

El valor de la actividad física: A multilevel approach to understanding and improving PA among
Hispanic adults

by

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B.A., University of Northern Iowa, 2016
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AN ABSTRACT OF A DISSERTATION

submitted in partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY

Department of Kinesiology
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KANSAS STATE UNIVERSITY
Manhattan, Kansas

2025

Abstract

Background: The Hispanic population is growing linearly across the United States, with approximately 65 million Hispanics in 2023.¹ The cultural and economic opportunities associated with the growing Hispanic population emphasize the importance of reviewing Hispanic health.² The Hispanic population is at an increased risk for adverse health effects due to increased obesity rates.³ These increasing rates are important to address due to the illnesses/disease associated with obesity.⁴ While there are several factors impacting obesity rates, the primary focus of this dissertation will be on physical activity (PA), which is defined as any type of bodily movement producing energy expenditure.⁵ Thus, the objective of this dissertation is to identify and understand the factors affecting PA within the Hispanic population that will assist in creating equitable opportunities for future PA promotion within the community. This dissertation is comprised of three studies that outline specific goals in addressing the overall aim of the dissertation. **Methods:** The first study was a scoping review including literature within a 10-year period (2012-2022), which reviewed existing intervention programs aimed at improving PA within the Hispanic community. The strategies used in these programs were organized using the Social Ecological Model (SEM) to better understand the common levels that have been addressed within the ten-year time frame. The second study focused on the factors affecting PA among working Hispanic women (n=223). Quantitative data was collected among this population across the nation through a validated survey distributed by the Prolific database. This survey identified influences and barriers towards PA, which were categorized using the SEM. One-way ANOVA analysis and hierarchical linear regression were used to evaluate associations between PA levels and factors across SEM levels among working Hispanic women. The final study utilized a qualitative approach to expand upon PA influences among working Hispanic mothers.

The incorporation of a collaborative research approach using Photovoice provided a wholistic approach to identifying the factors influencing PA. **Results:** The scoping review identified three components: the types of PA interventions addressing PA among low-income Hispanic populations, the most common levels of the SEM that have been targeted in PA interventions, and changes in PA among the Hispanic community. The scoping review included 14 intervention studies that included both short and long-term intervention programs (4 weeks-12 months). In-person and online interventions were used among the Hispanic population. The scoping review also identified the individual, interpersonal, and community levels of the SEM as the primary levels being addressed by the intervention programs. The one-way analysis revealed higher individual level factors (self-efficacy ($F(2,220) = 10.00, p < .001$), exercise planning ($F(2,218) = 14.33, p < .001$), goal setting ($F(2,218) = 7.79, p < .001$), and outcome expectations ($F(2,219) = 4.30, p = .015$)) among more active participants. Social support levels from family ($F(2,218) = 6.06, p = .003$) and friends ($F(2, 219) = 9.17, p < .001$) were expressed by more active participants. In addition, work hours also differed among participants ($F(2, 219) = 3.46, p = .033$), such that participants with higher activity were working more hours/week. The community level demonstrated an inverse relationship with PA when addressing crime ($F(2,219) = 5.64, p = .004$). The least physically active participants reported the highest levels of crime in their neighborhood. The final two levels of organization and policy did not reveal any significant differences by PA level. The hierarchical linear regression demonstrated comparable results as individual level factors ($R^2 = .059, p = 0.001$) and work hours demonstrated positive associations with PA ($p = .024$), while crime was negatively associated ($p = .024$). The third study of the dissertation revealed key factors influencing PA participation among working Hispanic mothers through each level of the SEM. The individual level barriers were PA knowledge, time, and

exhaustion. The facilitators for PA within the same level were categorized into intrinsic and extrinsic motivation. The interpersonal level categorized family and friends as both barriers and facilitators, depending on the positive or negative influence their social environment had on PA promotion. Pets were another social influence mentioned by the participants. Similarly, safety and physical environment were expressed as both facilitators and barriers within the community level. The structure and perception of safety within their surroundings impacted their decision on PA engagement. Culture was an emphasized inhibitor to PA due to the pressure of family obligation within the Hispanic culture. The organization level mentioned colleagues as both positive and negative influences on PA, while most participants expressed a supportive atmosphere for PA from their supervisors. The time commitment from occupations was another detrimental factor for PA. The policy level of the SEM is limited to a few policy initiative programs aimed at promoting PA promotion among the working Hispanic mothers, while many expressed the absence of PA opportunities through policies as an inhibitor to engaging in PA.

Conclusion: Identifying subgroups within the Hispanic population that exhibit low rates of PA can assist in identifying the factors influencing PA participation. The incorporation of the SEM assisted in organizing the facilitators and barriers across distinct populations within the Hispanic community. The data collected within this dissertation can create a solid foundation for structuring future intervention programs with the factors identified in existing literature, as well as the factors identified by the studied population. While the data collected can create positive strides towards PA opportunities within the Hispanic community, future research can assist in addressing the higher levels of the SEM to provide intervention programs incorporating a wholistic approach necessary to create applicable programming among the entire Hispanic population.

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Approved by:

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Conclusion: Identifying subgroups within the Hispanic population that exhibit low rates of PA can assist in identifying the factors influencing PA participation. The incorporation of the SEM assisted in organizing the facilitators and barriers across distinct populations within the Hispanic community. The data collected within this dissertation can create a solid foundation for structuring future intervention programs with the factors identified in existing literature, as well as the factors identified by the studied population. While the data collected can create positive strides towards PA opportunities within the Hispanic community, future research can assist in addressing the higher levels of the SEM to provide intervention programs incorporating a wholistic approach necessary to create applicable programming among the entire Hispanic population.

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Acknowledgements

I express my sincerest gratitude to everyone who played a significant role in helping me complete my dissertation journey. I want to acknowledge Dr. Mary McElroy who took a chance as my mentor and worked to help me begin my academic and research journey before her retirement. To my dissertation committee, Dr. Emily Mailey, Dr. Gina Besenyi, Dr. Katie Heinrich, and Dr. Nadezda Shapkina, thank you for your support and guidance throughout my research, classroom, and writing experience at Kansas State University. All your support and guidance in my dissertation process have ultimately helped me successfully complete my dissertation research.

To all the amazing friends I have made in my nearly 13-year academic career, thank you! I sincerely appreciate your unwavering support and constant motivation to continue my academic journey. You have all supported me during my lowest and highest moments, and for that I want to once again express my sincerest gratitude. To Dr. Jesus Lizarraga Estrada, Ms. Cardenas, and the other amazing teachers and mentors that have been a source of inspiration for me, thank you for always pushing me to be my best. I also want to express my appreciation to all the study participants. Without you, there is no dissertation. Thank you for your support.

Finally, a special acknowledgement to my amazing family who have seen my journey from day one. Thank you for always supporting me and motivating me to finish and earn my doctorate degree. Thank you, Rosie, and Caden for being a source of inspiration in my journey. To all the other people who supported me: Katie, Steven, Megan, John, and everyone else, thank you for everything!

Dedication

This dissertation is dedicated to all my amazing family, friends, and mentors who supported my journey. My biggest dedication must go to my biggest source of inspiration, Maria and Javier Martinez. They showed me what true hard-work and perseverance is, and as a result I never quit, and I was able to achieve my goals.

Chapter 1- Dissertation Introduction

There is a national health concern that can be attributed to the increasing obesity rates across the nation. This issue is concerning due to the increased mortality rates and financial hardship that is placed on the United States.^{6,7} While there are several factors influencing the obesity rates, one of the main contributors is the physical inactivity levels within the U.S. population.⁸ To date, approximately 25.3% of all U.S. adults are physically inactive.⁹ However, it is important to note that physical inactivity levels differ among several populations. One of the highest levels of physical inactivity is among the Hispanic population (32.1%).¹⁰

The Hispanic population is growing across the nation. According to the U.S. Census Bureau, this population accounts for nearly 19% of the U.S. population (63.6 million), with an estimated growth to 128 million by 2050.¹¹ This increase provides opportunities for both economic and cultural growth in the United States.² Specifically, the incorporation of diverse language, traditions, and other cultural perspectives from a diverse population can promote multicultural progression in the nation.¹² Additionally, the growth of Hispanic workers and entrepreneurial opportunities from the Hispanic community further enhance the U.S. economy.

There are certain subgroups within the Hispanic population that may be at-risk for physical inactivity which include, but are not limited to: low-income, older adults, and mothers. The low levels of PA, or any body movement resulting in energy expenditure, may be due to barriers such as: accessibility, time, and other cultural components.^{5,13} Addressing inactivity requires a multistep approach, which will be addressed in this dissertation. Thus, the aim of this dissertation is to better understand PA in the Hispanic population and identify subgroups needing further support, specifically: (1) conduct a scoping review of PA interventions for low-income Hispanic adults to classify the most used strategies to promote PA, as well as identifying at-risk

subgroups that need targeted interventions to address increased health risk, (2) use the Social Ecological Model (SEM) to understand PA barriers among Hispanic working women and (3) collect and understand qualitative information from Hispanic working mothers regarding specific facilitators and barriers needing to be addressed in order to promote PA.

In the first study of the dissertation, a scoping review of PA interventions within a 10-year period was conducted to understand the existing PA interventions within the Hispanic community. This information provided an understanding of the types of interventions that have been conducted, successful components within each intervention, as well as subgroups that needed further research. To systematically classify the strategies utilized in each intervention, a theoretical framework known as the Social Ecological Model (SEM) was used.¹⁴ The SEM framework assisted in organizing the intervention approaches into five categories: individual, interpersonal, community, organization, and policy. Upon completion of the scoping review, a better understanding of common levels used in intervention programs, as well as at-risk populations within the Hispanic community were identified.

The second study of the dissertation expanded upon study one, which identified an at-risk population within the Hispanic community: adult working Hispanic women. Study two focused on understanding the current PA of this population across the United States. Specifically, this study collected quantitative data using validated surveys to identify influences on PA within each level of the SEM. The data collected provided a better understanding of factors promoting or hindering PA within each level. Identifying the influences on PA among working Hispanic women identified opportunities for further research on areas of concern, as well as determinants that should be targeted in future PA intervention programs. The completion of this study identified an opportunity to incorporate qualitative information in study three, such as participant

interviews to gather a comprehensive understanding of the factors affecting PA among working Hispanic women.

The final study of the dissertation similarly focused on Hispanic women, however, this study addressed components that were not reviewed in depth in study two. Study three focused specifically on Hispanic working mothers, which was a combination of the two biggest barriers identified by Hispanic women: work and childcare. Study three used a collaborative approach to understand the facilitators and barriers towards PA within this population. The use of a qualitative approach provided an opportunity for the working Hispanic mothers to incorporate their personal ideas which provided a well-rounded understanding of their PA facilitators and barriers. In addition, the photovoice method was used to incorporate the working mothers' ideas of PA and create a dialogue that further enhanced the data collected in this study.¹⁵ The information from this chapter assisted in understanding the reasons for specific facilitators and barriers towards PA in the Hispanic population. In addition, the population being studied was able to express solutions that they believe would promote their decision to be physically active.

Together, this dissertation provided an in-depth review and understanding of PA within the Hispanic population guided by the SEM. Identifying at-risk subgroups within the Hispanic communities and addressing the factors that facilitate or inhibit opportunities for PA is crucial in creating future solutions to promote healthy PA behaviors. Implementing strategies gathered from this dissertation can assist in minimizing barriers towards PA among Hispanic working women and mothers within the Hispanic community. Addressing these barriers can assist in improving the life expectancy and quality of life among the Hispanic community, which will lower the healthcare costs and mortality rates associated with physical inactivity.^{16,17} However,

we must provide opportunities for this community to establish a healthy lifestyle to support the cultural and economic growth of the Hispanic population.

Chapter 2- A Social Ecological Approach in Examining PA Intervention Effects Among Low-Income Hispanic Adults: A Scoping Review

Background: This scoping review aims to review the physical activity (PA) interventions conducted during the 10-year period from (2012-2022) among low-income Hispanic adults. Using the Social Ecological Model (SEM) to characterize the interventions, the specific research questions were: (1) what types of PA interventions have been used to target PA among the Hispanic population? (2) What levels of the SEM have been addressed in the development of PA interventions among the Hispanic population? (3) To what extent have PA interventions among the Hispanic population been effective at improving PA? **Methods:** The search process was conducted according to the PRISMA guidelines. The study collection was conducted using the following databases: Scopus, PsychINFO (APA), SPORT Discus, and EBSCO-Host. Interventions included in the review met the following criteria: (1) Minimum 40% Hispanic/Latino sample, (2) 18 years or older, (3) participants identified as low-socioeconomic status, (4) primary focus of interventions was PA, (5) interventions conducted in the U.S., (6) published between 2012-2022, (7) written in English, and (8) peer reviewed articles. **Results:** A total of 804 studies were identified through the initial search criteria. The initial search criteria resulted in 137 abstracts being reviewed. These abstracts were reviewed and excluded based on research focus, which resulted in 55 full-text articles. These full-text articles were then further reviewed, which resulted in 14 interventions included in the scoping review. The majority of PA interventions (74%) contained multiple conditions, including randomization and control groups. Duration of interventions varied from four weeks to 12 months. Interventions were either

delivered in-person (n=11) or through a combination of both in-person and online formats (n=3). Intervention strategies used were predominately categorized across three levels of the SEM: individual (n=13), interpersonal (n=13), and community levels (n=10). Approximately 85% (n=12) of the interventions demonstrated positive changes in PA, eight of which were statistically significant improvements ($p < .05$). **Conclusion:** While there is progress being made regarding improving PA behavior and other health outcomes through interventions, there are certain areas needing further research. Aspects such as longer programs, mixed method delivery formats, and targeting underutilized SEM levels need to be addressed to better understand long-term effectiveness of programming that can be implemented among larger Hispanic communities.

2.1 Introduction

The Hispanic community is one of the fastest growing populations in the United States. The population has increased from 9.6 million to 29.9 million between the years of 1970 and 2018.¹⁸ The rise in the Hispanic community is a positive trend due to the cultural impact associated with the population's presence in the United States.¹⁹ However, the growing Hispanic population is also associated with increased risks of obesity which is at 44.8% compared to the U.S. average of 42.4%.²⁰ Obesity is a concerning issue in the United States which is demonstrated by the increasing prevalence of obesity (30.5% to 42.4%) and severe obesity (4.7% to 9.2%) from 2000 and 2018 respectively.²⁰ This increasing trend of obesity has led to both financial and medical consequences among the United States population. The medical costs associated with obesity range from \$147-\$200 billion per year.⁷ In addition, high obesity rates increase the threat of cardiovascular diseases such as: heart disease, stroke, and diabetes, which are all leading causes of mortality rates in the nation.⁶ These financial and health concerns express the importance of addressing the contributors of obesity across the United States.

The increased levels of obesity among the Hispanic population are due in part to the high levels of physical inactivity (32.1%).⁹ While PA is any body movement resulting in energy expenditure, physical inactivity can be defined as the failure to achieve the recommended PA guidelines established by the United States Department of Health and Human Services (USDHHS), which is 150 minutes of weekly moderate PA or 75 minutes of vigorous PA, along with two days of muscle strengthening exercises.^{5,21,22} The emphasis on these guidelines is due to the importance of combating chronic diseases associated with low levels of PA within the U.S. population.⁸ According to the Centers for Disease Control and Prevention (CDC), approximately 25.3% of adults in the United States are physically inactive.¹⁰ While this statistic is cause for

concern, it is crucial to note that the Hispanic community is well above the U.S. physical inactivity percentage at 32.1%, specifically the low socioeconomic Hispanic communities.¹⁰ The socioeconomic component is crucial due to research noting low socioeconomic communities as an at-risk population for adverse health risks.²³

One research study known as SOL (Study of Latinos) focused on the health of the Hispanic community across four areas (Chicago IL, Bronx NY, Miami FL, and San Diego CA).²⁴ This study reviewed PA levels (minutes/day) of Hispanic individuals from various groups (Central American, Cuban, Dominican, Mexican, Puerto Rican, and South American). In addition, various factors such as age, gender, and nationality affect differences in weekly PA engagement. The results from this study revealed that Hispanic adults 45 years and older had lower levels of daily minutes of recreational PA (15.8 men/9.9 women) compared to 18–44-year-old participants (43.1 men/19.9 women). This study also noted that female participants were averaging lower levels of recreational PA (13.3 minutes/day) than their male counterparts (23.9 minutes/day) from ages 18-74.¹⁸ Hispanics identifying as Cuban, Dominican, and Central American had lower minutes/day of recreational PA compared to other nationalities within the Hispanic population (17.7, 18, 19.8) respectively.¹⁸ This research emphasizes the importance of increasing PA among specific groups within the Hispanic population in order to minimize their susceptibility to health risks such as heart disease, cancer, stroke, and diabetes.²⁵

The rise in physical inactivity levels in the nation has led to the implementation of health promotion strategies such as behavioral interventions aimed at improving PA among physically inactive groups. Interventions are programs that are established to promote PA through the utilization of various behavior change techniques across levels of the SEM such as individual, community, or policy changes. Interventions have been established to address physical inactivity

among the Hispanic population. These interventions include: community walks, educational sessions, faith-based initiatives, and barrier prevention/problem-solving skills.^{26–29} The success or failure of interventions through improved PA can be highlighted in systematic and scoping reviews.

Systematic reviews are used when a researcher is addressing a specific hypothesis or examining the success of specific intervention components such as “strength training interventions among older adults.” This type of review identifies the current practices, methodology, and information that can address a specific question that is being investigated by researchers and uses the results to draw conclusions about the effectiveness of interventions.

The collection of articles in a systematic review can provide ability to quantify intervention effectiveness due to the specificity of the research question being explored.³⁰ Scoping reviews are similar to systematic reviews, with the distinct difference being focused on a broader range of questions and concepts in order to identify areas needing further research. Scoping reviews are used when there is not enough high-quality evidence to conduct a systematic review. Scoping reviews serve as preliminary evidence that allows researchers to better understand the existing research and identify gaps that need to be addressed. Researchers can use this knowledge to develop specific research questions aimed at addressing the gaps in the research.³¹

There is one systematic review published by Ickes and colleagues in 2012 that collected information on existing PA interventions specifically targeting the Hispanic community.³² This review emphasized variables of interventions that were successful in promoting PA and behavior change within the Hispanic community. The incorporation of variables such as family, community, faith, and social support were a few factors highlighted by Ickes and colleagues that

resulted in positive changes in PA and health behavior.³² In addition, Ickes and colleagues also mention aspects of intervention programming that should be included in future interventions to provide long-term adherence and changes in PA promotion. These inclusions are: cultural values, self-identity, self-regulation, and addressing levels beyond the individual and social support.³² The information from this review provided excellent foundational evidence to support PA changes within the Hispanic community. While this review was beneficial in identifying successful variables to improve PA, it is important to mention that it was conducted over 10 years ago. The literature since 2012 must be examined to confirm previously addressed factors impacting PA, as well as identify additional components being used in intervention programs that will assist in creating effective interventions promoting PA in the future. A review of the literature can be enhanced through theoretical frameworks that categorize common themes and ideas. One of the most prominent theoretical frameworks used in research to identify levels of influence affecting behavior is the Social Ecological Model (SEM).¹⁴

The SEM is a framework that highlights various levels of influence associated with behavior change. There are five levels of the model which include: individual, interpersonal, organizational, community/built environment, and public policy.¹⁴ The popularity of this framework is due to the successful nature of multilevel interventions to promote behavior change. Programs utilizing multilevel approaches demonstrate improvements in program implementation and adherence, as opposed to programs only addressing one specific influence of behavior change.^{33–37} These multilevel approaches utilize several of the SEM levels in the form of: social support, educational knowledge, and community support.^{38,39} In addition, the multilevel approach has shown promising results when implemented among minority

populations.³³ The effectiveness of these types of interventions stress the importance of addressing the success of a multilevel approach among the Hispanic community.

The purpose of this scoping review is to identify the PA interventions focused on improving PA among the low-income Hispanic community within a 10-year period. The incorporation of the SEM will allow for appropriate categorization of the interventions and emphasize the levels that have been primarily utilized within previous years of research. This review will identify strategies within the levels of the SEM that have demonstrated success in improving PA levels among the Hispanic population, as well as the levels that have not been utilized as a primary form of research.

Specifically, the scoping review will address the following research questions:

1. What types of PA interventions have been utilized to improve PA among the low-income Hispanic population?
2. What levels of the social ecological model have been/have not been used in the development and delivery of PA interventions among the Hispanic population?
3. To what extent have PA interventions among the Hispanic population been successful?

