Evaluating the Impact of SMAA's Meals on Wheels Program on Socialization, Isolation, and Nutrition Risk Among Older Adults

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INTRODUCTION

The South Maine Agency on Aging's (SMAA) Meals on Wheels program plays an essential role in supporting homebound older adults in Cumberland and York counties by delivering nutritious meals directly to their homes. Our study leverages a comprehensive dataset provided by SMAA, focusing on two crucial aspects: socialization/isolation and nutrition risk among the program's recipients. This research aims to evaluate the impact of Meals on Wheels on these parameters, thereby understanding its role in the lives of elderly individuals reliant on this service.

The primary objective of this research is to assess the effectiveness of SMAA's Meals on Wheels program in addressing social isolation and nutritional risks faced by its recipients. By analyzing data from October 2021 to September 2023, we aim to identify trends and changes in the social engagement and nutritional health of these older adults. This analysis is intended to offer actionable insights to SMAA, enabling them to enhance the program's capacity to meet the holistic needs of their elderly clientele more effectively.

In this report, we present a detailed analysis of SMAA's dataset, focusing on the observed dynamics in socialization, isolation, and nutrition risk among Meals on Wheels recipients. By examining these parameters, our study highlights the program's influence on mitigating isolation and improving nutritional outcomes. The findings are intended to provide valuable information to SMAA, supporting them in optimizing and tailoring their services to better align with the evolving needs of the elderly population they serve.

BACKGROUND

Meals on Wheels programs across the United States play a crucial role in addressing the nutritional and social needs of older adults. National research

conducted by Meals on Wheels America has demonstrated these programs' effectiveness in reducing hunger, improving nutrition, and decreasing social isolation among the elderly(Research: Meals on wheels america). This nationwide data sets the stage for understanding the potential impacts of such programs at a local level.

Specifically, the South Maine Agency on Aging's (SMAA) implementation of Meals on Wheels caters to the unique needs of homebound older adults in Cumberland and York counties. For decades, SMAA has delivered nutritious meals, accommodating diverse dietary requirements including standard, low sodium, vegetarian, gluten-free, and diabetic-friendly options. These meals, prepared in USDA-inspected kitchens by a local Maine company, aim to meet a third of the Federal Dietary Reference Intake. More than just providing meals, the program includes vital wellness checks and friendly visits during deliveries every Tuesday or Thursday, contributing to the overall well-being and safety of its clients (Meals on wheels).

Our study builds upon these national and local contexts, aiming to analyze how the SMAA's Meals on Wheels program translates these broader objectives into tangible outcomes. We focus specifically on the impacts of this program in Cumberland and York counties, exploring changes in socialization, isolation mitigation, and

nutrition risk among the recipients. This local focus provides a deeper understanding of the program's effectiveness in a specific community setting.

METHODS/ANALYSIS

We aim to assess the potential changes in socialization, isolation alleviation, and nutritional risk factors among clients who have received support and actively engaged in multiple assessments. Our goal is to determine if there have been discernible alterations in these outcomes over time. So we've identified five key factors for comparison along with additional identifying columns to facilitate analysis.

Selected Factors for Comparison:

- 'ANS: Isolation: How Often Feel Lack Companionship'
- 'ANS: Isolation: How Often Feel Left Out'
- 'ANS: Isolation: How Often Feel Isolated from Others'
- 'ANS: Isolation: How Satisfied With Ability to Visit with Others'
- 'NSI - High Risk - (6+ Score)'

Additional Identifying Columns:

- 'Client ID'
- 'Assessment Date'
- 'Assessment Type'

Data Formatting :
Data conversion: For each column, we convert the user's choices into different

numbers according to the level for t-test analysis

Data Filtering:
Filtered the dataset to include clients who completed at least one initial assessment and one annual assessment. This step ensures a comparative analysis of changes between these assessment points.

Data Cleaning:
Duplicate Data Removal: Eliminated duplicate entries to ensure accuracy in analysis.
Uncertain Information Removal: Removed rows containing uncertain or unreliable information such as ['Unknown', 'Declined to Disclose', "Don't Know", "Don't know", 'Information unavailable', 'null', 'nah'] to maintain data reliability

Data Analysis:
Customer Choice Distribution: Initial vs. Annual Assessments:
We initiated the analysis by computing the count of every client choice, to show the distribution of the choices and facilitated a comparison between the initial and annual assessments.

