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Oncology Infusion Nurses' Personal Protective Equipment Use While Handling Hazardous Drugs

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Objectives

Learning Outcomes

#1: By the end of the presentation, participants will be able to identify one knowledge gap that could be utilized to promote Personal Protective Equipment (PPE) adherence for oncology infusion nurses.

#2: By the end of the presentation, participants will be able to identify how more experienced nurses could promote PPE adherence for oncology infusion nurses.

Background

- 8 million healthcare workers (HCW) exposed to hazardous drugs (HD) every year
- Potential cause of acute and chronic adverse health effects (skin rashes, infertility, spontaneous abortions, congenital malformations, possibly leukemias, and other cancers)
- Recommended HD guidelines from many professional groups (ONS, NIOSH, OSHA, ASHP)
- PPE adherence not adequate
- Health risks should encourage PPE use
- HD contaminants not visible to the naked eye
- Ownership of monitoring and PPE use reinforcement fall on the oncology nurse professionals

(Menonna-Quinn, et al., 2019; National Institute of Occupational Safety and Health, 2020)

Background



What are some of the reasons PPE use is not adequate?



What could the oncology nursing profession do to promote better PPE use?

Literature Review

Lawson, et al. (2020)

- Fertility issues
- Retrospective study
- Two times more likely to cause spontaneous abortion

Moretti, et al. (2014)

- Cancer Risks
- Comparative study
- Oncology nurses more prone to show in blood samples with chromosome aberrations

Ramphal, et al. (2014)

- Environmental exposures
- Comparative study
- Chemo exposure occurred in hospital environment whether oncology unit or not

Boiano, et al. (2014)

- Perceived barriers
- Survey methodology
- Top 3 reasons:
 1. Perception of minimal skin exposure
 2. Not part of organizational protocol
 3. PPE not readily available

Polovich & Clark (2012)

- Cross-sectional study
- Survey methodology
- High knowledge but low PPE use
- Organizations need to show support & worker safety
- Shared responsibility

Purpose/Aim

What are the perceived risks, organizational influences, perceived conflict of interest, and interpersonal influences in oncology infusion nurses administering chemotherapy in multi-site out-patient settings?



What is the bivariate analysis for the demographics of oncology infusion nurses with perceived risk, organizational influences, perceived conflict of interest, and interpersonal influences?

Methods/Approach

| Variables | Instrument | # Items / Scoring | Interpretation |
|--------------------------------|--------------------------------|---|--|
| Perceived Barriers | Barriers to Using PPE | 13 items, 1 = strongly disagree to 4 = strongly agree. Range: 13-52 (Sum) | Higher score indicates higher perceived barriers |
| Perceived Risk | Risks of Chemotherapy Exposure | 3 items, 1 = strongly disagree to 4 = strongly agree. Items are reverse-scored. Range: 1-4 (Mean) | Higher score indicates higher perceived risk |
| Organizational Influences | Workplace Safety Climate | 21 items, 1 = strongly disagree to 5 = strongly agree Range: 21-105 (Sum) | Higher score indicates better safety climate |
| Perceived Conflict of Interest | Conflict of Interest Scale | 6 items, 1 = strongly disagree to 4 = strongly agree. Range: 6-24 (Sum of items) | Higher score indicates higher conflict of interest. |
| Interpersonal Influences | Interpersonal Norms | 4 items, importance to others of using PPE, 0 = not at all, 1 = sort of, 2 = a lot Range: 0-2 (Mean) | Higher score indicates higher belief that others think PPE is important. |
| | Interpersonal Modeling | 3 items, frequency of others' use of PPE, 0 = never to 3 = usually Range: 0-3 (Mean) | |

- Research design was a descriptive, quantitative study

- Measured five variables/subscales using validated instrument, Chemotherapy Handling Questionnaire developed by Polovich & Clark (2012)

- Perceived Barriers = Barriers to not using PPE
- Perceived Risk = Risk of chemotherapy exposure
- Organizational Influences = Workplace safety climate
- Perceived Conflict of Interest = Conflict of interest scale
- Interpersonal Influences = Interpersonal norms and modeling

Methods/Approach

-
- **Sample population/selection:** oncology infusion nurses; purposeful sampling
-
- **Inclusion criteria:** RNs who worked in ambulatory infusion center and administered chemotherapy
-
- **Exclusion criteria:** None; study considered demographic variables and impact on PPE use
-
- **Setting:** Four out-patient infusion centers of a faith-based medical center in Southern CA
-
- **Time frame:** June 6, 2022, to July 8, 2022
-
- **Data:** Anonymous online REDCap survey
-
- **Analysis:** SPSS (Statistical Package for the Social Sciences) for data analysis

