

An Investigation on the applicability of game theory:

an analysis of the decision making process between patients and nurses in a hospice setting.

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Miyuki Matsubara, ph.D.,R.N.

Kure University, Faculty of Nursing



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Motivation of Research

- **There are multiple conflicts, dilemmas, and sources of distress.**





OVERVIEW

- QUESTION

How can we handle medical **DECISIONS** in a hospice?

- ANSWER

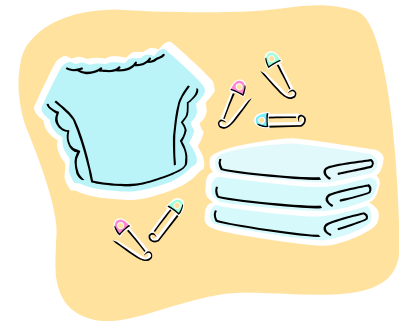
Between Patients and Nurses' Interactions we should be **STRATEGIC**, using **game theory**.

The purpose of my research

To analyze conflict situations between patients and nurses in a hospice setting .



For example
bathing service,
meal service,
and putting on diapers.





1. PURPOSE



2. METHODS

3. RESULTS

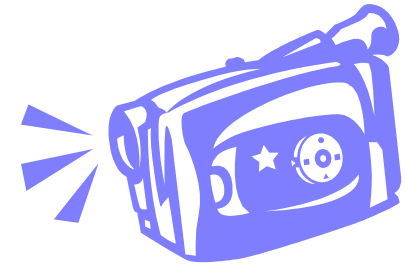
4. WHAT IS GAME THEORY?

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DATA



- Ethnographic research of actual nursing situations: a video tape recording of nursing situations formed part of this ethnographic data.
- To gain cooperation with the hospice, patients and families, permission was formally granted to do this research.





Analysis of the data

- Two people supervised the analysis of the data.
- Various typical situations well studied by game theory, such as the battle of the sexes, the game of chicken and the prisoners' dilemma game also described in the research.

Sample

(See table 1)



- The patient sample consisted of **4 patients** and **8 nurses** at a hospice in Hiroshima, Japan.
- **Patients** ranged in age from 60 to 70 years, one woman and three men.



(See table 2)



- **Nurses** ranged in age from 30s to late 50s.
- They were licensed nurses who wanted to do palliative care .



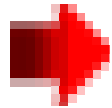
The data collection period

- From July to September in 2004.
- A videotape recording was carried out in the **patients' private rooms**.
- All patients knew their **disease name**, and they gave informed consent to their physicians about **non-recovery** from advanced cancer.



1. PURPOSE

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Analysis of 21 Situations

- To illustrate how the theory could be applied in nursing, we examined 21 situations analyzing decision making between patients and nurses in a hospice context.
- 21 situations were divided into **5 sub-groups**: checking vital signs, meals, bathing, diapers, and treatment.





Understanding Specific Conflicts

- People won't seek or want help from other people about going to the toilet, **even from nurses.**
- These conflicts are serious in a hospice which provides palliative care.



Two cases

- It is important in a hospice to understand these conflicts; in the case of a hospice the main priority is to make patients **as comfortable as possible in their last days.**

1. Bathing case

2. Catheter for urination case

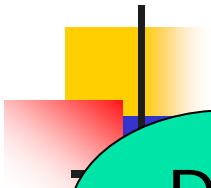
1. Nurse Z recommends a bath

Do other patients go to take a bath with nurse's help?
It is absurd to have to take a bath all time .



Mr. B, let's go to the bathroom, shall we?





Do other patients
go to take a bath
with assistance?



Nurse's actions had
encouraged him
to get ready for
a bath.



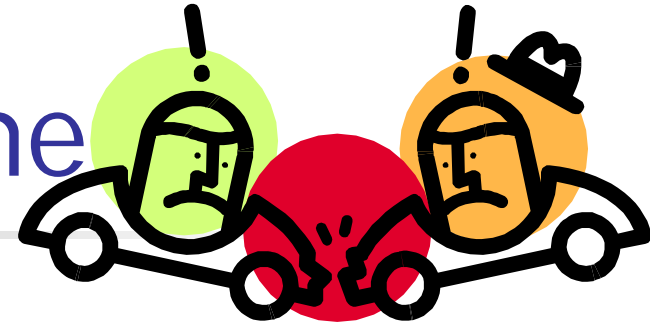


After conversation

- **Patient B** had a bath with assistance. In this situation, **Nurse Z** had strongly recommended it.
- **Patient B** wouldn't go to the bathroom, but because **Nurse Z** recommended to have a bath, he took her suggestion.



It's like Chicken Game



Two cars drive towards each other to see which one will swerve or turn first; that person is the “chicken”.

