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**EFFECT OF REFERENTIAL LEVEL OF HOSPITALS
ON THE MODEL OF DECISION MAKING IN NURSING**

**WPLYW STOPNIA REFERENCYJNEGO SZPITALI
NA MODEL PODEJMOWANIA DECYZJI PIELĘGNIARSKICH**

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S u m m a r y

Introduction. A review of nursing literature in Poland confirms that studies concerning decision making by nurses are scarce. Knowledge pertaining to decision making is of great importance in the preparation of future nurses for an independent and effective making of clinical decisions.

The objective of the presented study was identification of the models of decision making applied by charge nurses, and the investigation of the relationship between the referential level of the hospital and the model of decision making applied.

Material and method. The research instrument was the Finnish 56-item questionnaire form examining decision making by nurses. This questionnaire was translated and adjusted to Polish conditions, and its psychometric properties were confirmed concerning validity and reliability.

The study covered a group of 1631 charge nurses employed in 280 surgical and conservative treatment wards,

and intensive care units in 45 hospitals of three referential levels in the Regions of Lublin, Warsaw, and Krakow.

Results. Analysis of the data shows that nurses employed in hospitals of various referential levels apply four models of decision making: analytical, intuitive, analytical-intuitive, and intuitive-analytical. A statistically significant relationship was observed between the model of decision making and the referential level of hospital. The analytical-intuitive model was dominant in the hospitals in the study. The intuitive model was most frequently applied by nurses employed in hospitals of the third referential level, while the analytical model was most often used in hospitals of the third and second referential level.

Conclusions. Nurses employed in hospitals of various referential levels apply both analytical and intuitive models of decision making. The referential level of hospital is among the factors differentiating the decision making models.

S t r e s z c z e n i e

Wstęp. Przegląd piśmiennictwa pielęgniarskiego w Polsce dowodzi, że badanie podejmowania decyzji przez pielęgniarki jest ograniczona. Wiedza na temat podejmowania decyzji odgrywa zatem ogromne znaczenie w przygotowaniu przyszłej kadry pielęgniarskiej do samodzielnego i efektywnego podejmowania decyzji.

Celem niniejszych badań była identyfikacja modeli podejmowania decyzji stosowanych przez pielę-

niarki oraz zbadanie zależności między stopniem referencyjnym szpitala a stosowanym modelem podejmowania decyzji.

Materiał i metoda. Narzędzie badawcze stanowił fiński 56-punktowy kwestionariusz ankiety badający pielęgniarskie podejmowanie decyzji. Kwestionariusz ten został przetłumaczony i dostosowany do warunków polskich oraz potwierdzono jego własności psychometryczne co do trafności i rzetelności.

Badania przeprowadzono na grupie 1631 pielęgniarek odcinkowych pracujących na 280 oddziałach zabiegowych, zachowawczych i intensywnej terapii w 45 szpitalach o trzech poziomach referencyjnych w województwach: lubelskim, mazowieckim i małopolskim.

Wyniki. Z analizy danych wynika, że pielęgniarki pracujące w szpitalach o różnym stopniu referencyjności stosują cztery modele podejmowania decyzji: analityczny, intuicyjny, analityczno-intuicyjny i intuicyjno-analityczny. Stwierdzono istotną statystycznie zależność modelu podejmowania decyzji od stopnia referencyjnego szpitali.

Key words: decision making models, nursing, referential level of hospital

Słowa kluczowe: modele podejmowania decyzji, pielęgniarstwo, stopień referencyjny szpitala

INTRODUCTION

Decision making in nursing is a complex process with respect to processing information, critical judgement, and evaluation of evidence, with the use of proper knowledge, problem solving skills, and clinical evaluation of the state of a patient. The goal was the selection of the best direction of action possible, which would optimize patient's health and minimize possible harm [1]. Therefore, it is justifiable to investigate this process and recognize the strategies of decision making by nurses.

A review of Polish nursing literature confirms that the studies of nursing decision making are limited. In the literature there is a lack of study results pertaining to the theory of decision making in nursing, also, very little is known about the strategies of decision making by Polish nurses. The recognition of important factors which exert an effect on nursing decision making is the premise for the improvement of the process of decision making by nurses.

The majority of international studies concerning decision making in nursing refer to the theory of analytical judgement or information processing.

Pioneer studies of nursing decision making were conducted in 1976 by Aspinall. Based on the obtained results he stated that decision making in nursing takes the course following a certain systematic process in which decisions are obtained by analyzing a given situation [2]. Analytical decision making is described as a planned, conscious and logical process, containing a series of organized steps which may be indicated by the decision-maker. In the analytical model of decision making, a rational and logical action by the decision-maker is assumed. In this model, the decision-maker possesses complete information regarding the decision-making situation and possible decision-making variants [3].

