Using Visualization Methods to Discover Tailoring in Nursing Intervention Data

School of Nursing Research Day
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Acknowledgments

This research was conducted through the Omaha System Partnership for Knowledge Discovery and Health Care Quality.

Data were generated by public health nurses from Washington County Minnesota Department of Public Health and Environment in the course of routine client documentation.

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We are indebted to the public health nurses, and to the families who shared their life journeys. The details of their stories are the fabric of this research.
Background

Public Health Nurse Home Visiting:

Client-focused
Strengths-based
Evidence-based
Relationship-based
Complex client situations
Complex social contexts
Multifaceted co-occurring interventions
Long term commitment (months/years)
Purpose

What do PHNs do that makes a difference?

• Is there a client effect?
• Is there a nurse effect?
Why Use Data Visualization?

1. The human brain sees, interprets, and comprehends a picture more easily than a spreadsheet full of numbers or a paragraph of text.

2. Statistical analysis can mask hidden patterns in the data.

3. Revealing hidden patterns can help generate new hypotheses and research questions.
Identical Statistics...

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<th>x2</th>
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\[
\bar{x}_i = 9.0 \\
\sigma^2_{x_i} = 11.0 \\
\bar{y}_i = 7.5 \\
\sigma^2_{y_i} = 4.12 \\
\rho_{x_i y_i} = 0.866 \\

\text{LS linear fit} \quad y_i = 3 + 0.5x_i
Different Plots

\((x_1, y_1)\)

\((x_2, y_2)\)

\((x_3, y_3)\)

\((x_4, y_4)\)
Sample

Convenience sample

Omaha System Partnership data warehouse
Washington County Public Health and Environment

De-identified PHN intervention data

High risk mothers
218 clients
14 PHNs
6779 interventions
Sample
Methods
Methods
Key
Do PHNs Tailor Interventions?
Preliminary Results

Differential use of case management by two PHNs ($p < .001$)

Higher proportion of surveillance vs. teaching, guidance, and counseling between two subgroups ($p < .001$)
PHN Signature Styles?
Data Quality Issue vs. Signature?
Next Steps

Statistical analysis of grouped patterns
   Is there a significant nurse style?
   Is there a significant client type?

Future studies:
Do patterns persist in data across counties?
Are there associations of patterns with client outcomes?
Are there optimal pattern associations between nurse style and client type?
Thank you!