforced due to the frustration of the leadership and a generated ambivalence toward current initiatives.

Goal planning was successfully implemented by five gardens. For example, the garden administrator of a place-based garden scheduled specific activities and programs based on the eight dimensions of wellness. This garden's goal planning was effective, holding a participation rate of ~33% of the community population. Another garden generated a successful community participation rate, which followed a contrasting goal planning philosophy. The place-based garden employed a notably relaxed set of goals or mission, as expressed by the garden administrator. "Low expectations. I didn't have a grandiose mission. We weren't launching street festivals, seeking donations or buy in. No organizational mission. Just, 'here is this space that is available if you would like to be available there is no charge.'" The garden's maintenance rests solely with the community participants, as the intervention enforces no structural rules or provides any resources beyond providing the land for planting. The administrator shared that the lack of mission contributed to the garden's success. The administrator described this theory of management as low expectations requiring fewer costs or incurring fewer deterrents for the interventions continuation. The simplicity of this garden's management structure speculates community garden interventions may require little oversight if centered in an invested community.

Discussion

Defining Communities

The findings of this study observed no differences in the perceived benefits or management styles between interest-based or place-based communities. The lack of observed differences may be due to the limited sample number of gardens and volunteers. The community types defined in this study corresponded to definitions presented in Firth et al. (2011) of interest-based and place-based communities. The designation of community types operating gardens may guide the tailoring of programs and heighten the availability of services to meet participant needs. To illustrate, a place-based garden's participation rate may improve with an open schedule of garden access due to the near proximity of the population. However, an interest-based garden's participation rate may improve with scheduled work periods, which allow for increased interaction amongst distal populations. Continued research into specific populations associated with each community type may refine these applications.

Benefits

The findings of this study agreed with previous research which noted a perceived benefit of increased physical activity, enhanced garden knowledge/efficacy, improved fruit and vegetable intake or willingness to try new fruits and vegetables, incidences of psychological relief, observations of skill building or job training, enhanced aesthetic value of the environment and improved social cohesion with garden participation (Armstrong, 2000; Fulford and Thompson, 2013; Poulsen et al., 2014; Teig et al., 2009; Yang et al., 2012). Intervening mechanisms of community gardens which improve social cohesion were not investigated by this study. However, several of the mechanisms identified in the study by Teig et al. (2009) arose in the data set, including: reciprocity, civic engagement and community building.

Garden administrators and volunteers shared common descriptions of their perceived benefits of community garden participation. The participation of most the garden administrators as laborers in their gardens may have contributed to a lack of dissonance between the two views, as garden administrators would be sensitive to a volunteers' perspective. The lack of dissonance among administrators and volunteers fills a previous gap in the literature accessing volunteer perceptions of garden benefits. This knowledge may guide future intervention programming and recruitment strategies to maximize reported benefits and attract additional volunteers.

The function of community gardens to provide increased access to food in relief of economic stress for low-income community members was exemplified through this study. To illustrate, a place-based garden that collected outcome results received a report from their municipality that the need for emergency utility aids had decreased since the initiation of the garden/pantry. The administrator attributed the decrease to the redistribution of limited low income household funding from food sources to required utilities once food needs were met by the pantry. Prior research by the Food and Agriculture Organization of the United Nations (2007) and Shisanya and Hendriks (2011) found cost savings from gardens enabled receiving households to purchase more of other household essentials. The further application of community gardens as economic relief interventions may encourage greater community garden resource support from municipal agencies. The specific application of garden savings was not investigated in this study and presents a potential for continued research.

Intervention Sustainability

The findings of this study revealed garden administrators designated limited attention for intervention sustainability. Yet, strategies with the potential to improve the sustainability of interventions were identified including: the recruitment of volunteers of diverse ages, the

development of volunteers to accept leadership roles, the specialization of intervention missions and the establishment of multi-person leadership teams. Prior research by Yang et al. (2012) further recommended enhancing volunteer self-efficacy through the hosting of hands-on workshops and the creation of leadership positions to increase intervention sustainability. The lack of attention to intervention sustainability by leadership expresses a need for the education of administrators and garden stakeholders, upon subjects of creating long-term community changes in pursuit of health-behavior change through sustainable community interventions. Continued research may consider intervention models which support sustainable interventions and investigate the average duration of community garden interventions.