Mean, median value Comparison:
We conducted a comparison by computing both the median and mean values of client choices between the initial assessment and the annual assessment. This allowed us to assess any variations or changes in these values over the assessment periods.
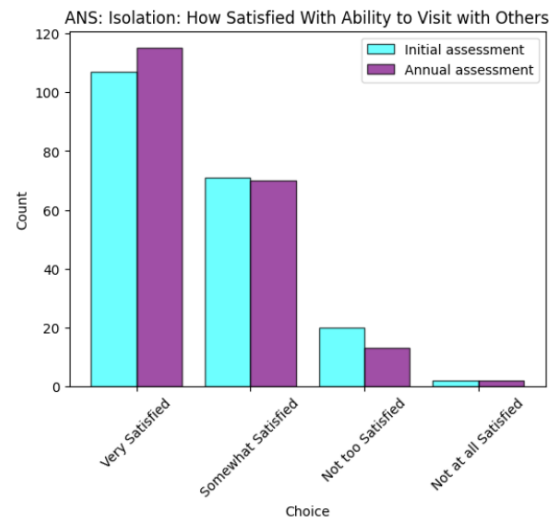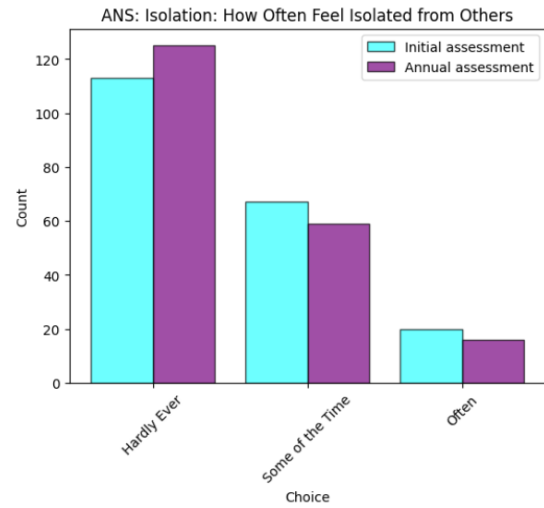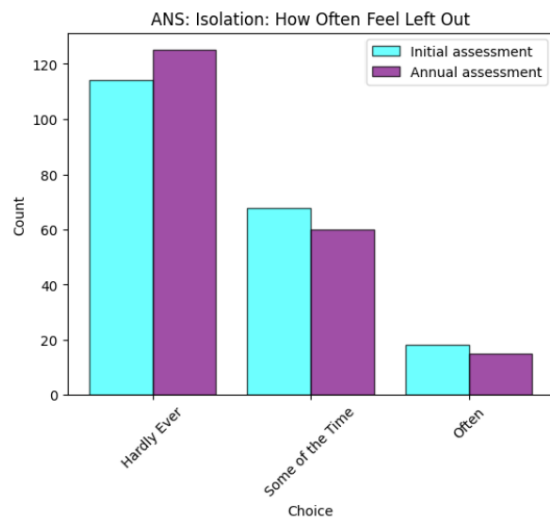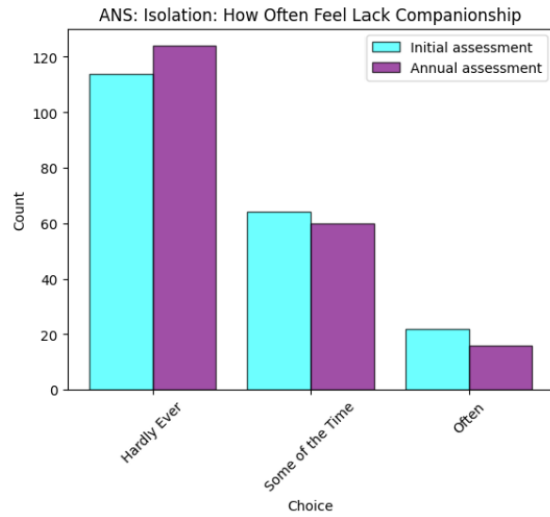
Statistical Analysis - T-Test:
Subsequently, employing the t-test methodology, we conducted an in-depth examination of customers who completed both the initial and annual assessments for each factor. The derived p-values were rigorously evaluated to ascertain the presence of significant changes in their preferences or responses over the assessment periods. We set the cutoff for p-values to be 0.05. A p-value lower than the cutoff suggests a substantial change, and vice versa.
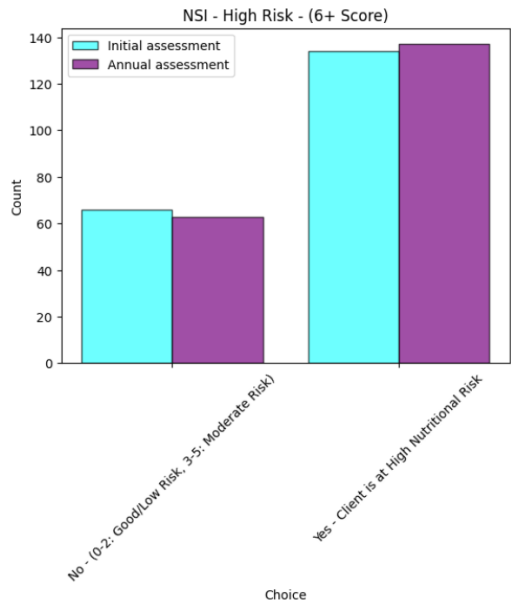
Mean, median value Comparison and T-Test Analysis after remove some choices:
We removed the clients who choose 'hardly ever' for the factors 'ANS: Isolation: How Often Feel Lack Companionship', 'ANS: Isolation: How Often Feel Isolated from Others', 'ANS: Isolation: How Satisfied With Ability to Visit with Others', 'ANS: Isolation: How Often Feel Left Out' and also removed the clients who choose 'Very satisfied' for the factor 'ANS: Isolation: How Satisfied With Ability to Visit with Others' in their first assessment, we want to examine if there have been any changes in the mean, median values, and p-values for clients experiencing loneliness, isolation, a lack of companionship, and seeking more interaction with the outside world across assessment periods