2.2 - Methods

The decision to conduct a scoping review as opposed to a systematic review was made to identify the existing literature from 2012 to 2022 and identify the gaps from the literature that can be addressed in future studies aimed at improving PA among the Hispanic community. This review serves as a tool to explore existing interventions and identify the levels of the SEM that

have been used to develop these interventions. The scoping review was organized following the procedures set forth by the PRISMA guidelines, which is outlined in Appendix A.⁴⁰

2.2.1 Inclusion/Exclusion Criteria:

Inclusion criteria for the studies included in the scoping review were: the participant sample in the intervention was (1) minimum 40% Hispanic/Latino, (2) residing in the U.S., (3) 18 years or older, and (4) individuals identified as low socioeconomic status; and interventions (5) primarily focused on improving PA, (6) included a minimum of one level of the social ecological model, (7) were published between 2012-2022, (8) written in English, and (9) peer reviewed articles. In addition, any intervention included in the review needed to have a measure of PA with post-evaluation. Studies that did not meet the previously stated criteria were excluded.

The participants included in the review were all a minimum of 18 years of age, as previous studies have focused primarily on early childhood/adolescent Hispanic children.^{41–43} The focus on interventions conducted on this population is to evaluate existing methods utilized to promote PA among the at-risk Hispanic community. The scoping review also focused on participants categorized as low-income individuals. The measurements of PA (objective/subjective) were important to include in order to evaluate any strengths or limitations of research studies. Post-evaluations allowed for proper review of PA intervention effectiveness among the Hispanic community. Finally, the only existing piece of literature written at the time of this scoping review that focused on Hispanic interventions was published in 2012.³² The inclusion of articles published between 2012-2022 reviews 10 years of literature discussing interventions conducted among the Hispanic community.

2.2.2 Study Abstraction

A literature search was conducted by the main author from August 30, 2022- December 2, 2022, along with the assistance of a secondary author, who was a Kansas State University graduate student researcher. The two researchers collected articles relevant to the purpose of the scoping review. The researchers conducted an extensive literature search in order to collect studies relevant to the inclusion/exclusion criteria, as well as the main population being addressed by the scoping review.

The search process utilized the following databases: Scopus, PSYCInfo (APA), SPORTDiscus, and EBSCO Host. Combinations of keywords including “Hispanic” or “Latino/Latinx” AND “adults” AND “low income” AND “PA” or “exercise” were used to initiate the search process. In order to eliminate studies that did not pertain to the purpose of the review, the key word “interventions” was used in the search process as well. These combinations of words were used as the primary search criteria for collecting studies relevant to the purpose of the review.

2.2.2.1 Review Process

Using the identified key word/phrase search terms, a total of 804 articles were found for review. The extensive review of these articles began with the removal of 30 duplicate articles, followed by the review of the research focus within the article titles. The purpose of this initial review was to remove any articles that did not include the key words “intervention” or “Hispanic/Latino.” The second cause for removal was due to studies published before 2012. In addition, studies that indicated a population under 18 years (i.e., adolescents, children) were removed. Research conducted outside the United States were also removed to focus on interventions that could inform future research within the U.S. Finally, only peer reviewed

journals were included for the purpose of the review. These exclusions resulted in 637 articles to be removed.

The remaining 137 studies were further reduced through the review of abstracts. First studies that focused on aspects such as diet and nutrition as their primary purpose, rather than PA, were excluded. Second, qualitative studies and secondary data analysis explaining previous interventions and not original data collection were also excluded. The abstract review removed 82 articles. The final 55 articles that passed the previous screening process advanced to the final stage of full-text reviews.

The full-text review of articles was the final component of review before being included in the final scoping review. The articles underwent full-text review and were removed if they met certain exclusion criteria. The first exclusion was research not focused on the Hispanic population. Studies that did not include a minimum 40% Hispanics were excluded. Although the abstract review eliminated non-intervention studies, there were some studies that could not be categorized as non-interventions until the full-text review. Due to this, several non-intervention studies were also removed. PA is the primary factor that is being measured for intervention purposes, which prompted the removal of studies that did not have a measure of PA, or a post-measure to assess PA changes. In addition, any duplicates that remained were removed from the final interventions included in the scoping review. The final removal of full-text articles resulted in 14 interventions included in the scoping review. The full review process is outlined in Figure 2-1.

2.2.3 Data Extraction:

The main researcher of the scoping review extracted relevant information from studies that would be utilized in explaining existing evidence related to the purpose of the scoping

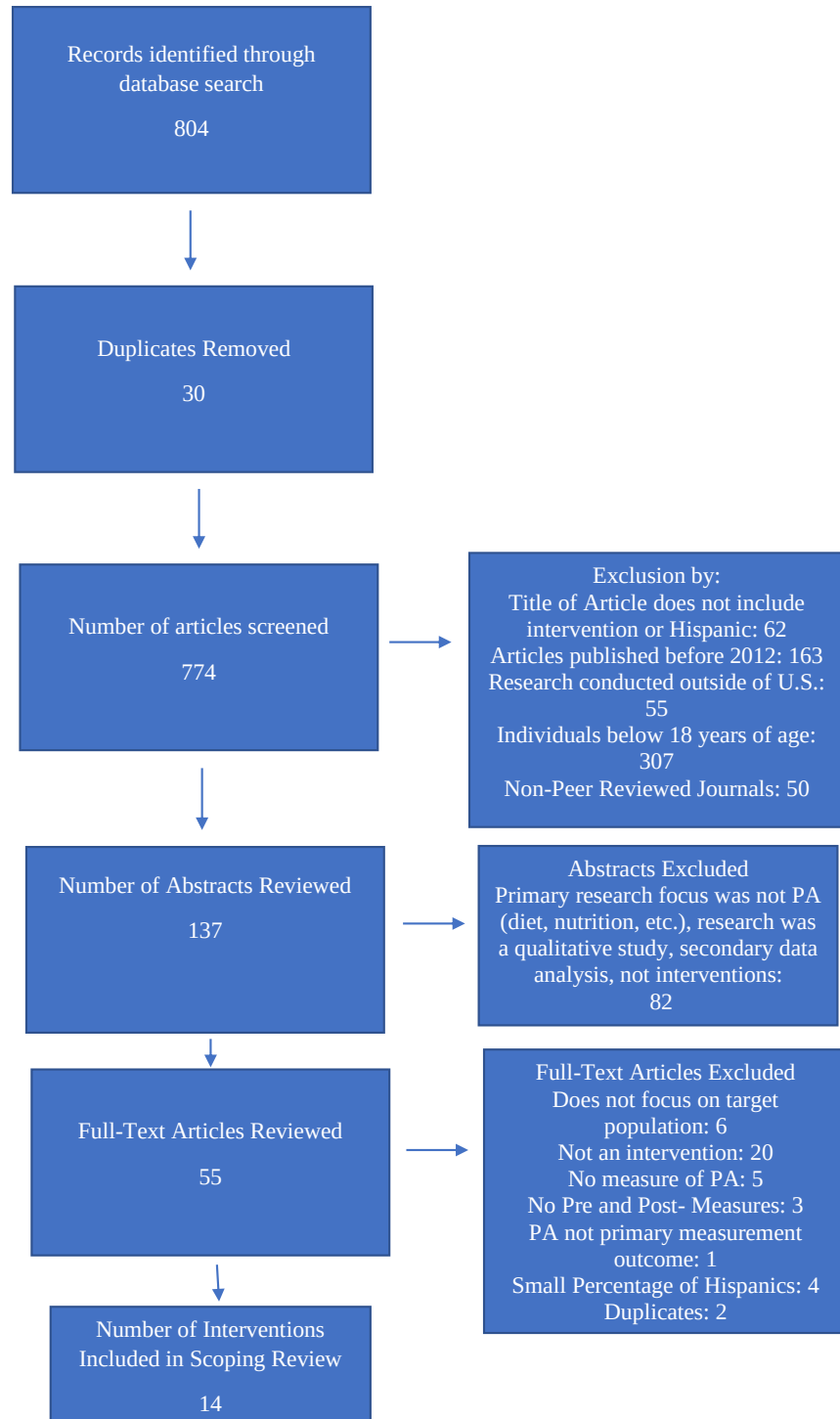
review. The secondary author confirmed the data extracted from the studies was aligned with the purpose of the review. Extracted data included: author information, publication year, sample size, study design, gender, age of participants, percentage of Hispanic participants, mode of intervention delivery, intervention summary, duration of intervention, measurements of PA, PA changes/types of changes, and components associated with the SEM individual, interpersonal, organizational, community, and public policy levels.

2.2.4 Synthesis of Results:

Upon extraction of all the relevant information from the literature, a narrative synthesis was compiled. The frequencies of each extracted component were examined in order to determine trends among the studies. There was no statistical analysis conducted in this scoping review. The collection of information gathered from the studies included in the review were organized and categorized in accordance with the PRISMA checklist.

Figure 2-1 Scoping Review Results

Figure 1: Summary of Scoping Review Results



2.3- Results

2.3.1 Included Studies

The 14 PA interventions are summarized in Tables 2-1- 2-3, providing a description of the sample characteristics, levels of the socioecological model targeted by the interventions, and intervention characteristics.

2.3.2 Design and Sample

The interventions included in this scoping review were limited to a Hispanic population with a percentage greater than or equal to 40% in order to justify effects of the intervention to the general Hispanic population. Six of the articles included in this review contained a Hispanic population of 100%.⁴⁴⁻⁴⁹ The remaining studies had a Hispanic percentage between 41.5% to 92.5%.⁵⁰⁻⁵⁶ The age of the participants in these studies ranged from 18 years to 84 years. Approximately 71% of the studies included focused on age ranges between the ages of 35-84 years of age. While there was a mixture of genders included in these studies, 7 of the studies contained 100% female participants.^{44-48,53,57} This information may demonstrate that half of the interventions among the Hispanic population are targeting females. The sample size of each program varied. Eight of the interventions included in the review had a sample size that was less than 100.^{47-52,54,55} Six of the interventions included sample sizes that were larger than 100, which would be considered a large sample size.^{44-46,53,56,57} In addition, the participants recruited for the interventions were all categorized as low-income, and some also reported health conditions such as: cardiovascular disease (n=3)^{44,46,48,54}, depression (n=1)⁵⁸, stroke (n=1)⁵⁴ and diabetes (n=2).

^{52,53}

More than half (57%) of the interventions included for review were randomized controlled trials, or included a partially randomized patient preference trial (PRPPT), in which

participants were able to select a treatment group, however they did not know which treatment they were receiving.^{44–47,50,53,56,57} There were two interventions that included groups that were not randomized, but did have control or comparison groups.^{54,56} The remaining interventions (n=5) in the review did not include a control or comparison group, however did they include a pre and post-evaluation of PA.^{48,51,52,54,55}

The duration of the interventions included in the scoping review varied from four weeks to one year. Approximately 57% (n=8) of the interventions were between 4 to 16-weeks in duration.^{44,46–50,54,55} The remaining interventions were a duration of six months or longer (n=6).^{51–53,56–58} The delivery method of the intervention varied among all studies. The majority of interventions (n=11) were conducted using an in-person format.^{44,46,58,47–49,51,52,54–56} The remaining interventions were conducted with a combination of in-person, telephone, and online formats (n=3).^{50,53,57}

Studies used various intervention approaches. One of the most common strategies used was group fitness sessions.^{46,47,52,54,55} These exercise sessions were led primarily by bilingual health professionals and promoted exercises such as stretching and balance techniques.^{46,54} Some group exercise classes were culturally adapted and included aspects of the Hispanic culture such as using Latin music for aerobics classes.⁴⁷ In order to monitor intervention adherence, studies also incorporated sessions during which staff would answer questions, set reminders, and address any other concerns presented by participants regarding the intervention.^{48,50,53} Post-intervention contacts such as phone calls, newsletters, and postcards were also utilized in order to track any changes to PA and provide additional motivational support among participants.^{44,48,54} In addition to these approaches online/technological methods were also utilized. Text messages, website content, and social media platforms were used to spread educational information, send

reminders, and encourage communication among researchers, staff, and participants.^{49,57}

Intervention details are further explained through the social ecological model approach.

2.3.3 Social Ecological Model Approach

The interventions included in this scoping review provided sufficient information about their strategies to categorize them into different levels of the SEM. The two most utilized levels of the model were the individual level (n=13)^{44,46,56–58,47–50,52–55} and the interpersonal level (n=13).^{44,46,56–58,47–49,51–55}

The knowledge and attitudes participants had regarding PA was one of the primary focus points within the individual level of the SEM. Educational seminars and materials were utilized in order to improve the knowledge of PA benefits and change any negative perceptions regarding exercise participation.^{44,46,48–50,52,53,55,56} Self-efficacy is another component that was addressed among interventions.^{47,52,54,55} The component of self-efficacy was addressed using group discussions and goal-setting techniques in order to overcome barriers addressed by participants.^{47,52,54,55}

Intervention strategies that were categorized in the interpersonal level of the SEM included social support from family, peers, staff, and researchers.^{44,46,55–58,47–54} Family participation was encouraged through at-home family exercises and educational seminars that promoted the importance of family cohesion.^{44,49,55,56,58} Peer support was incorporated by promoting group activities.^{47,51,54} Participants encouraged each other during community walks⁵¹, and group sessions in which they discussed barriers preventing PA participation.^{47,54} In addition, social support networks were also established in order to promote PA among participants.⁵⁷ The support from staff was primarily during group sessions and face-to-face counseling sessions.^{44,48,52,53} Social networks were also established among trained staff delivering the

interventions in order to monitor progress and encourage participants throughout the interventions.⁴⁶

The third commonly used level of the SEM was the community level (n=9).^{46–48,50–53,55,56} Community level strategies centered around the cultural values/norms of the Hispanic community.^{46–48,50,52,53,55,56} Culture is an influential factor that is emphasized within the Hispanic community; thus this component was categorized in the community level of SEM. The impact of culture was implemented through several factors that included: religion⁵², dance⁴⁷, and sports specific to the Hispanic culture, such as soccer and handball.⁵⁵ Incorporating bilingual researchers, staff, and educational materials in order to promote accessibility for the Hispanic community can also be considered an incorporation of cultural value due to the inclusion of language.^{46,51,52,54–58} In addition to the cultural value, the built environment was also addressed within the community level of the SEM. One study addressed the infrastructure of parks and neighborhoods through the incorporation of traffic safety and accessible walking and cycling routes.⁵⁶ This study provided a positive change to the built environment in order to promote PA opportunities and enhance active lifestyles.

While the 14 interventions used combinations of strategies that were categorized across three levels of the SEM (individual, interpersonal, organizational), there were two levels of the SEM that appeared to be underutilized including organizational (n=1), and public policy (n=1).⁵⁶ The organizational level utilized the church to promote a connection between spiritual messaging and health behaviors to promote adherence to PA.⁵² The public policy level was addressed through the awareness of resources that assist in creating an accessible PA environment among low-income neighborhoods.⁵⁶

Intervention PA Outcomes and Measures

The measures of PA included were: self-reported (n=8)^{44,47,48,52–56}, accelerometer/pedometer data (n=5)^{46,49,51,57,58}, and a combination of both (n=1).⁵⁰ Twelve of the interventions (85%) demonstrated a positive change in PA levels among the participants in the studies.^{44,46,56,58,47–52,54,55} Within these changes, eight of the interventions demonstrated some type of significant change in PA ($p < .05$).^{46,47,50–52,54,55,58} The increases in PA occurred across a variety of outcome measures. Three of the studies demonstrated increases in weekly minutes of walking. One of these studies utilized an objective measurement through pedometers to collect the walking data.⁵¹ This study saw an increase in maternal walking from baseline (6278) steps per day to 10,580 steps per day.⁵¹ The other two studies used validated self-reported measurements to collect data from the participants.^{53,54}

Two studies showed increases in moderate activity through self-reported surveys and questionnaires.^{47,48} One of these studies saw an increase of 42 minutes/week and 13 minutes/week after a 3-month intervention in moderate and vigorous PA respectively, while the other saw an increase in number of days/week of PA which was .34 to .69 after a 12-week intervention.^{47,48} From these interventions, only one was a statistically significant increase ($p < .001$).⁴⁷

Vigorous PA also increased in two intervention studies using similar self-reported measures.^{48,56} Many of these improvements were through self-reported only measures such as questionnaires and surveys.^{47,52,54,55} The remaining improvements were seen using a mixed method objective and subjective measures such as pedometers, accelerometers, and surveys.^{46,49,58} . However, it is important to note that a majority of the interventions only included subjective measures of PA, thus the majority of improvements were seen through a

subjective measure. In addition to the PA measures, there were some intervention programs that demonstrated improvements in fitness outcomes such as strength, flexibility, and endurance.^{46,47,52} There were two intervention studies that did not have any significant changes to PA post intervention.^{53,57} These studies taught behavior change strategies, but did not specifically incorporate PA into the sessions. The behavior change strategies included self-care, self-management, and PA.^{53,57}

Participants in these interventions were provided access to online resources such as educational materials, web diaries, instructional videos, and individualized sessions with health professionals to minimize cultural barriers and create self-care goals.^{53,57}

In addition to the primary measure of PA and fitness, there were also PA mechanisms of change that showed positive changes within the interventions. Nearly all of the research studies (n=13) indicated improvements in social support from family, peers, and medical professionals.^{44,46,56–58,47–49,51–55} Changes in the knowledge/attitudes regarding PA perceptions increased in nine intervention studies.^{44,46,48–50,52,53,55,56} Improvements in participants' self-efficacy to engage in PA were shown in three studies.^{52,54,55} Mental health in the form of depression was improved through an educational setting in one of the interventions.⁵⁸ The interventions demonstrated promising changes in primary PA and fitness outcomes, as well as additional mechanisms of change.