Garden administrators of this study provided limited insights of succession plans for their gardens. A lack of succession planning influences garden operations. As exemplified in two gardens of this study, poor communication amongst successive administrators may result in changes in garden missions or interruptions in garden operations. The findings of this study may be applied in raising awareness of succession or long term intervention planning as an issue in community interventions. Continued research may review similar fields of study to determine best-practice recommendations which may be applied to community gardens.

Land Access as an Obstacle

This study found garden site relocation caused a disconnection of gardens from target populations, the loss of specialized gardening structures, the down-scaling of plot sizes related to limited land availability and the termination of one garden entirely. Prior research by Wakefield, Yeudall, Taron, Reynolds and Skinner (2007) similarly concluded a primary concern for garden sustainability to include insecure land tenure or a lack of garden site ownership by garden interventions. However, in contrast to concerns raised in the study by Schukoske (2000), none of

the three vacant-lot utilizing gardens encountered direct obstacles with current municipal policies related to increased risk of site loss.

The reported resource needs of community gardens were unanticipated by researchers. Garden administrators applied less focus to fiscal resources than predicted. Prior research by Wakefield, Yeudall, Taron, Reynolds and Skinner (2007) concluded direct funding support for garden infrastructure was fundamental to operations. In agreement, two gardens of this study did request further fiscal support from potential health promotion organizations. Yet, in contestation, five gardens described self-sufficiency of funding needs. Administrators described self-sufficiency was obtained through utilization of additional grant and commercial funding sources. Resource needs of these gardens focused on best practice for participant recruitment and retention, and the sharing of additional publicity resources to emphasize the garden missions with the public. Resource availability may also improve through collaborations among community interventions or organizations as supported by this study and prior research by Twiss et al (2003). The collaboration of similarly missioned organizations increases the availability of volunteers and funding for initiatives.

Recruitment techniques described in this study are similar to those described in prior research. A study by Teig et al. (2009) established increased community involvement occurred following the offering of activities or events in communal areas associated with the garden sites. The recruitment methods described in this study may be applied by a health promotion organization to centralize recruitment methods and improve participation rates in community interventions.

Potential of Health Promotion Organization Aid

Health promotion organizations can facilitate services to community interventions, including completion of need assessments for community garden interventions within specific locations or populations and orchestration of culturally relevant planting varieties for specific populations. Planting of culturally appropriate varieties of produce in community gardens was established as an attraction for community members in this study. Prior research by Wakefield, Yeudall, Taron, Reynolds and Skinner (2007) similarly stated the provision of culturally appropriate foods was a community garden benefit. Communities in Wakefield et al. (2007) were described as possessing limited local availability to culturally important foods, with available options lacking freshness or sold at high prices. Further, health promotion organizations may encourage served population representatives to report back the effects of garden services through a public forum, thereby increasing social justice publicity. Health promotion organizations may further enhance intervention publicity by including links to garden pages and other public awareness resources.

Limitations

Despite an effort to contact the original 17 community gardens involved in the 2013 grant from the MCWC, only 12 garden administrators responded, further only 10 garden administrators agreed to interviews. Limitations of this study included a small sample size of 58.8% of 2013 grant recipient gardens and an average response rate of 1.3 volunteers per garden. The sample number of 12 volunteer participants does not meet a confidence level of 95% decreasing validity of study results for generalization among varied populations. Garden administrators had limited response in forwarding survey links to participants or did not utilize email/social media as a mode of communication among garden participants. Future research may

include larger samples of garden administrators and volunteers to increase confidence ratios on study results. Portions of sampled populations had limited written English skill, limiting respondent's ability to express community garden experiences in written surveys. Portions of the data which provided greatest insight were the direct opinions of garden volunteers. The degree of bias attributed to self-selection is unknown; garden administrators were speaking in perception of their own gardens and potentially were not subjective observers of the state of their interventions.