Model analityczno-intuicyjny przeważał we wszystkich przebadanych szpitalach. Model intuicyjny był najczęściej charakterystyczny dla pielęgniarek pracujących w szpitalach o trzecim stopniu referencyjności. Model analityczny najczęściej stosowano w szpitalach o trzecim i drugim stopniu referencyjności.

Wnioski. Pielęgniarki pracujące w szpitalach o różnym stopniu referencyjności stosują zarówno analityczne jak i intuicyjne modele podejmowania decyzji. Jednym z czynników różnicujących modele podejmowania decyzji pielęgniarskich jest stopień referencyjny szpitala.

At present, in the majority of nursing reports, intuition is presented as a part of the decision making process. Girt suggests that intuition is a perception of possibilities, meanings and relationships by profound understanding [4, p.289]. Benner describes aspects of intuitive decision making as acting according to the pattern and acknowledgment of probability, common sense and differentiation of significant events [5].

Hedberg and Larsson found that nurses identified the patterns of management as elements of the process of decision making [6]. The recognition of patterns was often combined with intuitive judgement and perception [7]. This recognition occurred at the moment when a nurse compared the patient's symptoms and problems with the memorized patterns in order to adjust them to the appearing situation [8]. This capability developed together with the sense of importance and abilities to recognize characteristics specifying an individual clinical situation [9].

While reporting study findings, Polge suggested that decision making and clinical judgement are associated with an intellectual process, which possesses both a rational and intuitive component [10].

At present, a dominant approach in nursing decision making is the analytical-intuitive theory described by Hammond who does not approach analysis and intuition as two separate cognitive systems. He presents an idea of a cognitive continuum, where analysis and intuition are places at its extremes. According to this theory, cognition often occupies a middle position between analysis and intuition. This means that various problems may be solved by means of various cognitive processes, resulting in that the decision making process may, to a lesser or greater degree, be intuitive or analytical. In Hammond's theory, the number and character of the clues and

amount of information related with the recognized task are of great importance. The more structured the task, the more analytical the procedure. In a poorly structured task, decision making is more intuitive [11].

OBJECTIVE

The objective of the presented study is to provide answers to three problem questions:

1. What decision making models are applied by nurses in hospitals of various referential level?
2. Is there any relationship between the referential level of the hospital and the model of decision making by nurses?
3. Are there differences in the models of decision making at individual stages of the decision making process?

MATERIAL AND METHOD

The study was conducted during the period from August 2008 to February 2010, and covered 1631 charge nurses employed in hospitals of various referential levels. The hospitals selected for the study belonged to three groups: hospitals with the highest level of care were those of III referential level, and constituted a scientific-didactic basis of medical universities, regional hospitals of a mediocre - II referential level, and those of the lowest referential level I providing treatment within the scope of elementary domains of medicine. The studies were carried out in 45 hospitals in the Regions of Lublin, Warsaw and Krakow - in the Lublin Region: 8 hospitals of the I referential level (n=326), 5 hospitals of II referential level (n=168), and 2 hospitals of III referential level (n=117); in the Warsaw Region: 10 hospitals of I referential level (n=264), 9 hospitals of II referential level (n=349), and 4 hospitals of III referential level (n=203); in the Krakow Region: 7 hospitals of I referential level (n=113), hospitals of II referential level (n=58), and 1 hospital of I referential level (n=33).

In the study of decision making models, the method of a diagnostic survey was applied with the use of a questionnaire technique. The research tool was a standardized

questionnaire form: the 56- item Nursing Decision Making Instrument, developed by Lauri and Salanterä from Turku University in Finland, for the evaluation of decision making models.

In order to conduct studies concerning the decision making models applied by nurses, contact was made with the authors of the original Finnish research instrument (Lauri and Salanterä). After obtaining consent from the authors, a validation of the instrument, which covered linguistic adaptation and assessment of the basic psychometric parameters, was carried out.

STATISTICAL ANALYSIS

Statistical analyses were performed with the use of the statistical software STATISTICA® StatSoft® Version 8.0.

In order to detect the significant decision making models an analysis was performed with the use of neuronal-fuzzy logic networks. The relationship between the model of decision making and the referential level of a hospital was verified by means of chi-square test and ANOVA, with repeated measurements, where the main independent variable was the stage of decision making, and between-subject variable – the referential level of the hospital. This analysis was a basis for performing further statistical analyses of the differences. Duncan test was performed as a post-hoc test method when ANOVA $p < 0.05$.