Table 2-1 Intervention Sample Characteristics

Study	Sample Size	Gender	Age	Ethnicity	Health Risk Factors
King et al., 2013	N=40 (N=20 virtual, N=20 health education)	Female = 72.5%, Male = 27.5%	Mean = 53.7 years	92.5% Latino	N/A
Bender et al., 2014	N=33 Mother/Daughter Dyads	95% Women	18-35 years	85% Hispanic	N/A
Gutierrez, J, Et al., 2014	N=76 Latinos	Female =86.7%, Male = 13.3%	18-44 (22.6%), 45-64 (62.9%), 65-74 (14.5%)	41.5% Latino	Diabetes
Keller et al., 2014	N=139 Madres	100% Female	18+	100% Hispanic	Depression
Khare et al., 2014	N= 180	100% Female	40-64 years	100% Hispanic	Cardiovascular Disease
Ruggiero et al., 2014	N= 126, MAC (Medical Assistant Coaching) = 65, TAU (Treatment as Usual) = 61	100% Female	53.15 ±12.36 years	47.4% Hispanic	Diabetes
Agomo et al., 2015	N= 25 (afternoon), N=13 (evening)	80% Hispanic Women	35-64 years	100% Hispanic	Cardiovascular Disease, Stroke
Anderson et al., 2015	N=26 Hispanic	75.8% Female, 24.2% Male	38 ± 9.4 years	78.8% Hispanic	N/A
Koniak-Griffin & Brecht, 2016	N= 111	Latina Female	35-64 years	100% Hispanic	Cardiovascular Disease
Phelan et al., 2017	N= 302	100% Female	18 to 40 years	82% Hispanic	N/A
D'Alonzo et al., 2018	N=76	100% Female	29.80 ± 7.92	100% Hispanic	N/A
Berg et al., 2019	N=271 Hispanic	Female: 91.4%, Male: 8.6%	N/A	87% Hispanic	N/A
Estrada et al., 2019	N=36	100% Female	18-44 years	100% Hispanic	Cardiovascular Disease
Connor et al., 2020	N= 36 Fathers	100% Male	26-46 years	100% Hispanic	N/A

Table 2-2 - Intervention Levels of the Social Ecological Model (SEM)

Study	Individual	Interpersonal	Organizational/ Social Institution	Community/ Built Environment	Public Policy
King et al., 2013	Self-reported PA, attitudes towards PA	N/A	N/A	Cultural values	N/A
Bender et al., 2014	N/A	Formed community walk groups	N/A	Incorporate community stakeholders	N/A
Gutierrez, J, Et al., 2014	Self-reported PA, knowledge/skills for PA, self-efficacy	Social support from staff/trainers	Church	Culture (religion)	N/A
Keller et al., 2014	Understanding of PA postpartum depression outcomes	Family, mothers,	N/A	N/A	N/A
Khare et al., 2014	Knowledge/skills, self-reported PA	Social support from IWP staff/researchers, family	N/A	N/A	N/A
Ruggiero et al., 2014	Knowledge/skills, self-reported PA, self-care	Social support from Medical Assistants (MAs)	N/A	Cultural values/norms	N/A
Agomo et al., 2015	Self-reported PA, self-efficacy	Social connection with peers and facilitators	N/A	N/A	N/A
Anderson et al., 2015)	Self-reported PA, knowledge/skills for PA, self-efficacy	Family (parents and children), social media (Facebook)	N/A	Cultural values/norms	N/A
Koniak-Griffin & Brecht, 2016	Knowledge about CVD health and preventative measures	Social networks with one another and promotoras	N/A	Cultural values/norms	N/A
Phelan et al., 2017	Developed skills to lose postpartum weight (PA/nutrition advice) (motivational videos)	Social networks with WIC participants	N/A	N/A	N/A
D'Alonzo et al., 2018	Self-reported PA, developed skills to overcome PA barriers	Social support among other immigrant women	N/A	Cultural values/norms	N/A
Berg et al., 2019	Self-reported PA, knowledge/skills/attitudes for PA	Family support	N/A	Cultural values/norms/ resources/safety of neighborhoods	Accessibility of PA
Estrada et al., 2019	Self-reported PA, educational knowledge	Social support from counselors	N/A	Cultural values	N/A
Connor et al., 2020	Knowledge of PA	Encouragement of family dynamic to promote PA	N/A	N/A	N/A

Table 2-3 Scoping Review Intervention Summary

Study	Study Design	Mode of Delivery	Duration	Measurement of PA	Intervention Summary	PA Changes	Type of PA Changes
King et al., 2013	Randomized Control Trials (RCT)	in-person, utilizing computers for virtual advisors	4-months	Community Health Activities Model Program for Seniors (CHAMPS) Survey, Pedometer	Virtual Advisor sessions lasted 7 minutes (included: salutation, individualized social dialogue, progress review, personalized feedback, problem solving, goal setting, educational information based on progress). Waitlist group (offered general health promotion program (nutrition/home safety), offered 4-month virtual advisor program upon completion of their 4-month study.	Yes	Virtual Group Walking (increase 253.5+-248.7 minutes/week), Control Group (increase 26.8+-67 minutes/week), (p=.002) Pedometer Results (Week 9: Virtual 4350.2 +-4095.8 steps to Week 16: 7129.7+-4740.4 steps) (p=.47), Motivational strategies increased: risks of inactivity (p=.03), committing to be physically active (p=.006), sustaining more active alternatives (p=.0004), reward oneself for being physically active (p=.03), remind oneself to be physically active (p=.009)
Bender et al., 2014	Pre-Test/Post-Test	in-person	9 months	Pedometers (maternal step counts) (only on 2 days) (Tuesday and Saturday)	Vida Saludable: phase 1: bi-weekly interactive group lessons delivered over 2 months by a trained promotora in English and Spanish (promoting healthy drinks, PA, parental role modeling); Phase 2: 6 monthly group community activities enforcing healthy behaviors (field trips to walking trails, community parks,)	Yes	Maternal walking increased more during the week (69%, 4302 steps) (p<0.0167), compared to the weekend (49%, 3151 steps) (p<0.0167). Maternal Walking (step counts) (Tuesday) Baseline: 6278 (802) Postintervention: 10,580 (947) (Saturday) Baseline: 6479 (870) Postintervention: 9630 (944)
Gutiérrez, J, Et al., 2014	Pre-Test/Post-Test	in-person	6-months	Baseline, 12-week, and 6-month follow up surveys. Baseline and 12-week (self-administered), 6-month (by telephone).	Bronx Health Reach (BHR). FFF (Fine, Fit, and Fabulous): low cost, 12-week faith-based diabetes prevention program. Spiritual messaging and support of church community to promote: nutrition, increased PA, better health using goal-setting techniques. Curriculum: dietary guidelines, portion sizes, healthy cooking techniques, relationship between spirituality and health behaviors. Each session (1 hour nutrition discussion + 1 hour exercise session. Culturally and linguistically adapted for Latinos in Spanish speaking churches. 2 consultants (1 fluent in Spanish. Weekly 1 hour fitness sessions conducted by 2 bilingual trainers. Participants completed medical questionnaires to allow for appropriate design of low-impact cardiovascular exercises for all ages and abilities.	Yes	Improvements in knowledge and behaviors related to PA from baseline to follow-up. Increased exercise in the past 30 days. Latino Baseline: 69.6% 12 weeks: 92.8% (p<.05) Increased physical endurance (90%), energy levels (76%), more active lifestyles (78%)

Keller et al., 2014	Randomized Control Trials (RCT)	in-person	48-weeks	Standard Brief Activity Survey (SBAS) self-report, PA (pedometer and accelerometer data)	Intervention group participated in 12 weekly walking sessions and completed walking diaries supported by promotoras. Control group received monthly newsletters with information not related to PA (breast examination, diet, and emotional support). Each intervention group participant required to walk at least once/week with the promotora. Intervention group sets “steps per day” and “bouts per day” goals and self-monitor progress. During weekly meetings, intervention group evaluates their goals and set new goals. Walking routes are mapped by promotoras. Each intervention participant provided with fitted athletic walking shoes. Promotoras provided tips for walking in the hot Arizona heat. Measures recorded at month 3, 6, 9, and 12.	Yes	Total Steps Control Baseline: 4909.74 (2255.70), 6 months: 6040.16 (2561.94), 12 months: 6425.04 (3390.90) Intervention Baseline: 5120.33 (2244.01), 6 months: 7575.60 (2785.47), 12 months: 6963 (3126.54) (p= .0436) Aerobic Steps Control Baseline: 369.64 (646.03), 6 months: 553.55 (964.98), 12 months: 648.66 (1154.26) Intervention Baseline: 447.36 (881.15), 6 months: 2254.20 (1745.95), 12 months: 1441.26 (1488.53) (p<.0001) Aerobic Walking Time (minutes per day) Control: Baseline: 3.59 (6.27), 6 months: 5.22 (9.13), 12 months: 5.92 (10.03) Intervention Baseline: 4.15 (7.75), 6 months: 19.52 (14.97), 12 months: 12.72 (13.19) (p<.0001) Moderate Lifestyle Activity (minutes per day) Control: Baseline: 77.29 (46.25), 6 months: 90.64 (49.52), 12 months: 104.82 (52.84) Intervention Baseline: 77.29 (35.32), 6 months: 102.21 (45.46), 12 months: 124.62 (66.90) (p=.0714) Vigorous Lifestyle Activity (minutes per day) Control: Baseline: 0.16 (0.64), 6 months: 0.66 (2.38), 12 months: 0.39 (1.33) Intervention Baseline: 0.57 (1.95), 6 months: 1.01 (3.43), 12 months: 0.63 (1.71) (p=.1627)
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Ruggie ro et al., 2014	Randomized controlled trial (RCT)	in- person/teleph one	1-year	Summary of Diabetes Self-Care Activities Questionnaire (SDSCA) (0-7 Days)	MAC intervention: written educational materials used to minimize literacy barriers and culturally appropriate to subgroups, self-care coaching was person-centered, individualized, and guided by (transtheoretical theory, empowerment approach), motivational interviewing to help individuals learn skills to make better self-care choices and changes, setting self-care goals, coaching feedback, (face-to-face and telephone surveys). Both groups received TAU (regular visits with primary health care provider, referrals, diabetes educational handbook at baseline)	No	No significant changes on self-reported PA
Agom o et al., 2015	Comparison group (afternoon vs evening)	in-person	4-weeks	Self-Reported	"Be Wise" Program implemented at community health center, participants received either English or Spanish Be Wise Lifestyle Intervention Participation Guide, 4 sessions: lecture/small group discussions, stretching/balancing exercises, participants identified small strategies to diet and PA behaviors at end of each session, follow-up contact made through phone calls and postcards	Yes	Participants added more PA to daily routines and engaged in new activities, some joined low-cost health clubs Hours spent/week for PA, $F(2,34) = 31.53$, $p < .0005$, Moderate PA, $F(2,34) = 24.18$, $p < .0005$
Anders on et al., 2015)	Pre- Test/Post- Test	in-person	16-weeks	Self-Reported	TST (Taking Steps Together) Intervention. 16 weeks long with 2-hour classes 1x per week. Class sessions (three 40-minute elements: cooking and eating, interactive educational activities, and PA. Children and parents attended weekly sessions together. Classes were in Spanish and English. Bilingual program coordinator, dietitians, pediatricians, guest chef, community experts on nutrition and exercise, bilingual and culturally aware volunteers. TST Curriculum: target health behavior outcomes, barriers and solutions to playing outside. Physical activities: Zumba, yoga, handball, soccer, relay races, etc. Social media was used to post pictures of PA activities from home.	Yes	Average number of days per week with at least 30 minutes of PA (2.6 to 3.9 days per week) ($p = .001$)
Konia k- Griffin & Brecht, 2016	Randomized Controlled Trial (RCT)	in-person	8-weekly sessions (2 hour) session (2- months)	Accelerometer (used as baseline measure) Self-Reported for interest in PA participation	Adapted form of Su Corazon delivered in 8 weekly (2 hour) sessions to groups of 10-15 women (8 groups) by promotoras to discuss CVD, cultural and language appropriate presentations/education, each class had 10-minute PA break (stretches, exercises, etc.)	Yes	Interest in health promotion (participating in PA) among participants who completed a colonoscopy was higher than those who did not. Heart Disease Knowledge Increased Pre-test (7.9 ± 2.6), Post-test (9.4 ± 1) ($p < .001$)

Phelan et al., 2017	Randomized Clinical Trial (RCT)	combination in-person/online	study entry, 6-months, 12-months	Waist-worn accelerometer (GT3x + ActiGraph), worn at least 2 days for minimum 8 hours/day	Intervention group had all elements of WIC program + 12-month internet-based weight loss program. PA goals increased to 30 minutes or more per day on most days of the week. Program available in English and Spanish. Guidance, resources, automated feedback, weekly lessons, web diary, weight and PA tracker, instructional and inspirational videos, message board. 4 weekly text messages notified participants of new website content, motivation, support, and feedback. Study interventionist held monthly face-to-face sessions at WIC Clinics (reinforce website)	No	No significant changes on moderate to vigorous PA
D'Alonzo et al., 2018	Partially randomized patient preference trial with a lag group	in-person	12-weeks (2 sessions)	National Aeronautics and Space Administration-Johnson Space Center PA Rating Scale (7-point scale response) (0 = No PA, 7 = run more than 10 miles per week)	Culturally tailored classes led by promotoras. Combination of low-impact aerobic exercise/Latin dance, with strength and flexibility activities. Classes met two times per/week. Babysitting provided at both sites (charter school, Latino community center). Culturally appropriate music, monitor intensity of workouts, classes taught in Spanish. Use of resistance band and small hand weights for 10-minute muscle strengthening + 40 to 50 minutes of aerobic activity. During cooldown sessions, promotoras led discussions on: problem solving strategies to PA barriers (family responsibilities, management of acculturation-stressors, sources of social support among other immigrant women)	Yes	Participants showed significant improvements in PA (days/week) 0.34 (SD = 0.22) to 0.69 (SD = 0.46) P<0.001) Physical Fitness Measures: aerobic fitness (vo2 max): Group 1: 24.93 (5.41) to 30.18 (5.07) mg/kg/min (p<.001) Group 2: 26.10 (5.55) to 30.56 (4.76) mg/kg/min (p<.001) muscle strength (curl repetitions) Group 1: 38.21 (8.91) to 42.25 (8.15) (p<.001) Group 2: 39.83 (8.89) to 62.52 (12.41) (p<.001) Flexibility: 33.14 (6.21) inches to 36.58 (5.98) inches (p<.001)

Berg et al., 2019	Control/Intervention	in-person	2013-2014	Self-Reported. Perceived availability of safe and affordable PA resources (3-item "no/yes" responses), Barriers to PA access (3-item scale assessing distance, poor quality, and safety). Utilization of resources in community for PA (ranges: less than once a month, 1-2 times a month, 1-2 times a week, or 3 or more times per week. Behavioral variables: time spent in vigorous activity and walking. Vigorous activity (how often for at least 20 minutes during past 7 days). Time Spent Walking (have you walked during the past 7 days)	GAVA (Go Austin Vamos Austin!) community PA, goal to address obesogenic environment in Dove Springs'. Cohort study examined impact of GAVA strategies on changes in key variables (awareness, use of community resources, PA and eating behaviors. Intervention and control community groups (child-parent dyads). Intervention group/community was in a single sized zip code which was within the GAVA intervention. Control group were in communities with similar demographics, but away from the intervention area. Key Measures (awareness of perceived barriers, usage of resources, behavioral variables and weight status. Outcome variables: perceived availability of safe and affordable PA resources, perceived barriers using PA resources, utilization of PA resources, PA behaviors,	Yes	Perceptions of availability of PA resources were high. Many participants did not engage in PA 32% of participants noted no walking during the past 7 days. (p=.24) 45% reported being vigorously active more than twice a week. (p=.50)
Estrada et al., 2019	Pre-Test/Post-Test	in-person	14-weeks	Self-Reported	Face-to-face counseling sessions --> phone counseling sessions --> option of either type of session --> final follow-up phone call session. Each participant received binder with core intervention content and supplementary materials. Participants received tailored counseling on oils, dressings, nuts, fish, and meats. At end of each session, participants asked to select 1-2 goals and identify first steps to achieving those goals during the next 2-4 weeks. Participants encouraged to read PA section to promote walking 30 minutes on most days of the week and ask questions if they had any.	Yes	Moderate PA increased by 42 minutes/week; vigorous PA increased by 13 minutes/week

Conno r et al., 2020	Pre- Test/Post- Test, Randomized Control Trial (RCT)	in-person	2 months	GT3X + activity monitor	Papas Saludables/Ninos Saludables. Fathers provided education and resources to lose weight, healthy nutrition, encourage fathers and children to engage in PA together. The waitlist group received full program after post assessment of full sample, Culturally Adapted Program, Joint PA component (Sports Club) for fathers and children (fundamental sports skills, fitness activities encourage active games that could be done at home; each family given culturally adapted game of cards with a bag of sports equipment to encourage sport skills at home. Cultural aspects (games modified specifically for Hispanic families, create closed Facebook group for mothers, lower reading levels, address barriers for PA participation among fathers, up-to-date PA recommendations	Yes	MVPA (minutes) increased for both intervention= 45.97 (27.21) to 51.48 (32.61) and control 30.59 (25.60) to 32 (18.81) groups No statistical significance(p>.05)
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*promotoras: community health worker

2.4 Discussion

The purpose of the scoping review was to collect and summarize existing literature discussing the interventions aimed at improving PA among low-income Hispanic adults. The review examined literature between the years 2012 and 2022 to characterize the recent intervention literature. According to the 14 interventions included in the review, it is evident that there have been promising advancements in the effort to promote PA among the Hispanic community. The review was limited to interventions that included a minimum of 40% Hispanic participants to consider a sufficient impact of the intervention program among the population. The majority of interventions included for review included primarily Hispanic participants in their studies. The high percentage of Hispanic participants is similar to a previous review published in 2012 that included a majority of Hispanic centered interventions.³²

The sample sizes for the interventions varied from small ($n < 100$) to large samples ($n > 100$). Many of the smaller interventions demonstrated successful changes in PA levels among their participants. Estrada and her colleagues found improved moderate and vigorous PA participation among their participants ($n = 36$).⁴⁸ Weekly days of PA increased from 2.6 to 3.9 days in a small sample of Hispanic individuals ($n = 26$) in a study conducted by Anderson and his colleagues.⁵⁵ In addition, smaller interventions resulted in improvements in flexibility and strength.⁴⁷ While the larger sample sizes also demonstrated positive changes in PA, it is interesting to note that two of the large sample interventions that did not show any significant changes in PA.^{53,57} To date, smaller sample sizes have generally been effective in promoting PA among the Hispanic population. This may be due to the ability to easily tailor and address multilevel influences of the SEM, which is further supported by the multiple levels addressed in the small sample interventions included in the scoping review. Smaller sample sizes may also

provide easier accessibility for researchers and staff to personalize sessions, address specific concerns, and communicate with participants.^{59,60}

The duration of the interventions reviewed were different for each of the programs implemented. The majority of interventions were administered during a 4 to 16-week time frame. In general, shorter duration interventions demonstrated successful post PA results among the Hispanic population. Improvements in moderate, vigorous, and weekly PA were seen among many of these short-term interventions.^{44,48–50,55} Agomo and colleagues found improvements in PA, as well as the decision to join health clubs during their 4-week interventions.⁵⁴ Long-term interventions, which were programs that lasted longer than 16-weeks, similarly demonstrated positive improvements in PA. Improvements in maternal walking were seen in a 9-month intervention through increased accessibility and safety of the neighborhood, while a year-long intervention used peer and facilitator social support during walking sessions to support maternal walking among postpartum mothers^{56,58}

The use of the SEM was important in order to categorize characteristics of successful interventions. The five levels that were used for categorization were: individual, interpersonal, community, organizational, and public policy. While all the interventions included for review had a combination of components of the SEM, there were certain trends that should be noted. One of the most common trends is the use of both the individual and interpersonal levels of the model. These two levels were the most utilized levels among the interventions reviewed. Behavioral change techniques of the individual level included the use of: knowledge, attitudes, and self-efficacy towards PA. Interventions used educational seminars and materials in order to promote the importance of PA, while also implementing sessions in which participants were able to learn and apply their new found knowledge.^{44,46,48,49,52,53,56,61} Educational components are

known to be successful when seeking to promote change in PA among underrepresented populations.^{62,63} The promotion of self-efficacy was also seen through the educational sessions. Anderson and colleagues used bilingual educational seminars to promote the concept of PA, which increased the self-efficacy of Hispanic mother-daughter groups to engage in more physical activities throughout the week.⁵⁵

The main theme of the interpersonal level of the SEM among the interventions was social support. The concept of social support was used to promote PA engagement and adherence. Support among parents and children proved to be effective in promoting PA participation.^{49,55,56} The use of parents serving as role models and a support system for their children also promoted PA among the entire family.⁵⁸ In addition to family support, support from counselors and medical providers proved to be effective in promoting PA patterns among participants. The addition of counselor support assisted in addressing issues/barriers preventing PA participation.⁴⁸ Incorporating individualized sessions to address common barriers Hispanics will encounter can assist in improvements to their PA engagement. Support among other participants in the same program also showed great promise in the promotion of PA. D'Alonzo and colleagues 2018 utilized social support components in their intervention to assist in creating a friendly atmosphere that allowed participants to address commonalities in regards to PA issues and solutions.⁴⁷

The community level of the SEM also focused on one common theme, which was cultural value. Researchers may have chosen to focus on this component to customize interventions specifically for the Hispanic population. The cultural component of the interventions was expressed in various manners. The use of bilingual traits in interventions was a simple, but effective strategy to ensure that the material presented in the programs was well

understood among participants with varying levels of the English language. The bilingual component was used in both the educational materials and the staff that administered both academic and exercise sessions.^{52,55} Religion is another cultural value that was used in an intervention targeting Hispanic individuals. Gutierrez and colleagues used a faith-based program that combined the concept of spirituality and PA in an effort to promote healthy behaviors among their Hispanic church members.⁵² The success of this program is further emphasized by previous research that demonstrates the impact of faith on the behaviors of the Hispanic community.⁶⁴ The incorporation of Latino based activities such as dancing was also noted. Latin dance music was used to promote aerobic exercise and flexibility among Hispanic participants.⁴⁷ Dancing is a favorite past time of Hispanics, which may demonstrate the usefulness in incorporating cultural physical activities in interventions centered among this community.⁶⁵ While the built environment was minimally addressed in these interventions, it did provide positive PA outcomes by addressing aspects of the physical environment in which infrastructure and neighborhood safety were the main concerns addressed. The incorporation of the built environment in previous research further emphasizes the importance of addressing factors such as safety, accessibility, and infrastructure in order to promote opportunities for PA among Hispanics, as self-reported PA increased with the improvements in these built environment factors.^{62,66}

The two underutilized levels of the SEM were the organizational/institutional and public policy/built environment levels. One of the interventions focused on changing street safety in order to promote walking among a predominantly Hispanic community.⁵⁶ While only one intervention implemented changes to the built environment, the success of the intervention prompts future interventions to address enhancements to the built environment to support

components such as accessibility and safety within the Hispanic community. The organizational/institutional level of the SEM was used in only one of the interventions included for review, which was centered around connecting the church to PA and healthy behavior change⁵². Common interventions implemented using the organizational level of the SEM are centered around the workplace^{67,68}. However, the interventions included in this review did not focus on the work environment of participants. Within the Hispanic community, the cultural value of work and providing for family is emphasized and promoted,⁶⁹ which may lead researchers to perceive Hispanics receive adequate occupational PA due to higher labor intensive occupations.^{70–72} This research may contribute to the minimal emphasis on the organizational level of the SEM. In addition, incorporating other organizational influences within the Hispanic community such as churches and schools can provide additional information on factors influencing PA.⁶⁴

2.4.1 Strengths and Limitations

This review included components that increased the strength of the intervention evaluations. One of the strengths is the use of the SEM. This model allowed for a categorization of common strategies found in successful and unsuccessful interventions. Categorizing the programs through five different levels of the SEM allowed the researcher to find common strategies across different levels. This review only included studies with pre- and post-measures of PA in order to determine changes in PA levels. This component is crucial to the review due to the main focus on PA changes due to interventions. The review of programs between 2012 and 2022 is essential in order to determine the most recent interventions that are used to address the physical inactivity levels among low-income Hispanic adults. To date, there has not been a

review that has evaluated the previous ten years of programming aimed at improving PA among low-income Hispanic individuals.