The cross-sectional design of the study captured only a one-time assessment of the key variables of interest. Thus, this study is not able to predict intervention sustainability as the gardens continue. Qualitative surveys, as utilized for garden volunteers, did not allow discussion or brainstorming for management, volunteer recruitment or volunteer retention strategies to improve garden sustainability. Further research including a focus group of garden volunteers may best distil barriers and solutions to improve community garden interventions. By conducting focus group interviews, future research may assess areas of consensus and divergence among community gardeners from different gardens and enhance the credibility of findings of previous qualitative studies.

The Center for Disease control and Prevention published support and provided funding to propagate the utilization of PSE change strategy in forming community interventions with the belief that efforts to change health risk behaviors will have limited success if policies, systems and environments are unsupportive of positive health behaviors (Honeycutt et al., 2015). This study did not evaluate effective implementation of PSE change strategy. Further research may utilize evaluation methods such as those identified in Honeycutt et al. (2015), to rate adherence

of current interventions. Research along this trend will contribute to an evidence base for PSE change strategy interventions and outcomes increasing the potential for community funding.

Conclusion

Significant national funding and planning resources are directed to chronic disease associated with increasing rates of obesity throughout the United States. Community interventions, including community gardens, compose a valuable method for counteracting environmental and lifestyle factors associated with an increased risk for chronic diseases. Garden interventions must be sustainable to optimize the effect on a community's health behaviors through extended reinforcement. Therefore, the early termination of community interventions results in the relapsing of behavior changes and creates the potential for communities to distrust and disengage from future interventions. This study provides insight into community garden management techniques, missions, and risk factors with the potential to affect community garden intervention sustainability. Garden administrators reported completing limited fore-planning for garden leadership succession or intervention sustainability. The lack of these practices identifies a need to create educational resources and models to promote leadership cultivation through familiar health promotion platforms such as university extensions or wellness coalitions.

Researchers of this study recommend the development of multi-person leadership structures; which were indicated to redistribute the stresses of leading an intervention for administrators, prevent burnout, engage more creativity and create a line of succession. Additional management techniques gathered from garden administrators of this study may be utilized by future administrators in response to common resource issues.

Further, researchers of this study recommend pre-intervention evaluation of proposed community populations to determine their capability to support the labor requirements of a

community garden. If deficits are found within a proposed population, they may be resolved through the networking of the garden intervention with additional communities and organizations in arranging an adequate labor force. Equally, garden intervention plans could also be downsized in response to limited community investment capability. Additionally, researchers recommend land access agreements should be well understood by all parties to allow for fore-planning. It is advised that when possible long-term agreements should be considered, with landowners acting as stakeholders in intervention sustainability planning. Finally, community gardens should seek diverse sources of funding, utilizing networking with organizations to maximize resource availability and enhance public knowledge of interventions missions and outcomes.

Future research of community garden interventions may investigate the average duration of garden interventions, to quantify the potential aid investment loss occurring due to prematurely ended interventions. Also, a greater comprehension of garden volunteers and their motivations for garden participation may be investigated. This information may aid recruitment techniques in establishing effective labor forces.

Community gardens implement positive health behavior change messages in local communities. The early termination of community interventions surrenders aid resources and diminishes the impact of health behavior community change. Addressing issues of community garden intervention sustainability creates opportunities to intercede in the continued rise of chronic disease and obesity in America and improve the health for the average citizen.

CHAPTER II: EXTENDED LITERATURE REVIEW

Community gardens are defined in this study as a segment of land, publicly or privately owned which is cultivated by a group of volunteers (Lanier, Schumacher & Calvert, 2015). Gardens are described in several manners throughout the literature such as community type, mission type, and volunteer motivation. Community types are defined by descriptors of interest or place based communities. Interest-based community gardens are associated with a community organization sharing a common interest, such as a church, rotary or recreation club (Firth et al., 2011). Place-based community gardens are associated with a residential base and are operated by a surrounding neighborhood (Firth et al., 2011). Mission types vary widely providing specialized benefits to hosting communities. Desires to beautify neighborhoods or give back to the community are recorded motivations for community participation (Ohmer, Meadocroft, Freed & Lewis, 2009). Previous research establishes missions to shift throughout time. Recent shifts show an increase in the number of community gardens hosted by hospitals and medical centers to combat obesity and related chronic conditions (George, Rovniak, Kraschnewski, Hanson & Sciamanna, 2014). Garden volunteers are reported to be diversely motivated to participate in gardening, varying from seeking economic reliefs found with independent food production to civic activism of improving local environments through sustainable agriculture (Flachs, 2010). Even within a single garden intervention, such as an allotment garden of Dublin, Ireland, as many as five distinct categories of gardeners were identified: practical gardeners, eco-warriors, socio-organic gardeners, Gucci-gardeners and non-gardening gardeners (Kettle, 2014).