RESULTS

Customer Choice Distribution for different factors: Initial vs. Annual Assessments

ANS: Isolation: How Often Feel Lack Companionship

ANS: Isolation: How Often Feel Left Out

ANS: Isolation: How Often Feel Isolated from Others

ANS: Isolation: How Satisfied With Ability to Visit with Others

NSI - High Risk - (6+ Score)

Mean, medium values and t-test result(p-value) for 'NSI - High Risk - (6+ Score)'

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
NSI - High Risk - (6+ Score)	5.01	6.0	5.055	6.0	0.749

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Left Out' before removing people who hardly ever felt left out in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Left Out	1.52	1.0	1.45	1.0	0.278

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Left Out' after removing people who hardly ever felt left out in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Left Out	2.21	2.0	1.95	2.0	0.0015

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Isolated from Others' before removing people who hardly ever felt isolated from others in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Isolated from Others	1.535	1.0	1.455	1.0	0.223

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Isolated from Others' after remove 'hardly ever' choice after removing people who hardly ever felt isolated from others in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Isolated from Others	2.23	2.0	1.92	2.0	0.0002

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Lack Companionship' before removing people who hardly ever felt lack companionship in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Lack Companionship	1.54	1.0	1.46	1.0	0.229

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Often Feel Lack Companionship' after removing people who hardly ever felt lack companionship in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Often Feel Lack Companionship	2.26	2.0	1.94	2.0	0.0002

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Satisfied With Ability to Visit with Others' before removing people who are very satisfied with their ability to visit others in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Satisfied With Ability to Visit with Others	1.585	1.0	1.51	1.0	0.277

Mean, medium values and t-test result(p-value) for 'ANS: Isolation: How Satisfied With Ability to Visit with Others' after removing people who are very satisfied with their ability to visit others in initial assessment

	Initial assessment		Annual assessment		t-test result(p-value)
	mean	median	mean	median	
ANS: Isolation: How Satisfied With Ability to Visit with Others	2.26	2.0	2.01	2.0	0.0032

DISCUSSION

Change in nutritional risk score:

We use a 0.05 cutoff for the p-value in our study. By conducting a t-test to see if there is a change between the initial assessment and the annual assessment in the nutritional risk, we got a p-value of 0.749, which is above the cutoff value we use. So, there is no change in the nutritional risk of the clients of MoW based on current data.

Change in feeling left out, isolated, lack of companionship, and change in satisfaction with the ability to visit others:

Initially, by conducting a t-test to see if there is any change in these four columns, the conclusion is, there is no change, because the p-values are above 0.05.

However, after we removed the data of the clients who did not feel left out in their initial assessment and left with the data of the clients who sometimes or often feel left out in their first

assessment, the p-value becomes 0.0015, which is below 0.05 and indicates a change. The same happens when we use the same method to deal with the data in the other three columns.

Combined with the fluctuations in the means and medians, we concluded that in the big picture, the clients of MoW did not do better in these four aspects. However, the people who sometimes or often felt left out in their first assessment have felt less left out. The people who sometimes or often felt isolated have felt less isolated. The people who sometimes or often felt they lacked companionship have felt more companionship. The people who were not completely satisfied with their ability to visit others in their first assessment have felt more satisfied.

Joining a MoW program does not have an impact on the loneliness a person feels if the person is not lonely in the first place. But for those who feel lonely, left out, isolated, lack companionship, and want more interaction with the outside world, joining MoW has the potential of helping them.

Our results are useful for the old people who want to feel less lonely and more companionship in their later lives. Joining MoW is one of the methods they could try if they are qualified.

LIMITATIONS

Several factors could have an impact on the results of our study.

First of all, there is no control group in our study. Ideally, there would be a control group and a treatment group so we could eliminate the influence of other factors on the results of our study. For example, the health conditions of the elderly are declining on their own. We could not know if the health conditions of the clients of MoW have any influence on the scores of their nutritional risk without introducing a control group to our study.

Secondly, we used the data of the clients who filled out the initial assessment and at least one annual assessment to conduct t-tests and observe the changes. There might be clients who filled out the annual assessment more than once and we did not separate these data. What we could have done is to compare the data from the initial assessments and the first annual assessments, the first assessments and the second assessments, so on and so forth. But it will add a lot of coding and analyzing to our workload.

Finally, there are many missing fields in the data set. If the missing fields were filled, the results and the conclusions of our study might be different.

References

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