Results

Response Rate: 56 surveys distributed and 32 responses (response rate 57%); 7 participants did not complete entire survey

| Demographic Variable | <i>M</i> | <i>(SD)</i> | <i>n</i> | % |
|--|----------|-------------|----------|------|
| Age (years) | 47.04 | (9.66) | 25 | - |
| Range = 31-64 | | | - | - |
| Gender | | | 28 | - |
| Male | | | 1 | 3.6 |
| Female | | | 27 | 96.4 |
| Childbearing Age | | | 28 | - |
| Yes | | | 13 | 46.4 |
| No | | | 15 | 53.6 |
| Ethnicity | | | 27 | - |
| American Indian/Alaskan Native | | | 0 | 0 |
| Asian | | | 6 | 22.2 |
| Black/African American | | | 0 | 0 |
| Hispanic/Latino | | | 6 | 22.2 |
| Native Hawaiian | | | 0 | 0 |
| White | | | 14 | 51.9 |
| Two or More | | | 1 | 3.7 |
| Other | | | 0 | 0 |
| Years of Nursing Experience | 19.81 | (10.84) | 27 | - |
| Range = 5-42 | | | - | - |
| Years of Oncology Nursing Experience | 13.07 | (10.61) | 27 | - |
| Range = <1-42 | | | - | - |
| Years of Chemotherapy Handling Experience | 11.93 | (9.68) | 27 | - |
| Range = <1-38 | | | - | - |
| Member of Oncology Nursing Society (ONS) | | | 28 | - |
| Yes | | | 18 | 64.3 |
| No | | | 10 | 35.7 |

Results

| Demographic Variable | <i>M</i> | <i>(SD)</i> | <i>n</i> | % |
|--|----------|-------------|----------|------|
| Highest Level of Nursing Education | | | 28 | - |
| Diploma | | | 1 | 3.6 |
| Associate | | | 4 | 14.3 |
| Bachelor's | | | 18 | 64.3 |
| Master's | | | 5 | 17.9 |
| Doctorate | | | 0 | 0 |
| Specialty Certifications | | | 28 | - |
| Not Certified | | | 8 | 28.6 |
| Oncology Certified Nurse (OCN) | | | 16 | 57.1 |
| Advanced Oncology Certified Nurse (AOCN) | | | 0 | 0 |
| Advanced Oncology Certified Clinical Nurse Specialist (AOCNS) | | | 0 | 0 |
| Nurse Practitioner (NP) | | | 0 | 0 |
| Advanced Oncology Certified Nurse Practitioner (AOCNP) | | | 0 | 0 |
| Other | | | 4 | 14.3 |
| Number of patients you personally administer chemotherapy | 6.46 | (1.79) | 26 | - |
| Range = 4-11 | | | | |
| Average number of patients receiving chemotherapy in your workplace | 45.37 | (18.42) | 27 | - |
| Range = 5-70 | | | | |

Results

- Age and years of experience correlated with Interpersonal Influences and Organizational Influences
- Larger patient caseload correlated with Perceived Barriers & Conflict of Interest; negatively correlated with Organizational Influences

| Variable | Age | Nursing Experience | Oncology Experience | Chemotherapy Experience | Number of Pts Personally Administer Chemo | Number of Pts Receiving Chemo at Workplace |
|----------------------------------|--------|--------------------|---------------------|-------------------------|---|--|
| Perceived Barriers | -.199 | -.305 | -.183 | -.178 | .369 | .428* |
| Perceived Risks | -.143 | -1.61 | -.094 | -.129 | -.084 | .346 |
| Modeling | .284 | .412* | .247 | .306 | -.358 | -.347 |
| Norms | .552** | .617** | .435* | .412* | -.362 | -.295 |
| Conflict of Interest | -.362 | -.380 | -.216 | -.208 | .480* | .416* |
| Organizational Influences | .419* | .422* | .289 | .309 | -.418* | -.324 |

Note: Level of significance set at * $p < .05$, ** $p < .001$ (2-tailed). A Pearson r was used to determine the strength of the correlations between variables.

Results

- Descriptive statistics

PERCEIVED BARRIERS

- 55% (n=17) “PPE is uncomfortable to wear”
- 62% (n=19) “Others around me don’t use PPE”
- 71% (n=22) “PPE makes me feel too hot”

PERCEIVED RISKS

- 26% (n=8) “I am not worried about future negative health effects from chemotherapy exposure”

INTERPERSONAL INFLUENCES: MODELING & NORMS

- 52% (n=16) Believed coworkers did not wear proper PPE
- 48% (n=15) Believed coworkers did believe PPE was important

PERCEIVED CONFLICT OF INTEREST

- 34% (n=10) “wearing PPE makes my patient worry”
- 21% (n=6) “wearing PPE makes my patients feel uncomfortable”

Conclusion

- Nurse viewpoint: Beliefs and cultures of chemo administration

- Data from multi-site Infusion Center

- Oncology Infusion Nurses PPE use not adequate

- Safety of nurses, other ancillary staff, patient caregivers

- Knowledge gaps identified for nurses and patient

- Limitations: small and homogenous sample size

Implication for practice

Create more comfortable PPE

Set AC colder in work area

Manageable infusion nurse caseload

More supervisor/manager visual presence and verbal encouragement

More experience nurses to collaborate with organization and newer coworkers

Chemotherapy contaminants not visible in work area

Reinforced potential adverse health effects with infusion nurses

Reinforced with patient reason nurses need to wear PPE

Future research: interventional studies, investigate infusion nurse caseload, larger sample

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Questions?