Community Garden Benefits

Gardens have been reported to instill the perception of benefits to communities such as improved health behaviors, engaged social cohesion, decreased psychological stress, increased

knowledge of gardening, increased self-efficacy for gardening, improved job skills and opportunities for employment (Armstrong, 2000; Lanier, Schumacher & Calvert, 2015; Sonti, Campbell, Johnson & Daftary-Steel, 2016; Susan, Lucy, Marian & Leslie, 2016; Yang et al., 2012). Gardens have the potential to improve health behavior habits within a community through overcoming barriers in local environments. Specific population sub-groups, such as low-income consumer groups are associated in literature with a greater tendency to follow unhealthy diets, lacking in the recommended five serving of fruits and vegetables per day (Dibsdall, Lamber, Bobbin & Frewer, 2003). Lower rates of fruit and vegetable consumption found in low-income groups as compared to higher income groups was believed, in the study by Dibsdall, Lamber, Bobbin and Frewer (2003), to contribute to current social health inequalities including chronic disease risks. The affordability of fruits and vegetables and awareness of nutritional recommendations were established as potential barriers to the consumption of five servings of fruits and vegetables per day. Eleven percent of the surveyed population felt that buying more fruits and vegetables was too expensive (Dibsdall, Lamber, Bobbin & Frewer, 2003). Community gardens present a viable solution to issues of produce availability and education. For example, a study by Susan, Lucy, Marian and Leslie (2016) found that participants ate an additional two cups of vegetables per person per day, post garden involvement compared to pre-garden involvement. Furthermore, produce obtained from the gardens contributed to an average cost saving of \$84 per month for community gardeners (Susan, Lucy, Marian & Leslie, 2016).

An increase in knowledge of produce and produce availability as provided through community gardens creates potential for maintaining a healthier diet among participants. Healthier eating behaviors and increased food security were reported in a study by Fulford and Thompson (2013) interviewing seven garden interns aged nine to 18 years old. The interns

participated in a youth-development, community garden. Another study by Litt et al. (2011) found a statistically higher consumption of fruits and vegetables in households which participated in community gardening as compared to households which did not. The households were surveyed as a sample of 436 residential households in Denver, Colorado. The difference in fruit and vegetable consumption for gardening and non-gardening residents in the study by Litt et al. (2011) averaged about one additional fruit or vegetable serving per day.

Improving the intake of fruits and vegetables within a community, through gardens, may be significant to the prevention of chronic disease per a study by Zick et al (2013). The body mass indexes of 198 community gardeners of Salt Lake City, Utah, were collected from the society listings of Wassatch Community Gardens and the census database Utah Population Database. The gardeners BMIs' when compared to the BMIs' of their spouses, neighbors and siblings were significantly lower than their neighbors who were not in the community gardening program. Additionally, women gardeners were 46% less likely to be overweight or obese than were their female neighbors, and men gardeners were 62% less likely to be overweight or obese than were their male neighbors. The study also observed no difference between community gardeners and non-gardening spouses of community gardeners, suggesting that those who live in the same household as a gardener also benefit from the produce and the physical demands of gardening (Zick et al., 2013).

Local agriculture such as community gardens provide benefits of increased food security, self-sufficiency and self-reliance according to the Food and Agriculture Organization of the United Nations (2007). Replacing food typically purchased from retail sources with fruits and vegetables from of community gardening decreases the need for consumers to allocate economic resources to food. These economic resources may then be applied to other costs of living. A

study by Conk and Porter (2016) reports that community gardens potentially provide participants an economically significant amount of produce and cost savings. The study accounted for multiple community gardens' yields over three growing seasons to establish the rates of vegetable availability and their consumption by participants. The average plot size was found to produce 128 #s (\$422) of produce per season, featuring an average 17 produce varieties. An average plot yield was enough to meet the vegetable needs of one adult for nine months per the United States Department of Agriculture consumption recommendations. Further, community gardens are shown to be effective platforms to provide education for local agriculture strategies. A study by Carney et al. (2012) found a decrease in Hispanic farmworker participant concerns of running out of food before money was available to buy more. The study also found an increased frequency of vegetable consumption post the farmworker's attendance of organic personal garden planting and maintenance education sessions.