While this scoping review contributed to our understanding of successful intervention programming, it does have its limitations. One of the limitations of this review is that it contained a limited collection of interventions from which to draw concrete conclusions. The 14 interventions may not be able to be generalized to the entire Hispanic population. In addition, the decision to focus on low-income Hispanic adults may have eliminated interventions that improved PA among Hispanic individuals that are not considered low-income. In addition, there was no inclusion of an assessment of quality in the results to review the interventions included in the scoping review. The use of one primary researcher to extract the data after the inclusion and exclusion were assessed was another limitation to the review process.

2.4.2. Future Implications

The scoping review provided useful information in evaluating the levels of the SEM that were used in the previous ten years of interventions focused on the Hispanic population. High rates of obesity and associated chronic disease within the Hispanic community is a cause for concern, which emphasizes the importance of implementing interventions that can assist in counteracting these health issues. The review revealed that while there are promising advancements in promoting PA among Hispanics, there is still much more work to be done in order to promote healthy behaviors among this community.

One factor that needs to be addressed is the small sample sizes within the interventions included in the review. It is difficult to generalize these results to a broader Hispanic population due to the minimal number of participants in the studies. Determining the feasibility and effectiveness in larger populations can be addressed in larger samples of participants. The

duration of the interventions was also another variable that needs to be addressed. The short-term interventions that demonstrated successful PA improvements need to be implemented for a longer duration in order to determine the sustainability of PA. The age of participants was another factor that can be further emphasized in future interventions. Due to the variety of age groups, it was difficult to determine which strategies at different levels of the SEM were the most effective for each age group. Future studies should focus on a specific age group in order to determine the effectiveness of an intervention.

Intervention delivery methods should also be noted when conducting future research. In-person and online methods were both used among interventions in the review. Both methods demonstrated some form of success. While both show promising results, it is important to note that many low-income Hispanic individuals may need to utilize one method over another due to factors such as work, childcare, and language⁷³⁻⁷⁵. Researchers must bear in mind that interventions must accommodate for these potential issues/barriers. Future researchers should implement delivery methods that are cost-effective for participants and allow accommodation for the previously mentioned factors. Collaborations with work and community organizations is a method that should be further reviewed to determine its effectiveness in promoting PA changes among low-income Hispanic adults that face multilevel barriers.

The SEM assisted in organizing strategies that should be incorporated in future interventions. The use of social support and education are two of the most common behavioral change techniques used in the successful interventions included in the review. In addition, culture is a crucial component that needs to be relevant in PA interventions among the Hispanic population. Future studies may need to incorporate these aspects in interventions to successfully address PA barriers and issues that prevent low-income Hispanic individuals from engaging in

PA. In addition to the SEM levels that were used to organize the interventions, the built environment is a component that was minimally addressed in the interventions. The built environment is a crucial component in promoting PA change among entire populations as it addresses factors that can be barriers to PA such as safety, infrastructure, and social interactions.^{42,76,77} Incorporating the built environment may allow for effective changes during long-term interventions, as well as be generalized among the larger Hispanic population. While only one intervention used policy to promote accessibility, it did show improvements in vigorous PA among participants⁵⁶. While implementing policy changes may be difficult at a larger scale, previous research supports the importance of addressing policies within the built environment, work-sites, and schools to promote opportunities for PA.⁷⁸⁻⁸⁰

While interventions demonstrate forms of success in improvements of PA participation, it is still important to identify areas needing further research. Many of the programs improving PA only implemented strategies targeting 1-2 levels of the SEM. This approach limits the ability to provide a wholistic approach to combating barriers towards PA among the Hispanic community.^{81,82}

The success of existing programs demonstrates the effectiveness of addressing certain levels of the SEM, however the minimal attention to the higher levels of the model leaves areas for improvement where researchers can explore strategies to address barriers to targeting these levels. Addressing these levels can provide better understanding of PA barriers the Hispanic communities encounter and further assist in minimizing detrimental health effects associated with physical inactivity within this community.

Chapter 3- Multilevel factors Associated with PA Among Adult Working Hispanic Women

Background: The Hispanic population is at an increased risk for adverse health effects due to the high levels of physical inactivity which are estimated around 32.1%. Specifically, adult working Hispanic women exhibit high levels of physical inactivity due to numerous barriers across multiple levels of influence. One model that is used to study these levels is the Social Ecological Model (SEM). The purpose of this study is to utilize the SEM to examine factors associated with physical activity (PA) among working Hispanic women. **Methods:** Participants (N=223) were recruited through the online research platform Prolific between May 31 and June 14, 2023. Participants were: (1) Hispanic adult females above age 18, (2) working part-time or full-time, (3) residing in the U.S. (4) and of Hispanic/Latinx origin. The participants completed validated surveys assessing variables across levels of the SEM: individual (self-efficacy, exercise planning, outcome expectations, and PA goals), interpersonal (family and friend support), community (accessibility, connectivity, infrastructure, aesthetic, and crime), and organizational/policy, which were combined into one level as they focused on work policies and occupational social influences. In addition, participants completed the IPAQ-short form to assess current PA levels. Demographic variables were also included in the final analysis. Hierarchical linear regression was conducted to examine multilevel predictors of PA among this population, with each level of the SEM entered into the model in sequential blocks. One-way ANOVA analyses were also conducted to compare the differences in SEM determinants across three different activity levels (inactive, minimal, active). Minimal qualitative data were also collected within the organizational/policy level in order to explore potential influences on PA. **Results:** The hierarchical linear regression demonstrated that the individual factors contributed

significantly to the variance in PA ($R^2 = .059$, $p = 0.001$). Adding interpersonal, community, and organizational factors did not significantly contribute to the prediction of PA. However, within the community level, crime was significantly negatively associated with PA ($p = .024$). When accounting for demographics, hours worked per week was also positively significantly associated with PA ($p = .024$). The one-way ANOVA analysis demonstrated that individual level variables differed significantly such that more active participants reported higher levels of: self-efficacy ($F(2, 220) = 10.00$, $p < .001$), exercise planning ($F(2, 218) = 14.33$, $p < .001$), goal-setting ($F(2, 218) = 7.79$, $p < .001$), and outcome expectations ($F(2, 219) = 4.30$, $p = .015$). Friend ($F(2, 219) = 9.17$, $p < .001$) and family support ($F(2, 218) = 6.06$, $p = .003$) also differed significantly across PA levels, where more active participants reported greater support. Higher crime ($F(2, 219) = 5.64$, $p = .004$) was associated with lower activity levels. The organizational and policy level variables did not have any significant differences across participant activity levels. When examining demographic characteristics, the amount of work hours per week ($F(2, 219) = 3.46$, $p = .033$) differed among the activity levels, as more active participants worked more hours per week. The qualitative data collected on work policy and culture through open-ended questions on the survey provided a brief view on negative and positive influences on PA. For example, participants noted time and stress as negative influences from their current occupation as barriers to PA. Whereas certain work incentives such as fitness programs and reimbursement policies positively impacted PA. Across both levels of analysis, the individual level, crime, and work hours/week demonstrated the strongest associations with PA.

3.1 Introduction

The Hispanic population is growing within the United States, and is estimated to reach approximately 120 million in the year 2060.⁸³ The rise in this population promotes increases in cultural diversity, inclusivity, and economic benefits within the nation.² However, adverse health outcomes within this population are a significant concern. According to the Center for Disease Control and Prevention (CDC), the Hispanic population is one of the minority groups at greater risk of illness and disease such as: obesity, diabetes, hypertension, heart disease and other chronic illness.⁸⁴ These health risks are concerning for the United States due to rise in mortality rates and health care costs.^{6,7} In order to minimize these adverse effects, it is necessary to address the main contributors that affect the health of the Hispanic population. One of these contributors is physical inactivity which is estimated to be approximately 31.7% compared to the national average of 25%.⁸⁵ Effective programs that address key determinants of physical inactivity are needed in order to combat the high levels of physical inactivity within the Hispanic population.

During the past decade, a variety of PA interventions have been implemented to address physical inactivity within the Hispanic population. While previous interventions demonstrate some success, there are limitations that need to be addressed. One of the limitations of these programs is a heavy focus on only individual and interpersonal determinants such as: self-efficacy, motivation, and social influences.³² Common intervention approaches have included targeting self-efficacy for exercise training among Latina women through goal-setting and overcoming personal barriers,^{47,52,54} incorporating peer and family support to improve adherence to exercise programs and family cohesion^{49,55,56,58}, and incorporating Hispanic culture/values such as: religion, dance, language, and sports in order to promote PA participation^{46,47,51,52,55}. In addition, many previous studies are limited by small sample sizes. In order to provide an

effective approach to reducing physical inactivity, it may be necessary to address a wholistic view of barriers beyond the individual and interpersonal levels. In addition, successful interventions must be tailored to specific subgroups within the Hispanic community in order to address common PA determinants among these populations.⁸⁶ Identifying these determinants can assist in creating future interventions aimed at improving PA among the entire Hispanic population.

Within the Hispanic population, research identifies working Hispanic females as one of the most inactive subgroups.⁸⁶ The low levels of PA among this group recognizes them as an important population to identify barriers towards PA. Previous research identifies certain barriers within the individual, interpersonal, and community levels that affect PA among Hispanic women. These barriers include: lack of knowledge of PA benefits, minimal resources to promote PA, the absence of social support from family and peers, and work exhaustion.^{58,66,86-88} However, this research is limited to small samples of participants and studies have primarily focused on individual, interpersonal, and community levels influences. The current study will provide a wholistic approach in identifying the variables affecting PA across various levels. Furthermore, this study will target the specific demographic of working Hispanic women, as research demonstrates this population is at risk for physical inactivity.⁸⁶ Thus, an approach using a structural framework among this specific population must be used to identify variables promoting or inhibiting PA.

One theoretical model that is successful in identifying a wholistic approach to determinants of PA is the Social Ecological Model (SEM).¹⁴ Researchers utilize this model to identify the determinants of behavior within five distinct levels of influence including: individual, interpersonal, organization, community, and policy.⁸⁹ The individual level of the

model identifies factors within individuals that can influence behavior. For example, an individual's self-efficacy, motivation, and knowledge promote or hinder a specific behavior.^{52,54} The support from peers and family among Latinas demonstrate a positive influence on PA within the Hispanic community.⁸⁸ The organizational level is centered on factors such as occupation and educational facilities that promote or impede PA engagement.⁹⁰ Community influence such as culture, neighborhood environments, and safety may also have an important impact on PA behavior.^{62,76,91} Policy is the overarching level that emphasizes federal, state, and local policies that oversee the availability/promotion of PA.⁹² The SEM framework is a useful tool for identifying determinants that must be addressed in programming aimed at improving PA. Using the SEM to construct PA programs among minority populations is highly relevant to the current area of research among the Hispanic population.³⁵

The application of the SEM can assist in understanding the specific multilevel determinants of behavior among working Hispanic women, as well as the relative influence of factors at each level on PA behaviors. Thus, this study aims to address two specific research questions:

1. Which determinants across the social ecological model differ by PA levels among Hispanic working women?
2. To what extent do factors across different levels of the social ecological model relate to overall PA among Hispanic working women?

We hypothesized that individual and interpersonal level influences would have the strongest associations with PA. Additionally, this study began to explore the potential impact of work culture and policy among the participants through brief descriptive information from additional qualitative questions.

3.2 Methods

3.2.1 Overview of Study Design

This study employed a cross-sectional electronic survey to identify factors associated with PA among working Hispanic females. The survey was distributed through the Prolific database.⁹³ Participants completed the survey between May 31 and June 14, 2023. This study was approved by the Kansas State University IRB (protocol #11688).

The Qualtrics survey was organized according to the SEM in which five levels were addressed using validated survey measures. The levels of the SEM addressed in the survey were: individual, interpersonal, community, organizational, and policy.

Participants

Interested participants completed a pre-screening survey that assessed eligibility criteria which included: (1) Hispanic/Latino, (2) female, and (3) working full-time (≥ 40 hours). Once eligibility was confirmed, participants completed a consent form acknowledging their understanding of the research, which was then followed by the survey. Eligible participants completing the survey were awarded approximately \$4 per person. Funding from the Kansas State University College of Health and Human Sciences allowed for the recruitment of 220 participants successfully completing the survey.

Measures

The survey was categorized into sections addressing each level of the SEM. Validated questionnaires were used to address factors at each level of the model. The organizational and policy levels were combined and evaluated using a combination of questionnaires from previous studies, as well as open-ended questions to gather information regarding the influence of policies and environment on PA. In addition, the International PA Questionnaire (IPAQ) was used to

collect current PA information from each participant. Demographic variables such as age, ethnicity, marital status, education, employment, occupation, income, number of children, and health status were also captured by the survey.

3.2.2 Individual Level

3.2.2.1 Barrier Self-Efficacy Scale

Self-efficacy was assessed using the Barrier Self-Efficacy Scale.⁹⁴ Participants were presented with a list of 13 scenarios in which they rated their confidence on a scale of 0 (not at all confident) to 100 (extremely confident) in overcoming barriers towards PA. Participants rated each scenario according to the following prompt *“I believe that I could exercise 3 times per week for the next 3 months if.....”* Examples of these scenarios included: “I felt pain and discomfort when exercising,” “it was not fun or enjoyable,” and “the weather was very bad.” The scores were added and divided by the total number of items, resulting in a total score between 0-100. Internal consistency for self-efficacy in this study was very good ($\alpha = .903$).

3.2.2.2 Multidimensional Outcome Expectations for Exercise Scale

The perceptions towards PA benefits were evaluated using the Multidimensional Outcome Expectations for Exercise Scale.⁹⁵ Participants were presented with several statements related to specific benefits of PA participation. Each benefit was rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*) according to the following prompt: *“The following questions will address your perceptions towards the benefits of PA.”* Examples of these statements included: *“exercise will improve my ability to perform daily activities,” “exercise will improve my social standing,”* and *“exercise will improve my mood.”* The statements were then categorized into three outcome expectations subscales: physical, self-evaluative, and social.

Each subscale was summed with separate ranges: physical (6-30), self-evaluative (5-25), and social (4-20). The internal consistency for this measure in this study is very good ($\alpha = .903$).

3.2.2.3 Exercise Planning and Scheduling Scale

Self-regulation techniques regarding exercise were assessed using the Exercise Planning and Scheduling Scale.⁹⁶ Participants provided their agreement on 10 prompts regarding self-regulation techniques aimed at exercise. The statements provided were based on the template “*the following questions will address how you fit exercise into your daily lifestyle.*” Examples of these statements are: “I plan my weekly exercise schedule,” “I never seem to have enough time to exercise,” and “exercise is generally not a high priority when I plan my schedule.” The ranking of each prompt varied from 1 (*does not describe*) to 5 (*describes completely*). Negatively worded items were reverse scored so that higher scores corresponded with greater use of self-regulation strategies. Item scores were then added for a total score range of 10 to 50. The internal consistency for this measure in this study is good ($\alpha = .853$).

3.2.2.4 Exercise Goal-Setting Scale

Exercise goals were assessed using the Exercise Goal-setting scale.⁹⁶ Participants were provided with 10 prompts which focused on exercise goals and techniques. Participants were asked to rate their agreement with each prompt. The template provided was “*the following questions will address how you set exercise goals and plan exercise activities.*” Examples of these statements included: “I often set exercise goals,” “I usually keep track of my progress in meeting my goals,” and “I have developed a series of steps for reaching my exercise goals.” The items were rated from 1 (*does not describe*) to 5 (*describes completely*). The EGS items were added and scored from 10 to 50. The internal consistency for this measure in this study is very good ($\alpha = .934$).

3.2.3 Interpersonal Level

3.2.3.1 Social support

Social support for PA was categorized into two sections: friend support and family support.⁹⁷ Participants were asked the following prompt “under each category, rate how often anyone living in your household has said or done what is described during the last three months” or “rate how often your friends, acquaintances, or coworkers have said or done what is described during the last three months.” Examples of the statements in the questionnaire included: “gave me the encouragement to stick with my PA program,” “discussed PA with me,” and “helped plan activities around my activity routine.” Participants rated each statement on a scale from 1 (*never*) to 5 (*very often*), with an additional option 8 (*does not apply*). The items for the family and friend support were summed and categorized from 0 (no support) to 50 (strong support). The internal consistency for family and friend support scales was very good in this study, which were at ($\alpha = .923$) and ($\alpha = .936$) respectively.

3.2.4 Community Level

The neighborhood environment was evaluated using the Neighborhood Environment Walkability Scale (NEWS) short-form questionnaire.⁹⁸ This scale evaluates the perceptions of the neighborhood environment and addresses specific barriers and facilitators towards PA. Participants completed this questionnaire to address their perceptions of the neighborhood surrounding their current work environment on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Questions were separated into 6 subscales: accessibility, street connectivity, infrastructure, aesthetics, traffic, and crime. Examples of accessibility questions include: “stores are within walking distance from my work” and “it is easy to walk to a transit stop from work.” Street connectivity and infrastructure questions include: “there are many alternative routes for

getting place to place” and “walkers and bikers in the neighborhood can be easily seen by people in their homes” respectively. Aesthetics, traffic, and crime were assessed with questions such as “there are many interesting things to look at while walking,” “most drivers exceed the posted speed limits while driving” and “there is a high crime rate.” Items from each subscale were summed. Street connectivity, traffic, and infrastructure all had low levels of internal consistency within this study, which were calculated at ($\alpha = .612$), ($\alpha = .547$), and ($\alpha = .716$) respectively. The community variables with good internal consistency in this study are accessibility ($\alpha = .881$), aesthetic ($\alpha = .844$), and crime ($\alpha = .892$).

3.2.5 Organizational/Policy Levels

The organizational and policy levels were combined into one category in order to explore specific worksite policies. This level was assessed using a combination of a previous Office Exercise Behavior Determinants Scale⁹⁹ and open-ended questions. The scale addresses the influence of the work environment on PA. Participants rated their agreement with statements on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Examples of questions from the scale include: “My supervisor thinks I should do PA,” “the workplace in the office positively influences my exercise behavior,” and “the policy of the company influences my exercise behavior.” The scoring for this section of the survey was categorized into two components: social and work. The social aspect of the organization focused on colleague/supervisor influence, while the work component focused on the influence of company policies on PA. In addition, the use of open-ended questions was used to begin exploring the impact of the work culture and policy on PA among the working Hispanic women from the study. An example of an open-ended question would be “please provide an example of how your company policy may affect your exercise behavior.” The internal consistency for the social and work variables within the

organization and policy levels in this study were both low at ($\alpha = .701$) and ($\alpha = .641$) respectively.

3.2.6 PA

Participants completed the International PA Questionnaire (IPAQ) short-form in order to gather information regarding current PA¹⁰⁰. The IPAQ short-form includes questions regarding: moderate, vigorous, walking, and sedentary activities. Examples of questions addressing moderate and vigorous activity included: “During the last 7 days, on how many days did you do vigorous PA like heavy lifting, digging, aerobics, or fast bicycling” and “how much time did you usually spend doing vigorous physical activities on one of those days? (minutes per day)” The survey also included a “N/A” option for participants that did not complete any of the activities. Walking was assessed using the following question “during the last 7 days, on how many days did you walk for at least 10 minutes at a time?” The option of “0” was included if the criteria of walking for a minimum of 10 minutes at a time was not met. The amount of sedentary activity was gathered using the question “during the last 7 days, how much time did you spend sitting on a weekday? (hours per day)” The option of “0” was also used in the case of no sedentary activity. To determine the activity levels of the participants in the study, a total PA score was calculated by summing MET-minutes per week across moderate, vigorous, and walking activities. In addition, using the total score, participants were categorized into three levels of activity: inactive, minimally active, and active. The inactive category consisted of participants meeting <599 METS of weekly PA. The minimal activity consisted of participants engaging in 600-2999 METS of weekly PA. Participants achieving a minimum of 3000 METS of weekly PA were placed into the active category.

