Preparing nurses for the next pandemic: the role of statistics educators moving forward

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Nurses & the COVID-19 Global Pandemic

Statistics & the COVID-19 Global Pandemic

Never in our lifetimes has statistics been so present in the public eye, and consumers of statistics (e.g., nurses) tasked with critical and immediate direct communications with the general population to keep communities safe in midst of a dangerous infectious agent.

The nursing workforce is the backbone of our health systems.

Nurses & the COVID-19 Global Pandemic

Nurses have been on the front lines and confronted with statistical issues and topics

- Daily communications with families and caregivers of patients about *risk* and *uncertainty*
- Correcting and discerning misinformation & disinformation
- Social media; conspiracy theories

Causality versus Association

- Hydroxychloroquine
- Ivermectin
- Remdesivir

- Communicating and interpreting **statistics**:
  - **Diagnostics**: COVID testing, antibodies
    - *Statistics*: accuracy, sensitivity, specificity, positive predictive value, negative predictive value
  - **Exposure risk**: surface, aerosol, indoors vs outdoors, food, mask, distancing
    - *Statistics*: probability, relative risk, competing risks
  - **Vaccines**: mRNA vs traditional virus-based technology
    - *Statistics*: efficacy & safety assessments, efficacy vs effectiveness
  - **Patient care**: symptoms, severely ill, treatments, mortality, long term effects
    - *Statistics*: probability, correlation, survival (time-to-event) analysis

The role of statistics education in nursing education

Are we training nurses to speak accurately about risk and uncertainty?

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A study of statistics knowledge among nurse faculty in schools with research doctorate programs

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Table 2 – Percentage of Correct Responses on Statistics Knowledge Assessment (*n* = 164)

Statistics Knowledge Questions	Count (Percent)
Understanding the potential problem with multiple testing.	136 (82.9)
Describing an observational study.	135 (82.3)
Relationship between the sample size and standard error.	133 (81.1)
Defining statistical power.	119 (72.6)
Understanding the difference between linear and logistic regression.	115 (70.1)
Interpreting a confidence interval.	70 (42.7)
Understanding the rationale for randomization.	38 (34.9)
Interpreting an odds ratio.	55 (33.5)

The role of statistics education in nursing education

Who & What of teaching statistics to nurses

Who

Many nursing programs invite other nurses to teach core statistics courses

Statistics educators in nursing often do not have a statistics degree

Statisticians are not asked to teach nursing courses

What

There are **no** competency guidelines for statistics education in nursing education

Conceptual vs Methods vs Skills

Depth versus breadth of statistical topics

Descriptive vs inference vs modeling

Getting ready for the next pandemic

Some lessons learned:

- We need to improve how we teach students to talk about uncertainty and risk
- Statistics toolboxes are out; science communication is in
- Team science is how it's done; we need to teach how to collaborate with a statistician
- There are serious ethical considerations in speaking to patients and the public about uncertainty and risk
- **For non-statisticians: Statistical concepts > Statistical methods**

Classroom Activities

Teaching students to talk about uncertainty and risk

In-class oral presentation ideas:

- Engage students in conducting comparative analyses of media reports about published studies
- Instructor provides data and a "simulated" research question; presentation describing data, study, findings
- Small group discussions about healthcare-related ethical scenarios and quandaries

Peer to peer learning

- Dialogue about uncertainty, analytic process
- Practice talking about and explaining uncertainty and risk
- Role play: *The chance of dying from COVID is only 1/100. Why worry?*
  Why should I wear a mask?
  Won't the vaccine affect my genetics and give me cancer?
  I already had COVID and thus antibodies. Why should I get vaxed?

Thank You

Questions?

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