Gardens increase the duration of physical activity for communities (Black & Chen, 2003; Caspersen et al., 1991; Lanier, Schumacher & Calvert, 2015; Saelen, Sallis, Susan, Lucy, Marian & Leslie, 2016; Yang et al., 2012). Significant changes in total cholesterol, HDL cholesterol and systolic blood pressure were associated with walking or gardening activities per a study by Caspersen, Bloemberg, Saris, Merrit and Kromhout (1991) where the various physical activity patterns of 863 Dutch men were tracked in relation to coronary heart disease. Within this study the activity of gardening was found to inspire more minutes of physical activity (PA) per week than similar activities: 225 minutes of PA per week by gardening compared to 160 minutes of PA per week by walking and 170 minutes of PA per week by bicycling (Caspersen et al., 1991). Increased physical activity in gardening communities was found to effect even non-gardening members of the community population in a study by Saelen, Sallis, Black and Chen (2003),

surveying two residential neighborhoods of utilizing 107 gardening and non-gardening adults. The residential neighborhood with a higher walkability and higher environmental aesthetic, associated with a community garden presence had on average a 70-minute greater PA duration compared with the second lower walkability neighborhood. The literature explains the difference in relation to the enhanced environmental aesthetics influencing behaviors such as walking duration (Armstrong, 2000; Saelen, Sallis, Black & Chen, 2003).

Aside from health benefits, gardens increase cross cultural communication and social connections within different demographics. Mechanisms of social connections have been identified as networking, reciprocity and giving back to the community (Lanier, Schumacher & Calvert 2015; Susan, Lucy, Marian & Leslie, 2016; Yang et al., 2012). The support of relationship building within the community by cross-sharing of surplus produce among community members or with groups was found to provide social connection and psychological benefits for gardeners (Poulsen et al., 2014). Researchers credited the camaraderie of caring for a shared space and reciprocity of exchanging gardening knowledge or produce for the building of relationships amongst garden communities and participants (Poulsen et al., 2014). Researchers concluded actions of reciprocity were particularly empowering for low-income populations which hosted community gardens. A successful garden allowed them to establish a history of success and increase community-efficacy (Wakefield et al., 2007).

Community garden interventions build social connections and social capital within the neighborhoods which host them. Enhanced social connection creates momentum for larger health and civic intervention programs through the unity of sharing missions such as fundraising or the hosting of community events (Firth, Maye & Pearson, 2011; Glover, 2004; Schukoske, 2000; Teig et al., 2009; Wakefield, Yeudall, Taron, Reynolds & Skinner, 2007). Higher perceptions of

social capital were identified among garden participants. The higher social capital was related to the formation of community norms including reciprocity, helping others, neighborhood pride and collective efficacy (Alaimo, Reischl & Allen, 2010; Teig et al., 2009). Social capital is an imprecise measure of social cohesion, democracy, economic well-being and sustainability as it affects how individuals connect in a variety of community, civic, cultural or economic structures and contexts (Firth, Maye & Pearson, 2011). A study by Teig et al. (2009) further identified intervening mechanisms in the building of social capital through community gardens to also include social connection, mutual trust, collective decision-making, changing social norms, enhanced civic engagement and community building. Social capital potentially builds tight subsets of communities. These tight subsets encourage cooperation within a community to produce environmental changes. However, the same mechanisms may also result in excluding portions of the community through action of anti-social and isolative behaviors as concluded in a study by Glover (2004). The study which interviewed 14 stakeholders in the development of a metropolis community garden determined anti-social results were more likely to occur in community garden interventions with non-diversified leadership teams (Glover, 2004).