3.2.7 Analysis

First, descriptive statistics were calculated for all variables. Then ANOVA and regression analyses were conducted to answer the primary research questions.

One-way ANOVA analyses were conducted to compare the differences in SEM determinants across the three different activity levels (inactive, minimal, active). All subscales from the measures described above were analyzed individually through post-hoc tests, with statistical significance set at ($p=.05$). Post-hoc analysis was conducted using both the Tukey's Honest Significant Difference (HSD) and Games-Howell test. The Games Howell- test was used to evaluate variables that did not meet the homogeneity of variance (EPS, Social Support, and NEWS variables (accessibility, street connectivity, and aesthetic)). The post-hoc tests compared the variable significance across the three different activity levels ($p < .05$).

Hierarchical linear regression was conducted using PA as the dependent variable. Several variables were omitted from this regression analysis. Specifically, exercise planning was removed due to its multicollinearity with variables within the individual level. due to poor reliability or multicollinearity.¹⁰¹ Street connectivity ($\alpha = .612$) and OEB work ($\alpha = .641$) were removed from the community and organizational/policy levels respectively due to their poor Cronbach alphas, which has a minimum approval point of .70.¹⁰²

There was a total of five blocks entered in the linear regression, which included all of the levels of the SEM. The first block included the individual level variables (self-efficacy, outcome expectations, goals). The second block included interpersonal influences (family/friend support). Following the second block, community components (neighborhoods access, infrastructure, aesthetic, crime) were added to the model. The fourth block included social support at work

within the organizational level. The final adjusted regression model controlled demographic variables (age, education, work hour/week, household income, number of children).

3.3 Results

3.3.1 Demographic Characteristics

A total of 227 participants participated in the study, 223 of whom completed the survey. The mean age of the final sample was $\mu=32.4 (\pm 10.5)$ years. Approximately 65.2% of the participants were of Mexican descent. The marital status of the participants was split into single/never married (48.9%, $n = 109$) and married or domestic partnership (44.1%, $n = 99$). A majority of participants (70.4%, $n = 157$) had completed some type of higher education and over half of the sample did not have children in the household. In addition, approximately half of the participants (52.5%, $n = 118$) were working in their current occupation between 1-5 years, while others worked in their occupation 6 years or longer (26.5%, $n = 59$). The remaining participants (19.7%, $n = 44$) worked in their current role for less than 1 year. Within this sample, approximately 15.7%, ($n = 35$) of participants worked multiple jobs, while the remaining (80.7%, $n = 180$) worked in one occupation. In the total sample, the average percent of the workday that was spent sitting was 54%, 22% standing, 18% walking, and 6% heavy labor. Approximately 56.5% of the sample reported doing no amount of heavy labor within their work week and more than half (52.5%) of the sample reported spending 55% or more of their work week sitting. While there were some missing data due to questions being voluntary to answer, only a few participants omitted certain responses. In addition, questions on the survey allowed for multiple selection of answers, which resulted in more than 223 total responses for some sections of the survey. Demographic characteristics of the sample are presented in Table 3-1.

3.3.2 Self-Reported PA

Self-reported weekly PA levels were categorized into three separate domains: moderate, vigorous, and walking. Within the sample, 38.6% and 46.2% reported no moderate or vigorous PA, respectively. In addition, 11.7% of the sample reported no walking throughout their week. In the final sample, 30.5% were inactive, 41.7% minimally active, and 27.8% active.

3.3.3 Quantitative Results

The results of the one-way ANOVA analyses examining differences in multilevel SEM determinants and demographic characteristics across PA levels are presented in Table 3-2. All individual level variables differed significantly such that more active participants reported higher levels of: self-efficacy ($F(2,220) = 10.00, p < .001$), exercise planning ($F(2,218) = 14.33, p < .001$), goal-setting ($F(2,218) = 7.79, p < .001$), and outcome expectations ($F(2,219) = 4.30, p = .015$). Specifically, self-efficacy was significantly higher in active than inactive ($p < .001$) and minimal active ($p = .016$) individuals, while outcome expectations towards PA were only significantly higher in the minimal active as compared to inactive participants ($p = .017$). Exercise planning was significantly greater in minimally active and active individuals than those who were inactive ($p < .001$). Goal setting was also significantly greater in minimal ($p = .040$), and active ($p < .001$) participants as compared to inactive. Friend ($F(2,219) = 9.17, p < .001$) and family support ($F(2,218) = 6.06, p = .003$) also differed significantly across PA levels, where more active participants reported greater support. Family support was significantly higher in minimal ($p < .001$), and active ($p < .001$) individuals as compared to inactive. Friend support was also significantly different between inactive and active ($p = .002$), as well as minimal and active participants ($p = .038$), as more active participants reported higher levels of friend support.

While the first two levels of the SEM demonstrate positive outcomes among active participants, the community level demonstrates an inverse effect. Higher crime ($F(2,219) = 5.64$, $p = .004$) was associated with lower activity levels. Crime was only significantly higher in inactive than active participants ($p = .002$). When examining demographic characteristics, the amount of work hours per week ($F(2,219) = 3.46$, $p = .033$) differed among the activity levels. Specifically, work hours per week were significantly higher in active individuals compared to inactive individuals ($p < .034$). No other variables were significantly different between participant activity levels.

Hierarchical linear regression analysis was conducted to examine the extent to which variables across levels of the SEM were associated with PA (Table 3-3). Step 1 demonstrated that the individual factors contributed significantly to the variance in PA ($R^2 = .059$, $p = 0.001$). Adding interpersonal, community, and organizational factors did not significantly contribute to the prediction of PA. However, within the community level, crime was significantly negatively associated with PA ($p = .024$). When accounting for demographics, hours worked per week was also positively significantly associated with PA ($p = .024$). Across all levels of analysis, self-efficacy, crime, and work hours/week demonstrated the strongest associations with PA.

3.3.4 Qualitative Results

The work/policy levels from this study allowed participants the opportunity to expand on these levels influence on their PA. Participants provided open-ended responses to three specific categories: breaktime, policy, and work burden influence on their PA. Within the breaktime influence, 41 out of 223 participants (18%) of participants provided an open-ended response. Within these responses, 22 participants do some type of PA during their breaks and 3 participants discussed being active with their colleagues. Examples of responses related to PA include:

“bounce volleyball during breaks” and “I can go outside and walk around for a bit for exercise.” Approximately 14 participants stated they did not have enough break time to be physically active, while 2 mentioned their breaktime not affecting their PA.

Only 21 (9%) of participants provided an open-ended response regarding the impact of work policies on their PA. Within this percentage, 14 participants mentioned some type of company incentive promoting PA. Statements from participants include “company offers incentives, fitness programs, and reimbursement program to reach health goals” and “we have a lot of exercise classes available to us.” There were 4 participants noting no breaks for PA, and 3 mentioned no influence from work policies.

The final component of work burden provided open-ended responses from 74 (33%) of participants. From these responses, 34 participants mentioned exhaustion and stress accounting as a negative work burden on PA. An example can be seen with the following participant statement “I am exhausted by the time I get home and it makes me less likely to want to exercise.” In addition, a lack of time was mentioned by 32 participants as the primary reason for minimal PA. One example from a participant: “I have too much work to do, and end up running out of time in the day.” Approximately 6 participants mentioned receiving their PA from their current occupation, while 2 mentioned no influence from work.

Table 3-1 Hispanic Working Females Demographic Characteristics (N=223)

<i>Characteristics</i>	<i>N</i>	<i>%</i>
Age Categories		
18-25	67	30.0
26-35	93	41.7
36-45	30	13.5
46-55	22	9.9
56+	11	4.9
Ethnicity		
Mexican	145	65
Other	78	35
Marital Status		
Single/Never Married	109	48.9
Married or Domestic Partnership	99	44.4
Widowed	1	.4
Divorced	10	4.5
Separated	3	1.3
Prefer not to answer	1	.4
Education		
Some High School, No Diploma	3	1.3
High School Graduate/Diploma/GED	50	22.4
Trade/Technical/Vocational Training	13	5.8
Associate degree	34	15.2
Bachelor's Degree	90	40.4
Master's Degree	27	12.1
Doctorate Degree	6	2.7
Employment		
Employed full-time (40+ hours/week)	136	61
Employed part-time (up to 39 hours/week)	62	27.8
Unemployed	1	.4

Student (employed full-time)	4	1.8
Student (employed part-time)	9	4.0
Working Multiple Locations		
Yes	35	15.7
No	180	80.7
Occupation Location		
In-person	136	60.9
Remote	58	26
Hybrid	27	12.1
Occupation Schedule		
Morning	193	86.5
Night	41	18.4
Employment Length		
Less than 1 year	44	19.7
1-2 years	64	28.3
3-5 years	54	24.2
6-10 years	39	17.5
11+ years	20	9
Activities During Daily Work		
Sitting	223	53.88
Standing	223	22.26
Walking	223	17.65
Heavy Labor	223	6.04
Annual Household Income		
Less than \$20,000	15	6.7
\$20,000-\$35,000	19	8.5
\$35,000-\$50,000	49	22
\$50,000-\$75,000	53	23.8
\$75,000-\$100,000	40	17.9

Over \$100,000	43	19.3
Prefer not to answer	4	1.8
Children at Home (under the age of 18)		
0 Children	155	69.5
1 Child	34	15.2
2 Children	22	9.9
3 Children	8	3.6
4 Children	2	.9
5 or more	2	.9
Caregiving responsibilities other than own children (niece, nephew, grandson, granddaughter, etc.)		
Yes	44	19.7
No	179	80.3
Current disability affecting PA		
Yes	13	5.8
No	210	94.2
Perceived Health Status (pre-study)		
Excellent	13	5.8
Very Good	79	35.4
Good	93	41.7
Fair	32	14.3
Poor	6	2.7

Table 3-2 One-way ANOVA results comparing SEM determinants across PA activity levels (M(SD))

Individual	Inactive (N=68)	Minimal (N=92/93)	Active (N=61/62)	Significance
Self-Efficacy*	29.2 (18.1)	35.48 (18.72) ^a	44.27 (21.11) ^{ab}	p<.001
Exercise Planning*	19.51 (8.02)	25.25 (8.85) ^a	27.74 (10.39) ^a	p<.001
Exercise Goals*	21.11 (9.72)	25.18 (10.16) ^a	28.31 (11.45) ^a	p<.001
Outcome Expectations*	58.23 (7.81)	61.65 (7.49)	61.30 (7.91) ^a	p= .015
Interpersonal	Inactive (N=68)	Minimal (N=92)	Active (N=61)	Significance
Social Support-Family*	16.89 (7.71)	22.40 (10.16) ^a	23.78 (11.51) ^a	p<.001
Social Support-Friends*	15.36 (7.54)	18.78 (9.89) ^a	21.19 (11.05) ^a	p= .003
Community	Inactive (N=68)	Minimal (N=92)	Active (N=62)	Significance
Access	2.84 (1.14)	2.78 (1.34)	2.98 (1.25)	p=.623
Street Connectivity	3.09 (.66)	3.07 (.93)	3.26 (.94)	p=.394
Infrastructure	3.17 (.80)	3.27 (.89)	3.30 (.94)	p=.668
Aesthetic	2.92 (.88)	3.00 (1.06)	3.14 (1.14)	p=.477
Crime*	2.62 (.86)	2.33 (.98)	2.07 (.91) ^a	p=.004
Organizational/Policy	Inactive (N=68)	Minimal (N=92)	Active (N=61)	Significance
OEB Social	2.53 (.69)	2.64 (.67)	2.59 (.74)	p=.610
OEB Work	2.29 (.68)	2.38 (.76)	2.47 (.79)	p= .388
Demographic	Inactive (N=68)	Minimal (N=92/93)	Active (N=62)	Significance
Age	33.47 (12.12)	32.71 (10.21)	30.82 (8.99)	p=.399
Education	6.06 (1.60)	6.37 (1.46)	6.13 (1.58)	p=.412
Work Hours/Week*	32.27 (11.66)	35.61 (9.84)	36.95 (10.33) ^a	p=.033
Household Income	3.99 (1.49)	3.91 (1.49)	4.24 (1.57)	p=.404
Children at Home	1.38 (.77)	1.58 (1.05)	1.65 (1.06)	p= .266

*Inactive = <599 METS of weekly PA, *Minimal = 600-2999 METS of weekly PA, *Active = ≥ 3000 METS of weekly PA

*a = significantly different from inactive

*b = significantly different from minimal

Table 3-3 Hispanic Working Females Results of hierarchical linear regression

Variable	Standardized β	Adjusted R^2	R^2 Change	p -value
Step 1 (Individual)		*.059	*0.072	*.001
Self-Efficacy	0.148			.057
MOEESTotal	-.050			.479
EGSTotal	.061			.458
Step 2 (Interpersonal)		.071	.020	.096
SSEFamTotal	.139			.096
SSEFriendTotal	.073			.346
Step 3 (Community)		.087	.032	.106
Access	.026			.746
Infrastructure	-.071			.374
Aesthetic	.050			.515
Crime	*-.150			*.024
Step 4 (Organizational)		.082	.000	.872
OEB Social	-.011			.872
Step 5 (Demographic)		.097	.035	.139
Age	-.103			.154
Education	-.106			.130
Work Hours/Week	*.156			*.024
Household Income	.030			.679
Number of Children	.032			.630

*MOEES = Multidimensional Outcome Expectations for Exercise Scale

*EGS = Exercise Goal Setting Scale

*SSE = Social Support for Exercise Scale

*OEB = Office Exercise Behavior

3.4 Discussion

The aim of this cross-sectional study was to understand the relationships between variables across levels of the SEM and PA among Hispanic working women. The results of this study revealed relationships of varying strengths across levels of the SEM. The individual level of the SEM demonstrated the strongest associations with PA. Self-efficacy, exercise planning, goal setting, and outcome expectations were all higher among more physically active Hispanic women in the sample. The results from the post-hoc test support these findings as self-efficacy, exercise planning, and goal setting were higher among active participants than inactive. While outcome expectations were only significantly higher in minimally active participants as opposed to inactive, the results still demonstrate the significant difference among more active participants.

Similarly, physically active women reported greater family and friend support at the interpersonal level. The post-hoc analysis also supported these findings as active and minimally active participants demonstrated higher family support than inactive individuals. The friend support was significantly different among active participants than the other activity levels, which may indicate a stronger influence on higher activity.

However, the community variable of crime demonstrated a negative association with PA among the participants. The participants with higher perceptions of crime were within the inactive group, which can be seen in the post-hoc analysis. Finally, greater work hours were positively associated with PA, which was also seen in the post-hoc analysis in which active participants demonstrated significantly higher work hours. Overall, these variables demonstrated the strongest associations with PA among the Hispanic working women in this study.

The results from the post-hoc analysis can be compared to previous research within the Hispanic community. Specifically among Hispanic women, variables such as health literacy on

the benefits of being physically active and changing the perception towards PA to a more positive view can improve self-efficacy and PA adherence.^{66,103} In addition, a collection of intervention studies among Hispanic women revealed the importance of setting goals through activity logs and pedometer utilization, as well as scheduling opportunities for physical activity throughout the day all improved PA among the participants.¹⁰⁴ While social support is an important component in promoting PA, the results from the post-hoc test revealed that friend support was stronger among more active participants. Similar research also supports the stronger influence of friend support in promoting PA among Hispanic adults, as opposed to the influence from family.¹⁰⁵ The post-hoc results regarding safety concerns due to high crime rates is consistent in research addressing barriers preventing PA opportunities among Hispanic women.^{43,88} The work hours per week results from the post-hoc analysis is interesting as previous research focused on Hispanic women discuss work as a barrier towards being physically active.^{86,106} Further research should be conducted on the influence of work hours on PA engagement.

Study results for the individual level of the SEM were similar results to previous research. The results from this study demonstrate that Hispanic working women who demonstrated higher individual variables such as: self-efficacy, exercise planning, and goal setting had higher PA levels. This result is supported by research among the Hispanic population that demonstrated improvements in self-efficacy resulting in increased PA participation and adherence.^{107,108} Incorporating exercise planning and goal-setting among Hispanic women can motivate them to schedule PA in their daily lives and reduce the risk of illness/disease.¹⁰⁹ The results of this study further support previous research emphasizing the importance of

incorporating variables within the individual level to increase PA adherence and participation among the Hispanic community.^{110,111}

Similarly, the family and friend support variables in this study also demonstrated positive associations with PA. Implementing social support components in interventions is shown to increase PA, specifically among Hispanic women.²⁷ Within the Hispanic community, family value is a common theme influencing the decision to participate in PA.⁶⁹ Interventions incorporating families can assist in increasing the PA of Hispanic women.^{112,113} Allowing families to participate in PA together will not only promote individual PA, but may also promote positive attitudes towards PA participation.¹¹⁴ Many Hispanic women may perceive PA as an additional chore that they must do after an exhausting day of work.⁸⁶ Providing social opportunities for both family and peer support can improve PA among Hispanic women and provide positive perceptions towards being physically active.

Crime is a variable that was negatively associated with PA among the Hispanic working women in the study. Hispanic women interested in being physically active may be hesitant due to the lack of safety they feel within their community and built environment.¹¹⁵ Safety is especially concerning among Hispanic women from low socioeconomic communities.¹¹⁶ The community an individual lives in provide several opportunities for PA such as parks, walking paths, and green space.^{117–119} However the fear of crime is a barrier among many women preventing them from utilizing the community to be physically active.^{120,121}

3.4.1 Strengths and Limitations

This study provided an opportunity to explore the associations between multiple levels of the SEM and PA among working Hispanic women. The large sample was representative of several locations within the United States and included several subgroups within the Hispanic

community, such as Puerto Rican, Cuban, Salvadorian, Dominican, Guatemalan, Honduran, Colombian, and other South American subgroups. The use of a theoretical model is another strength of this study. Examining associations with PA across the five levels of the SEM allowed for a wholistic review of variables that may be associated with PA among working Hispanic women. In addition, the use of validated questionnaires was another strength from this study. Each level of the model was measured using a previously validated questionnaire from previous research studies to ensure accurate and reliable measurements.

While there were strengths of this study, it is also important to note certain limitations. The validated questionnaires provided reliable measurements, yet they were limited in the manner of gathering sufficient data. Participants were not able to expand their responses beyond the questions included in each questionnaire. For example, participants were asked close-ended questions with responses such as “yes, no, agree, and disagree.” This limitation did not allow participants to provide an in-depth response on certain levels of the SEM, which may have impacted the associations of each level with PA. Utilizing open-ended questions can assist in collecting further information regarding a specific barrier. For example, it is difficult to determine if crime rates were objective or perceived crime concerns. Addressing the issue of crime will need to be tailored toward the perceived safety of the environment or objective crime rates supported by data within the built environment. While the organizational/policy levels allowed for open-ended responses from participants, the low response rate did not provide sufficient information on the influences of PA from work culture and policy. This may be due to the open-ended questions being voluntary and not required in the survey.

Within this same limitation, the minimal use of qualitative data prevented further exploration of each level of the SEM. This is especially seen among the organizational/policy

levels. In addition, the data collected was skewed towards younger and unmarried Hispanic women with no children. Thus, the data is not generalizable to the bigger Hispanic female population.

3.4.2 Future Directions

The results from this cross-sectional study revealed several findings that can be utilized to adapt future interventions aimed at promoting PA among working Hispanic women. First, positive associations with the individual and interpersonal levels of the SEM were supported within this study. The variables from these levels should continue to be incorporated in interventions among Hispanic women due to their positive influence on PA.

Crime is noted as one of the biggest concerns among the participants in this study. This variable may be diminishing opportunities for PA participation among the working Hispanic women. While it is difficult to eliminate crime completely, there is an opportunity for improvement in future interventions to mitigate this concern. Providing accessibility to PA in a safe and secure environment surrounding the workplace may allow individuals to improve their PA without the fear of crime-related circumstances. In addition, Hispanics note their built environment as an opportunity to engage in PA by using their local parks, walking paths, and green space.¹²² Programs providing resources such as cleaner green space, additional lighting, and restructured walking paths are a few examples of addressing safety within the built environment.