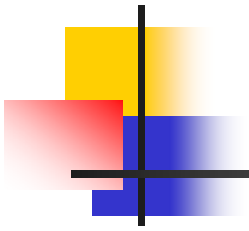
In this case the patient and nurse had **different goals**.



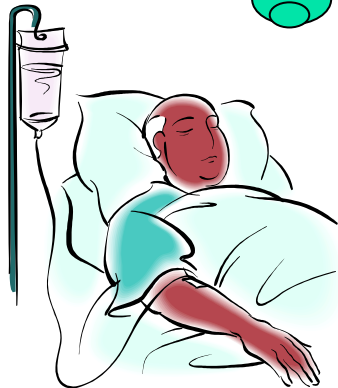
2. Nurse Y recommends a Catheter

- To illustrate how a nurse recommends a bladder insertion of catheter to **Patient B**, we analyzed the patient's interaction with **Nurse Y** in a hospice context.
- **Patient B** was continually incontinent and **Nurse Y** always had to change sheets and bed clothes.



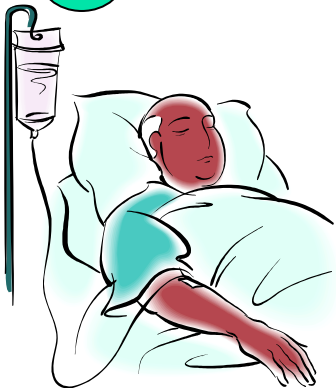


I refuse
your offer .




Mr. B, May I
talk with you
about . . . ?





I have in my mind a step by step process .



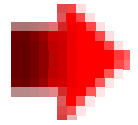
Is it all right if I insert of catheter?

I think it has already gotten to that stage.



After conversation

- Patient B was continually incontinent and Nurse Y always had to change sheets and bed clothes.
- In terms of game theory, the outcome was a lose-lose situation.



4. WHAT IS GAME THEORY?

- the actor is called a “**player**”.
- The player chooses one of the available strategies to **maximize their pay-offs**.
- Pay-offs show their **benefit** or the degree of **satisfaction**.
- The pay-off is dependent on the choice of the other players.



Pay-Off Matrix

Example

Strategy of Nurse

Strategy
of
patients

	C (cooperation)	D (non-cooperation)
C (cooperation)	(4, 4)	(0, 5)
D (non-cooperation)	(5, 0)	(1, 1)

$5 > 4 > 1 > 0$, Nash equilibrium and Parete optimality (1 , 1)

Strategy set for

Patient B and Nurse Y (S_P , S_N)

- Patient B's strategy choice Set =
{Catheter insertion, or non-insertion}

- Nurse Y's strategy choice Set =
{to recommend a catheter,
or not to recommend a catheter}

Table 3.

Catheter insertion and prisoners' dilemma pay-off matrix

Nurse Y's strategy

		Nurse Y's strategy	
		C' (not to recommend catheter)	D' (to recommend catheter)
Patient B's strategy	C (insertion catheter)	(9, 9)	(1, 10)
	D (non insertion)	(10, 1)	(2, 2)

$10 > 9 > 2 > 1$, Nash equilibrium and Pareto optimality (2 , 2)

Table 4. Outcomes of prisoners' dilemma game

		Nurse Y's strategy	
Patient B's strategy		C' (not to recommend catheter)	D' (to recommend catheter)
	C (insertion catheter)	(insertion catheter)	(insertion catheter)
	D (non insertion)	(non catheter)	(non catheter)



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Bathing and Catheter case

- No good resolution to the problem of the patient.
- Nurses can thereby develop what we might call strategic thinking.

Game theory is for helping
nurses analyze.



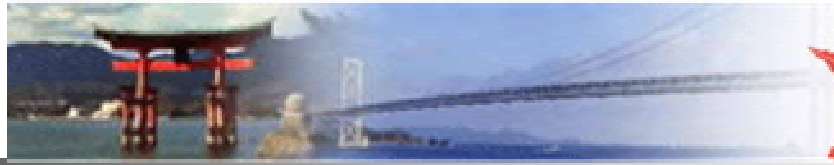
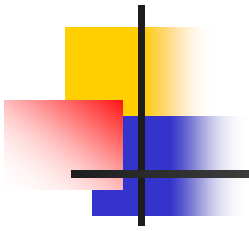
6. CONCLUSION

- Game theory can **help** nurses see the range of choices available.
- By having **a clear vision** of **the limits** of the game and the possible range of choices, nurses will then be in a **better** position to frame the choices when they present them to the patient.



The future plan

- Game theory will simply clarify the **logic** of the situation, thereby making communication more **effective and efficient**.
- The understanding of these kinds of dilemma from the point of view of game theory enables us to find **better solutions** with more favorable outcomes.



Thank you very much.