Community-Based Interventions: Policy, Systems and Environmental Change Strategy

Community-based interventions are effective methods of health-behavior change (Bunnell et al., 2012; Gavin, Seeholzer, Leon, Chappelle & Sehgal, 2015; Kegler et al., 2015). A model for community-based interventions, the PSE change strategy is considered an economical and sustainable approach for community-based health interventions (Bunnell et al, 2012; Kegler et al., 2015). The use of a PSE change strategy enhances the accessibility of healthy decisions whether dietary, physical activity or social within a targeted environment. The CDC endorses PSE change strategy as an effective model for community health interventions (Bunnell et al.,

2012). In 2010, the Department of Health and Human Services, through the CDC, developed the Communities Putting Prevention to Work (CPPW) initiative to accelerate and expand community and state level PSE change strategy interventions in chronic disease prevention. Four-hundred million dollars were invested in 50 communities over two years. CPPW provided a historic opportunity for communities to act boldly to confront obesity and tobacco use prevention for 55 million people (Bunnell, et al., 2012). A study by Bunnell, O'Neil, Soler, Payne, Giles, Collins and Bauer (2012) reviewed the 50 CPPW interventions, concluding community-based changes may lead to substantive and desirable public health outcomes. Alternative models to PSE change strategy were theorized to be unsuccessful in part due to insufficient funding to achieve widespread change in their communities. PSE change strategy interventions build social capital developing community-efficacy and propelling future change (Bunnell et al., 2012).

Intervention Sustainability

Community-based interventions require sustainability to reach and maintain program objectives (Merzel & D'Afflittl, 2003). According to a study by Merzel & D'Afflittl (2003) a limited duration in a community intervention was identified as a cause for the lack of intervention effectiveness per the review of 32 community-based interventions. Programs with a short duration of two to three years had difficulty achieving community-wide impact, dependent on the level and intensity of program activities. The prevalence of the ending of community garden interventions is a matter of concern. A study by Drake and Lawson (2015) found that of 8,550 gardens reviewed across the United States 1,615 gardens were lost (ended) from 2007 to 2012.

The access to funding or materials, participation of volunteers and access to land were identified as key challenges to community garden operations (Drake & Lawson, 2015). A lack of

access to funding or materials presents a barrier to intervention sustainability by limiting access to seeds, gardening tools, supplemental watering of plots and accessibility-resources for participants (Drake & Lawson, 2015; Economos & Irish-Hauser, 2007; Wakefield et al., 2007). A decline in the participation of a community in gardens interventions was established as a high risk for intervention failure in existing literature (Drake & Lawson, 2015; Litt et al., 2011; Poulsen et al., 2014). Community participation was reported to be inhibited, in part, by factors including the labor intensive, harsh climate and time-consuming nature of garden activities such as weeding (Poulsen et al., 2014). Further, the time investment required to maintain garden plots was identified as an obstacle to recruitment (Drake & Lawson, 2015). Secure access to land on which to host a garden site presents a challenge for community gardens. Insecure tenure or permanence of garden sites is a barrier to intervention sustainability (Lawson, 2007; Wakefield et al., 2007). Temporary leases were utilized by many studied garden interventions who did not have permanent access to land (Wakefield et al., 2007). A study by Lawson (2007) reviewing the relocations of a Los Angeles garden found garden sites located on municipal lots are labeled as vacant lots by city offices retaining risk of being resold or redeveloped. In the case of this study's garden, the site was described as subject to a land use agreement with a 30-day notice of eviction. When the land was sold, the garden community occupied the site in protest, stirring public interest to the effect of politicians attempting to repurchase the land. Efforts ultimately failed, due to refusals of the new landowners and the garden relocated (Lawson, 2007). A study by Wakefield et al. (2007) concluded insecure land tenures of community garden sites increased stress and uncertainty among low-income populations reliant on garden interventions for food security. This stress resulted in the partial limitation or negation of the psychological benefits associated with garden participation (Wakefield et al., 2007).

The entrenchment of negative perceptions within a community were identified as barriers to community interventions in a literature review by Economos and Irish-Hauser (2007). The negative perceptions were described as a sense of learned hopelessness or the insufficient resource of time, safe transport, finance, education and support to make necessary environment changes. Economos and Irish-Hauser (2007) established that even an intervention grounded in theory (such as a farmer's market) may not engage the community due to a deficient of resources (such as time and safe transportation) if targeting a resource deficient population (such as single parents working multiple low-income jobs). The access to funding and material resources for interventions and communities may be dependent upon relationships with municipalities or hosting organizations as well as geographical influences (Drake & Lawson, 2015).