The Hispanic women in this study spent a majority of their time working, which can be an area that provides opportunity for intervention. The positive association between PA and work hours within this study further emphasizes an opportunity for further research within occupations. The possible incorporation of exercise promotion within workplaces through

programs such as wellness walks, walking meetings, or on-site fitness facilities can be preliminary ideas to consider in future research. In addition, the variable of education is another area needing further exploration in order to understand how education and occupation interact to influence PA among working Hispanic women. For example, higher education may be associated with an increase in sedentary occupations, whereas individuals with lower education may work heavy labor occupations requiring more PA.¹²³ Future research needs to explore the association between work hours and PA among this population.

Conclusion

While the SEM has been used in previous research, this study utilizes five levels, with the policy and organization combined into one level, in order to provide a wholistic overview of PA influences among working Hispanic women. The individual and interpersonal variables from this study demonstrated the strongest relationship with PA, which is representative of previous research within the Hispanic community. The strong negative relationship between crime and PA demonstrates an important barrier that needs to be addressed in future interventions among working Hispanic women. While it may be difficult to eliminate the threat of crime, there are certain safety measures that can be implemented within a community such as street lighting and possible collaborations with policy makers. While there were not any statistically significant associations at the work/policy levels, the open-ended responses provided some avenue for future exploration, such as examining the influence of work hours and breaktime resources on PA. These responses provide foundational knowledge identifying potential barriers to PA within the work environment and policies that can be addressed in future studies. Overall, this study provided a wholistic overview of the PA influences among working Hispanic women, many of

which need to be addressed in future studies in order to establish potential solutions and promote PA within the Hispanic community.

Chapter 4- Qualitative Approach in Understanding PA Influence among Working Hispanic Mothers

Background: Hispanic working mothers exhibit high levels of physical inactivity, which may lead to detrimental health outcomes. The Social Ecological Model (SEM) may be used to help understand multilevel barriers and facilitators of physical activity (PA) in this population. The purpose of this study is to use a qualitative approach through the Photovoice research method to understand the factors influencing PA among working Hispanic mothers. **Methods:** Participants were recruited to participate in the qualitative study through the use of social media and snowball recruitment campaigns. Interested participants completed a pre-screening eligibility form to proceed to the interview portion of the study. Eligible participants were Hispanic females working part-time or full-time with at least one child under the age of 18. Participants (n= 10) acknowledging their consent completed a 1-hour long interview session via Zoom. Prior to the interview, participants completed a photovoice component in which they sent the researcher approximately 7 images from their daily lives that represented factors influencing their PA. Thematic analysis was used to identify the most prominent barriers and facilitators across each level of the SEM. **Results:** The qualitative data gathered through this study provided an overview of each level of the SEM and its influence on PA. The individual level outlined PA knowledge, time, and exhaustion as the barriers, while the facilitators were categorized into intrinsic and extrinsic motivation. The interpersonal level of the SEM categorized family and friends as both barriers and facilitators, which was dependent upon the positive or negative influence within their social environment. The inclusion of pets was a positive influence on PA among the working Hispanic mothers. The built environment and safety were also mentioned as barriers and facilitators within the community level. Culture was an important barrier towards

PA due to the pressure of family obligation that is emphasized within the Hispanic culture. Colleagues were identified as another positive or negative influence on PA promotion within the organization level. However, many of the participants expressed the supportive atmosphere for PA promotion by their supervisors. The time commitment within occupations was another common barrier expressed by the Hispanic mothers. The policy level was limited due to only a few of the participants mentioning policy initiatives, or a majority mentioning the absence of policies promoting opportunities for PA. **Conclusion:** The information collected through the collaborative qualitative approach within this study emphasizes the importance of addressing the multilevel PA influences within working Hispanic mothers. Addressing factors within each level of the SEM that are identified as barriers or facilitators can assist in creating effective intervention programs aimed at providing more opportunities for this population to be physically active. In addition, future research needs to address the higher levels of the SEM (organization/policy) to provide a wholistic approach in identifying barriers and facilitators across all levels of the SEM, which can improve the success of future PA intervention programs.

4.1- Introduction

There is a national health concern that can be attributed to the increasing obesity rates across the nation. The prevalence of obesity increased from 30.5% to 41.9% from 1999 to 2020¹²⁴, and the projected obesity rate for U.S. adults is 48.9% by 2030.¹²⁵ The increase in obesity rates is concerning due to the adverse health effects associated with chronic disease. High obesity rates may increase the likelihood of cardiovascular diseases such as: heart disease, stroke, and diabetes, which can lead to increased mortality rates.⁶ In addition, health care costs to treat obesity range from \$147 to approximately \$210 billion per year.⁷ One of the contributors of increased obesity rates is the physical inactivity levels within the U.S. population.⁸ According to the Centers for Disease Control and Prevention, approximately 25.3% of adults in the United States are physically inactive.⁹ However, it is important to note that the most physically inactive minority groups in the U.S. are within the Hispanic community, which is at 32.1% physical inactivity.⁹

Within the Hispanic population, there are several groups based on characteristics such as gender, age, and occupation that demonstrate high levels of physical inactivity. The National Health Interview Survey specifically identified Hispanic females as one of the primary groups with disproportionately high levels of physical inactivity (47.8%).¹²⁶ Furthermore, a 2016 study emphasized the physical inactivity among Hispanic women is attributed to the stress of work and family care.¹⁸ The exploration of PA within motherhood was another factor that was researched. One study reviewed the impact the transition into motherhood had on PA levels among working mother.¹²⁷ This study revealed that many working mothers were not meeting the recommend PA guidelines to reach health benefits due to barriers such as schedules, work commitments, and family responsibilities¹²⁷. While this study did not focus on primarily Hispanic mothers, an

additional study in 2023 reviewed the effect of motherhood among Hispanic women. This study revealed the responsibilities of motherhood such as childcare and lack of time were additional barriers to PA.⁸⁶ The information gathered from previous research demonstrates the importance of addressing the low levels of PA among working Hispanic mothers.

The high levels of physical inactivity among Hispanic working mothers is cause for concern due to both the health and monetary effects associated with obesity.^{6,7} Additionally, an increase in PA can promote positive health effects such as improvements in physical health, brain health, and overall quality of life.¹²⁸

Research aimed at improving PA among Hispanic women is growing due to the success of individual, interpersonal, and community-based programs.^{32,46,51,55,56} Previous intervention programs have included the promotion of educational seminars aimed at improving knowledge of PA skills, benefits, and knowledge among Hispanic women.^{44,46,48} Incorporating the Hispanic community values and cultural norms with variables such as bilingual education, religion, and cultural sports also showed promising results in increasing PA.^{47,52,61} Among these interventions, only one focused on the promotion of PA among Hispanic mother and daughter groups through educational seminars promoting self-efficacy and social support.⁶¹ This research demonstrates positive strides towards improving PA among Hispanic women, however it does also show limitations. While PA programs aimed at improving PA among Hispanic women is growing, to date there is limited research reviewing barriers and facilitators of PA among Hispanic working mothers. Thus, to combat physical inactivity among this community, it is necessary to provide a wholistic approach to identifying barriers across several levels of influence.

The Social Ecological Model (SEM) is a theoretical framework that identifies five levels of influence: individual, interpersonal, community, organizational, and policy.⁸⁹ The individual

level is focused on variables that influence an individual's decision to engage in a specific behavior, such as self-efficacy, knowledge, motivation, and attitudes towards a specific action.^{69,129} The interpersonal level includes the influence from peers, families, and coworkers when deciding to pursue a specific behavior.^{27,130} Community influence comes from the built environment surrounding an individual such as the neighborhood and cultural influences.^{76,131,132} The organizational level of influence is focused on different sectors such as schools and workplaces.⁷² The overarching level of the SEM is the policy level in which rules and regulations are created that ultimately affect the ability and decision to engage in specific behaviors.^{92,133}

In addition to using a theoretical framework to identify levels of influence on PA, it is also important to incorporate qualitative information from the community being researched. Research studies using qualitative data provide an opportunity for a collaborative approach utilizing the experiences from the research population in order to identify variables influencing PA.^{134,135} One qualitative research approach is photovoice, which provides participants an opportunity to use photographs as a reflection of their experiences with a specific topic of discussion. The participants are able to express the manner in which the photographs either positively or negatively affect their view of specific behaviors or themes.¹³⁶ The qualitative data gathered through photovoice research provides additional information that is not able to be collected through traditional quantitative data. Thus, this research study aimed to use photovoice methods to provide a wholistic view of PA barriers and facilitators across levels of the SEM among Hispanic working mothers.

4.2- Methodology

4.2.1 Reflexivity Paragraph

As a researcher with a similar Hispanic background as the study population, I acknowledge that my shared experiences and beliefs shaped my perspective and ideas regarding PA within the Hispanic community. To minimize my biases, I incorporated a collaborative approach with study participants using qualitative data, which allowed diverse perspectives and the voices of my participants to be expressed. In addition, as a Hispanic male, I am aware that my experiences will differentiate from the Hispanic women being researched. The inclusion of a structured interview guide, combined with personal shared experiences from the participants, improves the validity of the data collected in this study.

4.2.2 Project Design

This research study used a qualitative design to identify and explore multilevel PA influences among Hispanic working mothers. This study incorporated the photovoice research method to allow participants to reflect on their personal PA, as well as interviews to further explore their PA facilitators and barriers. The interviews were completed between October 24, 2023 and October 20 2024. This study was approved by the Kansas State University IRB (protocol #11889).

4.2.2.1 Participants

The pre-screening survey for the study was distributed through a combination of social media, flyer, and snowball recruitment campaign in Fall 2023. Interested participants completed the prescreening eligibility criteria form in order to proceed to the interviews. These criteria included: (1) currently a mother of a child under the age of 18 (2) Hispanic/Latino, (3) female, (4) working part-time or full-time, (5) proficient in English (ability to read and write in English),

and (6) access to technology (computer, phone, and zoom). Eligible participants were then sent a consent form outlining the purpose and requirements of the study. Participants acknowledging their consent to the study were then emailed by the researcher with instructions and a link to schedule a 1-hour interview session conducted via zoom. An email reminder with the photovoice instructions was sent to participants to ensure all materials were collected prior to the interviews. Compensation for successful completion of the photovoice study was \$50 per participant. In addition, participants completed a survey that was distributed to collect demographic information. The final sample of participants was n=10.

4.2.2.2 Photovoice

The photovoice research method allowed for a collaborative approach in exploring the levels of influences on PA. Participants photographed aspects of their daily lives that they believed represented an influence on PA. The photovoice method is used to allow individuals to take an active approach in research through opportunities to represent the world from their perspective.¹³⁷ Previous research supports the use of Photovoice to understand PA influences among the Hispanic community.^{138,139} Participants sent the researcher a minimum of 6 images that reflected a barrier or facilitator for their PA via email. The researcher used the photovoice images to guide the 1-hour interview with each participant.

The photovoice instructions were as follows:

Photovoice Component

The first component of this study will ask you as a participant to photograph aspects of your life that you believe represent PA. These photographs should be taken through a 1-week time period in order to gather sufficient information about factors that you believe make it easier or more difficult for you to be physically active.

Please be sure to photograph various aspects of your life that have an influence on your PA. These photographs may include aspects of the environment (neighborhoods, parks, streets), social influences (friends, family, peers), organizational settings (churches, schools work), or any other facilitators or barriers to your PA. Please be sure to include a minimum of 6 photographs in order to provide a full picture of factors that influence PA within your daily life.

4.2.2.3 Interviews

Individual interview sessions were conducted in order to discuss the photovoice images from each participant. Participants described the photograph and explained if they believed that aspect of their lives represented a barrier or facilitator towards PA. The photovoice discussion encompassed 20-30 minutes of the interview session. The remaining interview was organized using the SEM as a guide to better understand the levels of influence on PA (Appendix B). Participants answered questions related to the individual, interpersonal, community, and organizational/policy influences within their daily lives. Participants were able to provide detailed information on positive and negative influences from a social ecological perspective.

The participants mentioned the types of PA that they currently engage in, which were categorized into four domains. These domains were: recreational, occupational, transportation, and household PA.¹⁴⁰ Recreational PA is also known as “leisure-time” PA since it is completed during an individual’s free time.

It encompasses activities such as walking, running, swimming, and weight training.

Occupational PA is completed at an individual’s work. These movements are typically due to the responsibility of an occupation encompassing some type of PA. Transportation PA is the type of activity an individual performs while attempting to move from one location to another location.

Common forms of transportation include walking, running, and biking that are specifically performed with the intention of from place to place. The final domain is known as household PA. This type of PA is any activity done around the home, including yard work, laundry, sweeping, and mopping.

4.2.3 Analysis

The interviews from all ten participants were recorded and transcribed verbatim using the Happy Scribe software system. The transcripts were reviewed by the researcher once again to ensure information and transcription accuracy. Transcripts were uploaded into Dedoose for analysis.

The combination of inductive and deductive thematic analysis was used to explore the factors that influence PA among working Hispanic mothers.¹⁴¹ Open-ended responses from participant interviews were the primary data included in the qualitative analysis. These interviews focused on the factors influencing PA, which were categorized into each level of the SEM.

The first step in the analysis was to create a preliminary coding structure with barriers and facilitators for each level of the SEM as a guide when reviewing each transcript. Once the transcript review process began, several themes were created under each level of the SEM. As the analysis continued, additional subthemes were added to the appropriate levels. Upon completion of the initial analysis, a secondary review was conducted with the assistance of a secondary researcher. Subthemes were removed if there was not sufficient information to validate the importance of the subtheme. In addition, subthemes with similar messaging were combined into one theme. Upon agreement from the primary and secondary researcher, a final list of themes and subthemes was created.

4.3 Results

A total of 10 participants (M age= 35.3 years) completed the 1-hour interview sessions. The participants were Hispanic females with a minimum of 1 child under the age of 18 at home. The participants all worked full-time or part-time occupations, and all were from either Texas or Kansas. Approximately 70% of participants were married or in a domestic partnership, along with 90% of the total participants having some type of college degree. Additional demographic information is in Table 4-1. The PA domains expressed by the participants during the interviews are categorized into four different domains: recreational, occupational, transportation, and household.¹⁴⁰

Recreational and household PA were each mentioned by 100% of the participants. Recreational activities mentioned by participants included: walking, running, dancing, and weight training. The most common household physical activities expressed during the interviews were: laundry, mopping, vacuuming, and gardening. Transportation related PA (50%) was the third highest type of PA among the Hispanic mothers. The only transportation related PA mentioned by these participants was walking to and from work. The final domain of occupational PA (30%) was the lowest domain engaged in by the participants from this study. The occupational PA mentioned during the interviews was very limited to occasional lifting of boxes and walking to deliver materials.

4.3.1 Qualitative Results

The qualitative results are organized by each level of the SEM (individual, interpersonal, community, organization, and policy). The final themes are presented in Table 4-2, along with representative quotes from participants.

4.3.1.1 PA Influences (SEM Categories)

The individual level of the SEM provided an array of factors influencing PA behavior among the working Hispanic mothers. These factors were split into barriers and facilitators, which were further categorized into themes. The themes under barriers included lack of PA knowledge, lack of time, and tiredness. The facilitator themes on the other hand included: goals, intrinsic motivation, and extrinsic motivation.

4.3.1.2 Individual Level Influences

4.3.1.2.1 Lack of PA Knowledge

Hispanic mothers noted that their understanding of PA was a barrier towards maintaining or pursuing an active lifestyle. The Hispanic mothers knew that they should be engaging in some type of PA to maintain their health and wellness, however, these same mothers also expressed their discouragement when they encountered certain instances in which they felt their PA knowledge was lacking. Participants expressed this concern when attempting to be active in a fitness facility. One participant did not feel comfortable working out with free weights: “do you start with a high weight and then minimize it going down? Do you start with a low weight and then gradually move up?” Another participant mentioned wanting an introductory class to move to different exercises: “those beginner classes sound really helpful for weight training because I’m kind of afraid to get off the machines.” In addition to an unfamiliar environment, one mother expressed her concern with PA as “mainly that’s not being done because I don’t know what to do.” The minimal understanding of how to be physically active as a beginner or being introduced to new types of PA can be cause for concern among Hispanic mothers.

4.3.1.2.2 Lack of Time/Tiredness

One of the most common barriers expressed among most of the participants was the issue of time. Prioritizing PA was difficult among Hispanic mothers due to the scheduling conflicts included with work and taking care of their families. One participant provided an example: “as soon as I come home, I start dinner, after dinner, clean kitchen, then after that it’s like hey if you need help with homework, I’m there to help.” (Figure 4.1) While managing home life was difficult, other participants acknowledged the time commitment involved at work that prevented opportunities for PA. One Hispanic mother tried to organize her PA during the workday: “Monday through Friday, though sometimes that is impacted or affected because I might have meetings that run over my lunchtime.” The busy schedules expressed during this study make it difficult for many Hispanic mothers to prioritize PA throughout their daily lives. Due to their busy schedules, participants also mentioned tiredness as another barrier preventing PA. The stress of work and caregiving may sometimes result in exhaustion from the day. One participant expressed this concern: “being tired after work or something that happens either with the family or at work that really prevents me or affects my mood.”

Figure 4-1 Scheduling Conflicts



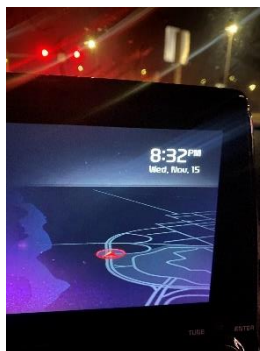
4.3.1.2.3 Goal Setting

One of the facilitators mentioned during the interviews was the desire to set new PA goals. These goals assisted the Hispanic mothers in identifying a short or long-term fitness objectives they wished to achieve. One participant expressed her weekly goal of strength training: “I usually do 20 minutes of weightlifting, but I try to do at least three times a week.” Another participant expressed her walking goal: “the overall goal is to eventually get myself to 10k steps a day.” (Figure 4.2) In addition to setting goals for themselves, the participants also mentioned their exercise planning strategies. The most common exercise planning strategy mentioned by the participants was the use of fitness devices. One participant mentioned: “since I got my smartwatch, I have been really diligent because my personal goal per day for PA is at least 30 minutes.” There were some participants that also intentionally scheduled their workouts at a specific time of the day. (Figure 4.3) The combination of creating goals and implementing exercise planning strategies assisted in facilitating PA among Hispanic mothers.

Figure 4-2 Step Goals



Figure 4-3 Scheduled Workouts



4.3.1.2.4 Extrinsic/Intrinsic Motivation

Participants incorporated both short-term and long-term goals that can be categorized into extrinsic and intrinsic motivational facilitators. The most common extrinsic motivational goal

expressed by the participants was focused on body image. The Hispanic mothers mentioned wanting to feel better about their body image. One example from a participant included a weight-loss goal: “I’m trying to lose 15-pounds over the span of a year.” Another participant expressed wanting to gain more lean muscle: “I feel a little uncomfortable with a little loose skin, so I know that I can work on toning that up.” The intrinsic motivators were focused on feeling healthier, accomplished, and managing stress. One participant mentioned the importance of her mental health: “I do want to take care of myself. I think that would be a little push of mental health with physical health that go hand in hand for me.” Similarly, another participant also mentioned prioritizing her health: “I need to take care of myself before I can help anybody else. I got to be strong mentally, physically, emotionally first, and that way I can build that onto my kids.” Aside from internal health benefits, some Hispanic mothers mentioned wanting to be healthy for their children. An example of this motivation was through a quote by a mother who mentioned “wanting to be around for my kids as they get older and future generations.” Intrinsic and extrinsic motivational factors provide a positive influence on PA.

4.3.3 Interpersonal Level Influences

The interpersonal level of the SEM was primarily focused on social support. This level demonstrated that social support from family and friends can be categorized as a facilitator or a barrier depending on the type of support that is present.

4.3.3.1 Social Influence

The social influence from family and peers was expressed as the most important interpersonal factor among the Hispanic mothers in the study. Among the Hispanic community, family is categorized as one of the primary influences on general decision making within the household. This sentiment was further emphasized among our participants. The Hispanic

mothers expressed that there were times where they felt that their families were causing a barrier in preventing PA. These barriers were mainly caused by family obligations both within and outside the household. One participant mentioned their child's scheduled activities as a barrier: "sometimes two to three practices, usually two practices a week, and then a game on the weekend. So, I really have to work around the kid's schedules." Another participant mentioned her minimal activity due to the sedentary activity at home: "we like to sit and watch movies most of the nights." (Figure 4.4) Peers were also mentioned as a potential barrier to PA. The participants mentioned that they are sometimes influenced to be sedentary by their friends (Figure 4.5). One mother mentioned "because we're all moms with young children, I feel like we want to get out and relax. We don't really have to move or do anything."