Community interventions and communities must overcome barriers to intervention sustainability as identified to include deficits in networking, a want for participant management and lack of long term planning (Drake & Lawson, 2015; LeGreco and Lenard, 2011; Ohmer et al., 2009; Shediak-Rizkallah & Bone, 1998). The formation of a community garden commonly involves networking with multiple community organizations such as local governments or non-government organizations to secure key resources (Drake & Lawson, 2015). The failure of members of a South-Central community garden, from a study by Legreco and Lenard (2011), to organize at a political level led to the failure of the intervention when they were faced with political.

Strategies for Improved Intervention Sustainability

The involvement of the majority of a community population in programming enhances volunteer participation in community gardens (Sediak-Rizkallah & Bone, 1998; Teig et al., 2009; Wakefield et al., 2007; Yang et al. 2012). Community involvement may be increased by

scheduling communal work such as weeding communal areas, picking up litter, raising funds through grant writing or larger projects like building garden sheds and compost bins. Hosting neighborhood activities at the garden site, such as festivals, contests and potlucks, provide benefits for volunteers by increasing social connections for participants (Teig et al., 2009; Wakefield et al., 2007). Offering leadership offices, such as individual administrator positions or garden care councils, may develop volunteer investment in the cause of the intervention (Teig et al., 2009). Education and training of garden skills attract new and existing volunteers (Shediak-Rizkallah & Bone, 1998; Teig et al., 2009; Yang et al., 2012).

Health promotion organizations or coalitions of specified experts and stakeholders were crucial to the formation and maintenance of successful community interventions in multiple studies due to their ability to harness material and expertise resources (Eggert et al., 2015; Sommers 2013). Coalitions or public health authorities have the potential to promote partnerships and collaborations between government, non-profit and private sectors to coordinate obesity prevention efforts, engage and mobilize stakeholders, and enhance capacity of communities to implement PSE change strategy interventions per a review of programs by a subcommittee of The Centers for Disease Control and Prevention Weight of the Nation 2012 Conference Subcommittee on States, Communities, Territories, and Tribal Nations (Sommers, 2013). A study by Ohmer, Meadcroft, Freed and Lewis (2009) concurred with LeGreco and Lenoard (2011) to recommend garden hosting organizations may improve the sustainability of volunteer forces through providing ongoing support and coordination of volunteer activities. Fifty-four percent of surveyed volunteers suggested they would like more support and leadership in volunteer activities (Ohmer, Meadcroft, Freed & Lewis, 2009).

Municipal policies impact the sustainability of community garden interventions (Schukoske, 2000; Twiss et al., 2003). Policies supporting the reclamation of urban spaces for the community, such as vacant lots for gardens, foster increased social capital through the elimination of unproductive space (Schukoske, 2000). Similar policies were discussed in the study by Twiss et al. (2003), the “Adopt-A Lot” policy of the city of Escondido, allowed for interim use of public and private land for gardens without a fee, waiving normal zoning regulations. This policy was concluded to be beneficial to community garden programs and community building (Twiss et al., 2003).

Conclusion

Existing research on community gardening benefits lacks input from garden volunteers directly. Current published research utilizes secondary sources in establishing the perceived benefits for community gardening from the volunteer participants. Further, existing research of PSE change strategy interventions lacks discussion of factors affecting community garden interventions sustainability. PSE change strategy has been discussed as an effective method of establishing health-behavior change in communities, but literature has not addressed how to enhance intervention duration to create sustainable interventions. Therefore, with minimal existing research on the sustainable resource needs of community gardens or the potential contribution of health promotion organizations to fulfill those needs, further research is necessary.

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APPENDIX A: GARDEN ADMINISTRATORS' SURVEY

[consent form will be the first page of the survey. Access to rest of survey will only occur if agree to participate in the study].

1. Name of garden_____

2. How are you affiliated with the community?

- a. Neighborhood Organization
- b. National Organization
- c. Church Group
- d. School or Academic Organization
- e. Other

3. Characteristics of community gardens:

Age of garden

_____ Years

Located in low-income areas

- _No
- _Yes
- _Don't know

Bulletin board present in the garden

- _No
- _Yes
- _Don't know

Garden includes a sitting area, with bench (es)

- _No
- _Yes
- _Don't know

Some activities done cooperatively by gardeners

- _No
- _Yes
- _Don't know

Gardeners hold regular meetings

- _No
- _Yes
- _Don't know

Cooperative workdays planned

_No

_Yes

_Don't know

Garden improved attitudes of residents about the neighborhood

_No

_Yes

_Don't know

Garden has led to other neighborhood issues being addressed

_No

_Yes

_Don't know

Garden site is in jeopardy

_No

_Yes

_Don't know

4. Would you be interested in being interview further about your community garden work?
If yes, please email Rachel Buenemann rjbuene@ilstu.edu.

APPENDIX B: GARDEN ADMINISTRATOR INTERVIEW QUESTION GUIDE

1. Describe how you first became involved with this garden?
2. What was the motivation in starting this community garden?
3. What benefits does the garden provide to the hosting organization, garden volunteers and target community?
 - a. Does your garden make health choices easier or more practical?
4. What rules or structures are in place for your garden?
5. How do you manage your volunteers?
 - a. What is the volunteer schedule structure?
 - b. What are your volunteer retention techniques between growing seasons?
6. How have you used the McLean Country Health Coalition gardening resources?
 - a. How have you disseminated gardening resources to volunteers?
7. What policies have affected your community garden sustainability outcomes?
 - a. Do you feel supported by any efforts from your municipality's health organizations, legislation policies?
8. What is the greatest obstacle you have encountered as a garden administrator?
9. What are your future goals for your garden?
 - a. What resources does your organization need to accomplish these goals?
10. How do you fund supplies for your garden?
11. Does your organization have a plan for garden intervention sustainability?
 - a. Do you feel your garden is prepared for sustainability? What would improve it?
12. What advice would you give to future managers? / What advice would you share with yourself, when the garden started?

13. Is there anything else you would like to share?

14. Would it be okay to follow up with you if we have questions?

APPENDIX C: GARDEN VOLUNTEER SURVEY

1. I consent to participation.
2. What is your motivation to participate in community gardening?
3. From the list below, please select your reason(s) for participating in community garden programs. (Check all that apply).
 - Fresh food is/tastes better
 - Organic food (no sprays, chemicals)
 - Exercise
 - Mental health benefits
 - Food source for low-income households
 - Good family/ children's activity
 - Enjoy nature/open space
 - Tradition cultural practice
 - Health activity
 - Income supplements (from sale of foods grown)
4. Please list and describe the benefits you have seen from gardening for your community.
5. Please list and describe the benefits you have seen from gardening for yourself.
6. Please list and describe the benefits you have seen from gardening for your membership organizations.
7. Do you feel connected to your community? With the people who live there? With the issues which effect it? Please explain.
8. What resources have made it easier to participate in community gardening? Which was most helpful? Please explain.
9. What obstacles to community gardens have you faced? Which was the greatest? Please explain.
10. From the list below, please select the obstacles that limit you participation in community gardening. (Check all that apply).
 - Time commitment
 - Physical labor
 - Weather conditions
 - Garden location
 - Lack of garden knowledge
 - Lack of garden organization

- _Lack of volunteer organization
- _Lack of garden supplies
- _Lack of reward/motivation
- _Lack of comradery/ support of garden

11. With which garden do you volunteer? _____
12. Please select the following age range, which applies to yourself.
 - a. 18 – 25 years old
 - b. 26-45 years old
 - c. 46 years old and above
13. How would you rate your garden expertise?
 - a. Very poor
 - b. Poor
 - c. Adequate
 - d. Good
 - e. Very Good
14. How many years have you been gardening?
 - a. This is my first year in gardening.
 - b. I have been gardening for 1-2 years
 - c. I have been gardening for at least 3 years.
 - d. I have been gardening for at least 5 years.
 - e. I have been gardening for more than 10 years.
15. How would you rate your community garden involvement?
 - a. I have not been actively participating
 - b. I participate at special garden events only
 - c. I participate at least once a month
 - d. I participate at least one a week
 - e. Other (please describe)