While family and friends can be barriers to PA, our participants also mentioned instances where these individuals can be facilitators in helping them be more active. PA as a family is one of the influencers mentioned by the Hispanic mothers. One Hispanic mother expressed her children as a facilitator: "even when I'm going for a walk around the neighborhood, my daughter will say, 'I'll go with you.' That really encourages me." In addition to children, the participants also mentioned their spouses as another facilitator within the family: "If it wasn't for my husband, I probably would be a sentient being. He always manages to get me up and out of the rut and says let's go walk somewhere." Participants also mentioned their pets as facilitators towards PA "but for my dog, I typically try to take him out at least twice a week to go for long walks around the neighborhood (Figure 4.6)." Friends can also be another factor that influences PA. Incorporating walking groups, fitness classes, and weekly fitness challenges with friends were a few examples mentioned within the study (Figure 4.7). One participant expressed her appreciation for her friend's motivation to be active: "One of my friends will message me every

day to be active. I guess they do motivate me in the sense of they don't allow me to forget that I have to be physically active, which I do appreciate.”

Figure 4-4 Sedentary Activity (TV)

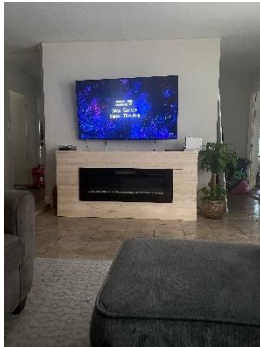


Figure 4-5 Sedentary Activity (Friends)



Figure 4-6 Dog Walks



Figure 4-7 Fitness Classes



4.3.4 Community Level Influences

The community level of the SEM contained several factors that influenced PA among Hispanic mothers. The categories within this level were also split into two sub-categories: facilitators and barriers.

4.3.4.1 Safety

The safety of the community was noted as a direct influence on our participants' decision to participate in PA. This factor can be considered both a facilitator and barrier depending on the level of safety within a Hispanic mother's environment. Participants identified components such

as lighting, traffic safety, and accessibility as factors that made their environment safe for PA. One participant mentioned “the fact that we have sidewalks on the road because safety is key.” Security monitoring was another factor stated by a Hispanic mother “it was safe to walk the parking lot at school because they have police that monitor cameras.” While some participants mentioned safety as a facilitator, others mentioned a lack of safety as a barrier to PA. Participants mentioned the absence of sidewalks, no lighting across parks, and stray dogs around their neighborhood as examples of barriers. These barriers prompted concerns among many participants with one stating “so I don’t think that I’m comfortable being outside once it’s dark. No, not in my area.” Some of the Hispanic mothers mentioned cases of kidnapping in their neighborhood: “while it wasn’t captured in the photos, there’s also kidnapping situations that just made me completely turned away from the option of exercising without another adult.” The Hispanic mothers in this study expressed a strong connection between safety and PA.

4.3.4.2 Physical Environment

The aspect of the physical environment is another factor that was considered a facilitator or barrier among the Hispanic mothers in the study. Factors such as aesthetics, proximity, accessibility, and weather were all considered factors impacting PA participation among the participants. The accessibility of neighborhood parks provides an opportunity for Hispanic mothers to participate in PA (Figures 4.8-4.9). One mother expressed her appreciation for parks because they provide an opportunity for family exercise: “we go to our park a lot because they have a playground for the kids, and we would all also go on walks together.” Another participant expressed her excitement about walking paths: “we do have a park down the street with a nice walking route. There’s supposed to be a green nature path (Figure 4.10). Aside from the neighborhood park, some participants mentioned most of their PA being completed at

recreational facilities. “I enjoy going to the gym and having that opportunity.” “I do most of my PA at the gym” (Figure 4.11). The physical environment was also described to have certain barriers preventing PA participation. The weather was noted as one of the most common barriers. Participants expressed their concern about unfavorable weather conditions. “It’s too hot to do anything, but then also when it’s too cold, you don’t want to go anywhere or do anything” (Figure 4.12). The poor conditions of neighborhoods and parks were an additional barrier mentioned. One participant expressed her concern about her neighborhood park: “our neighborhood park is a rock trail, just this circle, and it’s just rocks.” The physical environment is a factor that can promote or inhibit PA.

Figure 4-8 Parks



Figure 4-9 Community



**Figure 4.10
Walking Path**



**Figure 4-11
Recreation Center**



Figure 4-12 Weather



4.3.4.3 Culture

The component of a culture is a primary influence to the Hispanic community due to the impact of culture on an individual's behaviors. Unfortunately, the participants in the study discussed culture as a negative impact on their PA. The Hispanic mothers said the cultural norms engrained in their lives impacted their decisions to engage in PA. One mother mentioned "I always heard my mom tell me that she would rather enjoy her time with her kids than sacrifice that for other enjoyment." Other Hispanic mothers shared similar ideas "culturally for me, taking care of my family is key. I'll take care of everything else, and then I can take care of my workout." It is also interesting to note that some participants acknowledged these same cultural ideas, however they approached their PA in a different manner. "Sometimes the culture we created is that we have to be there all the time. No, it's not healthy for you. You need to take a break and go for that walk to be healthy for you." Another participant mentioned "maybe that's why my husband and I are trying to be more positive about working out because we both did not have that growing up." The participants acknowledge that their culture impacted their decision to be physically active.

4.3.5 Organizational Level Influences

The organizational level of the SEM focused on the occupations of the Hispanic mothers in the study. The factors influencing PA within this level included: colleagues, supervisors, and time.

4.3.5.1 Colleagues

The participants in the study expressed the influence from their work colleagues to be both a promoter and an inhibitor towards PA. One participant who was an educator expressed her concern due to the stress of her occupation. She mentioned her colleagues as a detriment towards

her PA: “the teachers are demanding as far as your attention and their needs. All the energy and positivity I have goes to them. At the end of the day, I’m drained.” However, some participants expressed positive influence from their colleagues. “Related to my work, I always go on a walk with my coworker and that really motivates me (Figure 4.13).” Another participant mentioned “PA breaks” with her colleagues: “we do office water breaks where we walk to the union to fill up our water bottle. It’s a way to get us all out of the office (Figure 4.14).” Work colleagues are mentioned as both a facilitator and a barrier towards PA.

Figure 4-13 Co-Worker Walks



Figure 4-14 Office Walking Breaks



4.3.5.2 Supervisor

The participants expressed the impact from their work supervisor to be a positive influence on their PA. The primary reason for this positive influence was due to the support on PA promotion among the participants while working. One example from a participant was “they don’t bother me because I go and take a break and go for a walk. I usually say that I will be back in 10 or 15 minutes, and they tell me to enjoy my walk.” Another participant mentioned that her supervisor promotes her fitness classes: “She told me that she goes to these fitness classes and

that next time we should go to the class together.” Five of the participants in the study mentioned their supervisors as an influence on their PA expressed their influence as positive.

4.3.5.3 Time

The biggest barrier caused by the participants’ occupation was time, specifically not enough time to exercise due to their occupation. The Hispanic mothers mentioned their long work hours and work responsibilities as the biggest inhibitors to their PA. One mother mentioned “because of work I get home late, and I am exhausted.” Another Hispanic mother had a similar comment “It can be very long hours, and it affects me negatively because I’m just too tired.” The time spent at work combined with the immense number of responsibilities caused many Hispanic mothers in the study to minimize their PA.

4.3.6 Policy Level Influences

The final level impacting the Hispanic mothers in the study was the policies involved with their current occupations. The participants expressed the ways their company policies affected their PA.

4.3.6.1 Company Incentives

One of the biggest contributors to the participants’ decision to engage in PA was through incentives provided by some companies. The Hispanic mothers mentioned the promotion of fitness programs such as: fitness facility discounts, health insurance reductions, fitness devices, and wellness programs. One participant mentioned a wellness hour policy: “I believe there is a wellness hour where you can get an extended lunch or leave early.” The discounted membership was one PA promoter for one participant: “they offered 50% off a gym membership and I was like I can and would go to the gym.” The free fitness devices were also another promoter for some participants: “when I had the Fitbit because they gave it to us for free, I would do the

fitness challenges.” The discounted insurance through PA challenges was another incentive used by a Hispanic mother “we can get points and it will reduce your payment for the next year.” While these company policies promoted PA, some participants mentioned their desire for some of these company policies within their occupation. One participant stated: “definitely a discounted gym membership or stipends, but we don’t have any of that.” There was one participant who mentioned the lack of promotion for their company fitness initiatives was a barrier. “The only way you find out about it is while you’re doing the insurance processes, outside that they don’t promote it very well.” The company incentives mentioned by the participants promoted their decision to participate in PA initiatives.

Table 4-1 Hispanic Working Mothers Demographic Characteristics of the Sample (N=10)

<i>Characteristics</i>	<i>N</i>	<i>%</i>
Age Categories		
25-30	3	30.0
31-36	4	40
37+	3	30
Ethnicity		
Mexican	9	90
Other	1	10
Marital Status		
Single/Never Married	2	20
Married or Domestic Partnership	7	70
Divorced	1	10
Education		
High School Graduate/Diploma/GED	1	10
Associates Degree	1	10
Bachelor’s Degree	2	20

Master's Degree	5	50
Doctorate Degree	1	10
Employment		
Employed full-time (40+ hours/week)	8	80
Employed part-time (up to 39 hours/week)	2	20
Years Employed at Current Occupation		
0-5	5	50
6-10	3	30
11+	2	20
Household Income		
<\$20,000	1	10
\$50,000-\$75,000	4	40
\$75,000-\$100,000	3	30
+\$100,000	2	20
How many children do you have living at home currently under the age of 18?		
1	2	20
2	8	80
How would you rate your current health (Pre-Study)		
Excellent	2	20
Very Good	2	20
Good	4	40
Fair	2	20

Table 4-2 Hispanic Working Mothers SEM Level Themes/Quotes

<i>Individual Level Influences</i>		<i>Quotes</i>
Barriers	Lack of PA Knowledge	• If I were to say specifically on PA, the knowledge of, like, definitely the machines or some of the machines, and I guess mostly just like, the education, the awareness to build that confidence as well, because, like I said, there's, like, certain things where I'm afraid to do because I wouldn't know what I'd be doing • I've been meaning to connect with one of the trainers there to get more. Like, am I doing the best job I can here? Like, are my squats as low as they should go? Like, you know, or am I going to hurt my back or. So, I think that could be a barrier.
	Lack of Time	• I think just time. Coming home, as soon as I come home, I start dinner. After dinner, clean the kitchen. Then after that, it's like, Hey, if you need help with homework, I'm there to help. • But really, it's just time. I need to figure out a way to manage my time better and fit an actual workout in.
	Tired	• Yeah. So I'm a single mom, and I don't have much help at home, so I have to do all the work, all the dishes, all the laundry, everything. So it's another thing that gets me exhausted from wanting to do anything further. That's my workout sometimes. • And then there's just sometimes where I just don't have the energy for it. I'm so drained, and so I just don't feel like going.
Facilitators	Goals	• Because like I said, since I got my smartwatch, I have been really diligent into making sure that... Because my personal goal per day for PA is at least 30 minutes. • But at least I try to go to the gym three times a week. When I do that, I run for 25 minutes. Then I do the

		elliptical for 10 minutes, and then I lift weights for 20 minutes.
	Intrinsic Motivation	• But then you also get that euphoria from after you work out, even if you'd walk the park or walk with the dogs or whatever, you physically did it. You were physically able to. There's that. It makes it enjoyable. So yes, I look forward to that part • I want to say, honestly, just the way it makes me feel. That time, and having my headphones in and just walking, how I feel afterwards. It's almost like I felt all stressed. It's almost like I forgot about it or it just went away. That, to me, is a huge thing for me because I notice when I don't work out, whether it be walking or the gym, I can feel myself getting sluggish, I guess, and then I just don't feel good mentally
	Extrinsic Motivation	• So I'm trying to lose, like, 15 pounds right now, but there's. But I would probably say, like, in a span of a year, because I'm not even, like. You know, they say, like, the faster you lose weight, the faster you'll gain it back. • I do walk a lot every day. I really do walk a lot, and I have actually lost a lot of weight in the past six months. But I've realized that I don't have that much tone up muscle, and that's where I know I need to get back to that.
<i>Interpersonal Level Influences</i>		Quotes
Barriers	Family	• I think one thing I was thinking as we were talking is just that it is so difficult. I think at times, especially with less free time with young children, like, it's very difficult to schedule intentional PA, but our culture is all about intentional activity • I feel hinders my PA because I have to be catering to my family
	Friends	• I want to say my husband's friends for sure make that harder because they don't

		really like working out. So we're a little more mindful. Well, with friends, because we're all moms with young children, I feel like we want to get out and have that excuse of, We don't have the kids. Let's finally relax and do something we want to do. That's why I said, When we go out, it's typically to go to dinner and to have drinks. We're not moving.
Facilitators	Friends	- Then my friends are more runners, and they do marathons and stuff. Then I'll meet up with them and we'll I'll go run their track or we'll go walking and running together. - Recently, I do have two girlfriends that love to walk. I know they've extended invitations to walk with our kids - I do have a friend that always invites me to her gym, which we actually spoke on Thanksgiving about it, and I actually might start going there instead of doing my 30-minute walk every day because it's obviously indoor and it'll cut cost for my current gym membership and all that stuff. I might actually start taking her up on that offer.
	Family	- Like I said, my daughter is a big motivator, even though she doesn't realize that she's just a kid. So I think she definitely helps me be more active - When my husband is in to doing it, we'll always go for a walk together - But me and my husband, we work out sometimes as far as, like, we'll go do walking or sometimes we'll go to gold's gym together
	Pets	So they're those dogs that do really cool tricks and stunts and stuff. It's really nice. But in order to keep that, that's what they want to do. We have to be physical with them, too. But because they're two dogs and they're intimidating; we usually just

		walk them around the neighborhood. • But for my dog, I typically try to take him out at least twice a week to go for long walks around the neighborhood
<i>Community Level Influences</i>		Quotes
Facilitators	Safety	• I will say park and also that we have sidewalks along the road. And like I said before, the safety, too. I think the safety is key. • The second one is that the safety that we have here, Manhattan, really helps because I can go for a walk at any time and that will be okay.
	Physical Environment	• We do have sidewalks all throughout the neighborhood. We do have a rec center. We do have a park nearby. The elementary schools are within walking distance. • We do have a park just down the street with a nice, like, walking route. I think they're making a footing way area, which hopefully will stay nice. Just behind our house as well. So those are. Yeah, there's supposed to be, like, a greenway like path. Nature path.
Barriers	Culture	• And it goes back to thinking about what the environment is that you've seen while you were growing up. I think that plays a really big role in how you view PA, especially as a Hispanic working mom. It just in the culture in general is you're catering to your family and to your household. And outside of that, everything else is a luxury, essentially. • Because like I said, culturally, for me, taking care of my family is key. It's just something that's culturally. I have worked with colleagues that say, They know my workout goes first, and then they have to wait for everything else. I don't do that. I usually don't. I am like, No, I'll take care of everything else, and then I'll take care of my workout. For me, when I heard one of my colleagues said that, I was

		like, I wish I could be like that sometimes, but I just can't. Culturally, I can't. It's not what I was taught or what I grew up seeing. I think that's really interesting. Having that component of the culture is really important.
	Safety	• And while it wasn't captured in the photos and there's also just been, like, kidnapping situations that just has made me, like, completely just turned away from the option of, like, exercising anywhere that's not a park with someone • I would say some of the barriers would be, like, safety barriers. Right. Like dogs, strange people, low lighting. There are no sidewalks. There's, like, bike lanes. And I think just being a female, like, it's just different as well.
	Physical Environment	• If it's super hot, we're like, You know what? No, we're not going to go outside today, or we'll wait till later, or if it's freezing outside, it's like, Well, we're not going to go outside. • So there's no way that we could physically be active in the front yard or anything like that because it's all crowded with cars. And then the sidewalks are pretty small, maybe a bike fits, but not two next to each other. There are a few parks that we could drive to, but obviously we would have to drive to them. But nothing in my area that... No park or nothing like that.
<i>Organizational Level Influences</i>		Quotes
Facilitators	Colleagues	• And related to my work, to my coworkers, because like I said before, one of them, I always go with a walk with her, and that really motivates me. • At work, I have a really close friend. She is an active and avid runner. Every day, she is the one that encouraged and motivated me to get a gym membership during lunch because she goes during lunch as well

	Supervisor	- It's because you have that support and you know you don't have a supervisor that's going to get upset or get mad because you're going for a walk - My boss actually likes to do yoga a lot. So she'll invite me to yoga once or twice a month
Barriers	Colleagues	- Every so often, we'll hear the MAs or one of the nurses talking about, I went to the gym or I did this, but it's never like, Hey, do you want to go to the gym? Or, Do you go to the gym? - The teachers are so demanding as far as your attention and their needs. I describe it as it drains me. All the energy and all the positivity I have, it goes into them. So at the end of the day, I'm drained.
	Time	- Now being an administrator, it's a little bit different. Even though the kids leave at 3:00 and the teachers leave at 3:00, I still I have to stay. By the time I get home, it's just enough time to do dinner, bath time, homework, and then go to bed. That prevents it, especially during the week. It's a little bit harder for that as far as trying to continue to be active during the week. - It's because of work, because I get home too late. And then sometimes it's Saturday. You're like, Saturday is my only day off. Or in a week, I have to do a job fair on a Saturday. So I'm not going to be able to do step that week, or they'll cancel it.
<i>Policy Level Influences</i>		Quotes
Facilitators	Company Incentives	- For example, I completed one a month ago, and it's like you have to walk for these many minutes during this period of time, and then you will earn \$20 towards your health savings account, and then five points towards your overall point so you can get the reduction for next year. - I know they offer the \$25 a month membership, and you can utilize a list of gyms throughout the US. They have

		that, and then they even have weight watchers, discount, and there's something else, but it's more like if you have pain, I guess. I think it's called Hinge Health. We have access to, I don't know what some classes or something. If your back's hurting, they offer suggestions or your knee or something.
Barriers	Lack of Policies	• I mean, definitely a discounted gym membership. I know there's stipends or some stuff, like going for your yearly physical or just things like that. We don't have any of that. • I don't think there is. The only way you find out about it is through while you're doing the insurance processes, you find out through it that way. And then if you're paying attention to your emails, like I usually do, You'll see the opportunities there. But I think outside of that, there's not really a great... They don't promote it very well.

4.4 Discussion

The aim of this qualitative study was to understand the factors affecting PA among working Hispanic mothers through each level of the SEM. The results from this qualitative analysis study revealed several facilitators and barriers among each level of the SEM.

Participants mentioned knowledge, time, exhaustion, goals, and motivation as the primary individual-level factors affecting their PA. The second level of the SEM was organized around social support from family, friends, and pets. The common factors mentioned within the community level were safety, physical environment, and culture. The organization and policy levels were minimally mentioned. However, factors such as colleague/supervisor influences and time were mentioned within the organization level, while company incentives and the absence of policy promotion were expressed in the policy level of the SEM.

The factors mentioned within the individual level of the SEM were thoroughly discussed by all participants. The Hispanic mothers expressed their concern with their knowledge of PA. Specifically, being uncomfortable understanding various exercise equipment or how to begin an exercise routine were barriers. Previous research supports the lack of knowledge of PA as a primary barrier preventing Hispanic women from being active.⁶⁹ Assisting in the promotion of PA knowledge can increase self-efficacy among Hispanic mothers and promote the incorporation of PA within their daily lives.⁵⁴ Time is another factor that can inhibit PA among Hispanic mothers. Many of the participants in the study mentioned their time constraints due to work, childcare, or household responsibilities as barriers to engaging in PA. These family obligations are expressed in previous research as common barriers among Hispanic women due to the limited availability of time to incorporate PA within their lives.⁸⁶ These family obligations also result in exhaustion that limits the motivation for PA. The participants in the study expressed their exhaustion as another barrier minimizing their opportunity for PA. The mental or physical exhaustion from an occupation can lead to diminished motivation for PA among Hispanic women.⁷⁵ While time and exhaustion are influenced by multilevel factors, in this instance they are framed as individual level barriers since we are interested in each participant's own perception of time.

While there were barriers preventing PA within the individual level, participants also expressed facilitators that promoted their PA engagement. One of the facilitators was through motivational factors. These factors were categorized into intrinsic and extrinsic motivation. The intrinsic motivation was primarily focused on the benefits to the Hispanic mothers' mental health. The mental health benefits associated with PA include: lower stress, improved cognition and sleep, and overall quality of life.¹²⁸ These mental health benefits can be immediate goals that

individuals can achieve, which can promote exercise adherence and positive attitudes towards PA.^{142,143} Promoting the mental health benefits associated with PA is a strategy that can be emphasized among Hispanic mothers to increase intrinsic motivation and exercise adherence. The extrinsic motivation expressed by the participants was focused on body image. The Hispanic mothers in the study wanted to engage in exercise to promote weight-loss or improve muscle tone. While these extrinsic motivational factors can promote PA, it is also important to note that this promotion may only be short-term.¹⁴⁴ The incorporation of goals among the Hispanic mothers was also a type of self-regulation that maintained their exercise adherence. Participants expressed setting weekly step goals, training schedules, and using fitness devices to maintain their accountability and reach their intrinsic or extrinsic goals. These self-regulation techniques can be utilized to maintain a PA routine.^{32,145}

The second level of the SEM was centered around social support from family and friends. The participants expressed social influences as both a barrier and facilitator. The Hispanic mothers that mentioned their family as a barrier towards their PA emphasized responsibilities and family obligations. Previously mentioned in the individual level, the child-care and household responsibilities played a role in preventing PA among participants. In addition, some of these participants also expressed the minimal support from their husbands in promoting PA participation within the family. Research demonstrates the negative impact on PA promotion with limited support from a Hispanic women's partner.^{74,146} On the contrary, Hispanic mothers that mentioned family as a supporting factor in their PA expressed how both their partners and children promoted their decision to be active. These participants mentioned their family engaging in PA through family walks, playing sports, and gym partners. Incorporating family

support has been demonstrated to promote PA adherence among Hispanic women due to accountability and encouragement.^{81,147}

The influence of friendship among the Hispanic women also demonstrated both positive and negative influences on PA. The negative influences are related to a promotion of sedentary behaviors or unhealthy eating. The mothers in the study expressed how these unhealthy behaviors limited opportunities for PA participation. The positive influence from friends mentioned by the Hispanic mothers included friends that promoted PA through walking and running partners and the consistent reminder to be active throughout the week. The positive social support from friends mentioned by the mothers in this study is consistent with research that states the importance of friend support in PA adherence and promotion.^{46,57} In addition to friend support, the inclusion of pets as a supporting factor to promote PA was also mentioned in the study. The participants specifically mentioned walking alongside their dogs around the neighborhood and park to exercise. The incorporation of pets to maintain a healthy lifestyle is also supported by previous research as they promote a sense of social support and routine exercise.¹⁴⁸

The third level of the SEM was focused on the factors impacting the community of the Hispanic mothers in the study. The primary factors within this level were safety and the physical environment. Similarly to previous levels, these factors contributed as both barriers and facilitators. Safety is a key factor mentioned by the participants as their decision to engage in PA. The mothers in the study mentioned worries such as crime and stray animals as the biggest barriers preventing them from being active. These concerns can be supported by other research explaining lack of safety within a neighborhood as a detrimental factor minimizing opportunities for PA among the Hispanic community.^{88,116} The physical environment can also be incorporated

into the safety aspect within the community. The participants mentioned hazards such as: diminished sidewalks, traffic, and detrimental weather as reasons to not engage in PA. These factors are also mentioned in previous research as limitations to PA due to the limited comfort of exercising in dangerous conditions.^{62,120,132} The mothers discussed their decision to engage in PA is dependent on the type of physical environment and safety within their community.

Within the community level of the SEM, culture was another important factor discussed by the participants. The Hispanic mothers expressed the importance of their Hispanic culture in guiding their lifestyle decisions, including PA. Unfortunately, the Hispanic culture does not view PA as an important value within the community.⁶⁹ The participants in the study further promoted this idea when they mentioned that their Hispanic culture emphasized the importance of caring for the family above all else. The Hispanic mothers mentioned that their lifestyles as mothers was heavily influenced by their own mothers. They saw their mother constantly fulfilling family obligations and catering to the household. The idea of PA was viewed as a luxury, rather a priority within their lives. These cultural ideas were engrained in their minds as they continued to recycle similar beliefs within their lives. It is interesting to note that these ideas are shared among other Hispanic females from previous research, who acknowledge the importance of family responsibilities above PA.^{69,75,149}

The organization level was one of the least discussed by the Hispanic mothers in the study. The organization level was focused on the influence from colleagues and supervisors on PA. The only negative influence from work colleagues was regarding the mental stress and exhaustion from assisting others and ensuring everyone completed their duties. Some participants mentioned daily walks with their colleagues to promote PA. In addition, some colleagues extended their PA influence by promoting recreational classes and gym memberships.

Supervisors also assisted in the promotion of PA through the encouragement of daily walking breaks and group fitness classes. The social support within the workplace is consistent with the importance of social support in overall PA promotion.^{150,151} The biggest negative influence from the organizational level was the time spent working. Participants mentioned cases in which they would work many hours and as a result would feel exhausted or have limited amount of time to incorporate PA in their life. As previously stated, exhaustion and time are crucial factors that inhibit PA promotion.^{75,86}

The final level of the SEM that was discussed in the study was the policy level. This level was minimally discussed as many of the participants mentioned an absence of workplace policies that promoted their PA, thus resulting in no images included in the photovoice portion for the policy level. The participants did express their desire to have their current occupations provide PA incentives as it would encourage them to be active. The Hispanic mothers that did mention company incentives discussed discounted insurance rates and reductions in fitness membership costs. One interesting factor to note is that the participants who mentioned policies promoting PA also mentioned a minimal effort in promoting these policies among the employees. They expressed their belief that an improvement in the promotion of existing policies promoting PA would encourage them to utilize these policies and adhere to more daily PA. The use of policies is important due to the significant impact in the promotion of accessibility and a better understanding of PA benefits.¹⁵²

4.4.1 Strengths and Limitations

This qualitative study provided an opportunity to identify factors influencing PA among Hispanic working mothers. This study incorporated several strengths in evaluating these factors. One of the strengths of this study was the incorporation of the qualitative analysis. This

methodology allowed participants to expand upon their responses on influences affecting their PA. Specifically, the photovoice component of the study was a unique strength as it allowed for a collaborative approach in identifying factors influencing PA among the research population. The participants in the study provided images of PA barriers and facilitators within their personal lives. This unique component added validity to the study as the information provided was gathered from the research population. The incorporation of the SEM was another strength, as it provided a structured template that organized each influential factor into specific levels.

While the study had several strengths, it also must be noted that there were limitations. One of the limitations was the small sample size. While the information gathered was very insightful in addressing the factors affecting PA among Hispanic mothers, the small sample size provides a difficulty in addressing the entire Hispanic mother population. For example, most of the participants received some college education and were engaged in sedentary work. These variables may not be representative of the entire Hispanic mother population; thus, it is difficult to generalize the results. Although data saturation was reached within this sample, it's possible that new insights can come from Hispanic working mothers that have different occupations. The second limitation of the study was the minimal responses for the organization and policy levels of the SEM. The limited information for these levels leaves a gap in the research on the manner in which worksite social influences and work policies influence PA.

4.4.2 Future Directions

The results from this study demonstrate positive strides towards understanding PA among Hispanic working mothers. Introducing intrinsic motivational factors and promoting goals among Hispanic mothers is a strategy that can be implemented in order to promote PA. Incorporating opportunities for social support within families, friends, and dogs can assist in

improving PA participation among Hispanic mothers. The value of social support within the Hispanic community emphasizes the importance of creating opportunities such as group exercise and mother/children intervention programs as possible solutions to improve social support among Hispanic mothers.

The physical environment is crucial in determining a Hispanic mother's decision to engage in PA. Addressing factors such as safety, weather, and accessibility can minimize negative physical environments. While safety and accessibility are easier factors to address, negative weather may need additional resources to combat. For example, creating workouts that can be modified between in-door and outdoor settings can minimize the negative effects of weather from diminishing opportunities to engage in PA. Introducing PA programs with accessible in-door equipment can be another possible solution in combating weather constraints. The biggest obstacle to address among Hispanic mothers is culture. The results from this study revealed the heavy influence placed on culture among the participants. Incorporating cultural components and emphasizing the importance of PA among the Hispanic community is crucial. Future studies may need to evaluate the Hispanic culture and identify components that can address the negative connotation associated with PA, while also incorporating the value of the Hispanic culture. One solution may be to emphasize the importance of a healthy lifestyle to ensure the ability to care for the household and family.¹⁵³⁻¹⁵⁵

The photovoice component of this study allowed for a collaborative research approach in which participants were able to express their perception of their daily PA. The images included in this study were predominantly within the individual, interpersonal, and community levels of the SEM. It is interesting to note that the organization and policy levels contained a minimum number of images or no images representing PA within these levels. The minimal photovoice

images within these levels may provide a basis that Hispanic working mothers do not perceive any opportunities for PA within their current occupations or work policies.

While not much information was gathered around the organization and policy levels, it is important to note that the Hispanic mothers in the study understood the importance of these levels in influencing their PA. The mothers in this study noted the opportunities provided for PA within their occupation made them more willing to engage in activities such as walking, running, and group exercise with their colleagues/supervisors. The mention of minimal work policies promoting PA was a concern among a variety of Hispanic mothers. Future studies need to address how to incorporate more opportunities for PA engagement through workplace wellness programs, as much of the Hispanic mother's time is spent at work. Addressing the factors mentioned within each level of the SEM can provide additional support in improving PA among the Hispanic community.

Chapter 5- Dissertation Conclusion

The overall goal of this dissertation was to identify the factors influencing PA within the Hispanic population. The three chapters included in this dissertation provided an overview of data that assisted in achieving the overall goal. The incorporation of quantitative and qualitative approaches in gathering data within this population provided an in-depth review of PA within the Hispanic population, two studies of which focused on Hispanic working women.

The SEM provided a guide for each of my studies in order to identify key determinants across levels of influence for PA among my research participants. Appendix C provides a general model with examples of each level of influence and some of the variables discussed across my research studies. While the variables included in this SEM model do not encompass every variable of influence, it does provide a foundational outline for each level of the SEM. In addition, throughout my research, I learned that culture spans across all levels of the SEM. Each level of the SEM is influenced by the cultural perspective and ideas within the Hispanic community and can be seen throughout each study of my dissertation.

The scoping review completed in study one provided a review of the existing literature between a 10-year period (2012-2022) which identified the intervention programs aimed at improving PA among low-income Hispanic adults. This scoping review identified the levels of the Social Ecological Model (SEM) that were addressed within the interventions. The individual, interpersonal, and community level factors were emphasized. This scoping review revealed that there are positive strides at improving PA among the Hispanic community, however there are areas that needed further exploration. Conducting more interventions that incorporate strategies at the organizational and policy levels is one of the areas that needs to be addressed in future research. Additionally, cultural influences mentioned in the interventions such as work, family

obligations, and language are factors that need further research to better understand their influences on PA. Finally, exploring the long-term effects on PA interventions is important to address in order to identify components that are successful in long-term PA promotion.

The second study of this intervention provided an overview of influences and barriers impacting PA among working Hispanic females. The combination of validated surveys into one structured measurement guide allowed for an opportunity to understand these influences across all levels of the SEM. The national distribution of the survey across working Hispanic females provided a generalized understanding of these influences. The positive influence from the individual and interpersonal levels on PA among this population demonstrates the importance of maintaining factors within these levels in future PA programs. The concerns about safety expressed by the working Hispanic women emphasizes a barrier that must be addressed. Crime concern is a complex issue that affects multiple levels of influence and thus needs a multilevel approach in finding solutions to this barrier. Incorporating safety changes within the built environment through policy changes aided by community support can assist in minimizing the safety barrier. In addition, addressing variables such as low socioeconomic status and cultural safety concerns within the Hispanic population can further improve safety and promote PA. The additional factor of work hours was also expressed as a barrier to PA within this specific study. Policy influence within occupations is another area needing further exploration to provide additional opportunities for PA engagement within the workplace.

The third chapter of the dissertation collected qualitative information regarding PA influences among working Hispanic mothers. The addition of the photovoice method was an additional collaborative approach that allowed the study population to express their voices and ideas regarding these PA influences. The concerns regarding a lack of PA knowledge should be a

priority among researchers to improve self-efficacy for PA participation among this Hispanic group. The explanation and demonstration of PA can improve self-efficacy and help in creating motivational factors among working Hispanic mothers. Family and friend support is another factor that should be maintained in future interventions due to the influential factors associated with PA participation and adherence among the Hispanic community. As mentioned in previous research, restructuring the built environment to include components such as green space, walking paths, and improved traffic and crime safety measures can further improve PA opportunities. The occupational social support from colleagues and supervisors can be further improved through the incorporation of policy changes aimed at improving PA participation. The Hispanic mothers in this study expressed their desire for more policy implementations improving PA such as: walking breaks, health and wellness programs, and discounted insurance rates. While policy changes may be difficult to implement, it is important to note that employee satisfaction through these wellness programs may be beneficial in the long-term success of companies. Further research is needed to identify the specific benefits and correlation between employee satisfaction and company productivity, specifically among Hispanic working mothers.

Across all three studies included in the dissertation, the data collected provides information that can outline future directions in the research. The scoping review identified existing intervention literature aimed at improving PA within the Hispanic population. However, this review did not quantify the impact of the intervention studies and thus remains an area that can be further expanded upon through a systematic review or meta-analysis. While studies 2 and 3 identified the factors influencing PA among different female Hispanic populations, it is also important to explore the level of impact from these PA influences. While these cross-sectional studies have explored similar influences, further research is needed to fully understand their

impact on PA. For example, the work hours' influence was expressed as both positive and negative influence on PA by participants in studies two and three. The type of influence may differentiate based on occupation type or work schedule. To fully understand the influence of work hours on PA, further research needs to be conducted. Implementing longitudinal intervention designs can identify their long-term impacts on PA. The results from these longitudinal interventions can provide foundational data necessary to create large scale experimental designs on a large scale to impact larger populations within the Hispanic community. The information gathered from all three studies highlights the importance of creating multilevel interventions addressing each level of the SEM to create a wholistic approach in improving PA among this community.

While the three chapters included in this dissertation are aimed at different populations within the Hispanic community, all the studies provide beneficial information that creates positive momentum in identifying the PA influences among groups within the Hispanic community. Identifying existing literature is crucial to understand the variables that are successful in promoting PA among Hispanics, while also identifying areas needing further research. Collecting quantitative data across multiple areas in the United States benefits the research of understanding the common factors influencing PA among a certain group in the Hispanic community. Finally, including a qualitative and collaborative approach in expanding upon influences and barriers within the community can improve the understanding of how these factors influence PA. The identification of successful intervention programs, as well as the expansion upon barriers and influences of PA among the Hispanic population will assist in minimizing the adverse health effects associated with physical inactivity in this community. This

positive stride in the research can promote equitable opportunities for PA engagement across the growing Hispanic population.

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Appendix A Ch. 2: Scoping Review PRISMA Checklist

Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
TITLE			
Title	1	Identify the report as a scoping review.	Page 21
ABSTRACT			
Structured summary	2	Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives.	Page 21-22
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach.	Pages 23-27
Objectives	4	Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives.	Page 27
METHODS			
Protocol and registration	5	Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number.	N/A
Eligibility criteria	6	Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale.	Pages 28
Information sources*	7	Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed.	Page 28

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Search	8	Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated.	Page 29
Selection of sources of evidence†	9	State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review.	Page 29-30
Data charting process‡	10	Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators.	Pages 29-30
Data items	11	List and define all variables for which data were sought and any assumptions and simplifications made.	Page 30
Critical appraisal of individual sources of evidence§	12	If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate).	N/A
Synthesis of results	13	Describe the methods of handling and summarizing the data that were charted.	Page 31
RESULTS			
Selection of sources of evidence	14	Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram.	Page 32
Characteristics of sources of evidence	15	For each source of evidence, present characteristics for which data were charted and provide the citations.	Page 33
Critical appraisal within sources of evidence	16	If done, present data on critical appraisal of included sources of evidence (see item 12).	N/A
Results of individual sources of evidence	17	For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives.	Pages 33-38

SECTION	ITEM	PRISMA-ScR CHECKLIST ITEM	REPORTED ON PAGE #
Synthesis of results	18	Summarize and/or present the charting results as they relate to the review questions and objectives.	Pages 39-46
DISCUSSION			
Summary of evidence	19	Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups.	Pages 47-51
Limitations	20	Discuss the limitations of the scoping review process.	Pages 51-52
Conclusions	21	Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps.	Pages 52-54
FUNDING			
Funding	22	Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review.	N/A

JB1 = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JB1 guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

From: Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med*. 2018;169:467–473. doi: [10.7326/M18-0850](https://doi.org/10.7326/M18-0850).

Appendix B- Ch. 4 Interview Questions

Step 1:

Introduction:

My name is Javier Martinez, I am a current Kinesiology PhD Candidate at Kansas State University. I am the leading researcher in this study.

-Purpose of the study: The purpose of the study is to understand the factors that affect PA among working Hispanic mothers

“All of the information gathered from this study will be kept confidential and only used to better understand the factors that affect PA among working Hispanic mothers.”

I'll also be recording the zoom session in order to transcribe the information for data analysis. Is this ok with you?

Do you have any questions before we start with the interview?

Step 2:

I want to begin the interview by discussing the photos you took for the photovoice component of the study.

1. What was the most meaningful photo you took? Why?
2. Can you explain why you chose this photo?
3. Do you think this picture represents the promotion or barrier towards PA?
4. How does this photo impact your everyday life?

Photos 2-6+

1. Can you explain why you chose this photo?
2. How does this photo impact your PA?
3. What aspects of this photo promote PA?
4. What aspects of this photo inhibit PA?
5. How does this photograph impact your everyday life?
6. How often do you participate in this activity? (if applicable?)

Step 3:

Did these photographs change your perspective/view on PA? If so, how?

Are you comfortable sharing a specific photograph in the case of the study being published? If so, which ones?

Step 4: Categorize the photos into the SEM

- Individual
- Interpersonal
- Community
- Organizational
- Policy

Now I want to talk about your PA. Can you describe your PA throughout a typical week?

- Frequency
- Intensity
- Duration

Can you tell me how often you're physically active throughout the week? (Frequency, Intensity, Duration)

Step 5: PA Questions

1. How often are you physically active?
2. Where do you do most of your PA?
3. What type of PA?
 - a. Leisure/Recreational?
 - b. Transportation? (to work, run errands, to get to place to place)
 - c. Household?
 - d. Occupational
4. What do you think are some facilitators that help you be physically active?
5. What are some of the barriers that may prevent or make it difficult to be physically active?

Step 5: Address Each Level of the SEM

Individual:

1. *The current PA guidelines is to engage in 150 minutes per week of moderate activity (on a scale of 1=low to 10= high, how confident are you in being able to meet these guidelines in a general week?*

Can you tell me why?

Strength Training?

2. What motivates you to be physically active?
 1. Overall, do you have a more positive or negative view of PA?
 2. Overall, do you view PA as enjoyable?
 3. What are some examples of strategies you use to stay physically active?

Now I want to ask you some questions about the social influences in your life. Can you tell me a little bit about your family, kids, etc.

Who do you live with?

How old are your kids?

Is your family active overall?

Interpersonal:

1. Do you do any PA with friends or family?
2. If so, what are some ways that your family/friends make PA easier for you?
3. What are some ways that they make PA harder?

Tell me a little bit about your community.

What is the population size of your city? Your neighborhood?

Do you live in a more urban vs rural neighborhood?

Community:

1. How does your community help you be physically active?
2. What are some resources in your community that can help with PA?
3. What are some things that make PA difficult?

Tell me about what you do for work.

What do you currently do for work?

Do you work in the office, at home?

How many hours do you work per week?

Do you work any other jobs?

Organizational/Policy:

1. How do your work colleagues/supervisor influence your PA?
2. How does your work place impact your PA?
 - a. If positive, how so? (provide examples)
 - b. If negative, how so? (provide examples)

Wrap Up Question

-Is there anything we didn't discuss that you feel would be relevant to share?

-As a reminder, you will be receiving a \$40 compensation for this study. I will write your information down and send it to the office in charge of payment. You should receive an email once I complete all of the interviews with further information on how to receive payment. I anticipate the interviews to be completed early Fall 2024

If you have any other questions/concerns about the study please feel free to contact me via email. Again thank you for your participation in the study. Hope you have a great day!

Appendix C- Social Ecological Model Diagram

*Adapted based on the SEM Model from McLeroy et al, 1988¹⁴