RESULTS

Based on the results of the studies it was found that the nurses employed in hospitals of various referential

Table I. *Relationship between the model of decision making and referential level of hospitals*

Tabela I. *Zależność modelu podejmowania decyzji od stopnia referencyjności szpitali*

No. Lp.	Model of decision making Model podejmowania decyzji	Referential level of hospital Stopień referencyjny szpitala						Total Razem
		I ^o		II ^o		III ^o		
		N	%	N	%	N	%	
1.	Intuitive Intuicyjny	46	6.54	32	5.57	26	7.37	104
2.	Analytical Analityczny	76	10.81	92	16.00	62	17.56	230
3.	Intuitive-Analytical Intuicyjno -analityczny	147	20.91	87	15.13	69	19.55	303
4.	Analytical-Intuitive Analityczno - intuicyjny	434	61.74	364	63.30	196	55.52	994
5.	Total Ogółem	703	100	575	100	353	100	1,631

Chi²=19.249; p=0.0038*

levels applied four models of decision making, i.e. analytical, analytical intuitive, intuitive-analytical, and intuitive.

The referential model of a hospital had a significant effect ($p=0.0038$) on the model of decision making applied by the nurses in the study (Table I).

Table II. *Stage of collecting information, and analytical and intuitive models vs. hospitals of various referential levels*

Tabela II. *Etap zbierania informacji i model analityczny i intuicyjny a szpitale o różnym stopniu referencyjności*

No. Lp.	Referential level Poziom referencyjny	Stage Etap (Model)	{1}	{2}	{3}	{4}	{5}	{6}
			$\bar{X}=3.9545$	$\bar{X}=4.0366$	$\bar{X}=3.8954$	$\bar{X}=3.9454$	$\bar{X}=3.8022$	$\bar{X}=3.9394$
1	I ^e	Collection of information (Analytical) Zbieranie informacji (Analityczny)		0.000261	0.238612	0.800076	0.001714	0.695007
2	I ^e	Collection of information (Intuitive) Zbieranie informacji (Intuityjny)	0.000261		0.000185	0.055770	0.000004	0.048337
3	II ^e	Collection of information (Analytical) Zbieranie informacji (Analityczny)	0.238612	0.000185		0.033725	0.039423	0.217089
4	II ^e	Collection of information (Intuitive) Zbieranie informacji (Intuityjny)	0.800076	0.055770	0.033725		0.000119	0.894730
5	III ^e	Collection of information (Analytical) Zbieranie informacji (Analityczny)	0.001714	0.000004	0.039423	0.000119		0.000011
6	III ^e	Collection of information (Intuitive) Zbieranie informacji (Intuityjny)	0.695007	0.048337	0.217089	0.894730	0.000011	

$F(2.1628)=3.30$, $p=0.0373^*$

It was found that in all the hospitals examined, the analytical-intuitive model dominated. It may be presumed that the intuitive model was most frequently used in hospitals of III referential level (7.37%). The analytical model was more often used in hospitals of III referential level (17.56%), followed by those of II referential level (15.31%). The mixed model – intuitive-analytical – was most frequently applied in hospitals of I referential level (20.91%), whereas the analytical-intuitive model was characteristic of hospitals of II (63.3%), and I referential level (61.74%).

The subsequent stage of analysis was investigation of the decision making models at individual stages of the decision making process.

Based on the results of tests performed, it was noted that the referential level of a hospital exerted a significant differentiating effect (F ; $2.1628=3.30$, $p=0.0373$) on the model of decision making at the *stage of collecting information*. The intuitive model of decision making significantly dominated statistically in all hospitals at the decision making stage examined ($p<0.001$). The analytical model ($\bar{X}=3.80$) was statistically most rarely applied in hospitals of the III referential level (Table II).

It was also observed that that the highest mean values for the analytical and intuitive models were noted in hospitals of I referential level ($\bar{X}=3.95$, $\bar{X}=4.05$), whereas the lowest – in hospitals of III referential level ($\bar{X}=3.80$, $\bar{X}=3.93$). However, the presented differences were insignificant statistically (Table II).

A statistically significant relationship was also observed between the referential level of a hospital and model of decision making at the *stage of information processing* ($p=0.005$).

Based on the results of the analysis performed, it was found that in all hospitals, at the stage of *information processing*, the analytical model of decision making was significantly dominant statistically ($p<0.001$) (Table III). The intuitive model ($\bar{X}=3.82$) in hospitals of I reference level was significantly more often applied statistically ($p<0.05$) than in hospitals of III referential level, where $\bar{X}=3.70$ (Table III).

Table III. *Stage of processing information and analytical and intuitive models vs. hospitals with various referential levels*

Tabela III. *Etap przetwarzania informacji i model analityczny i intuicyjny a szpitale o różnym stopniu referencyjności*

No. Lp.	Referential level Poziom referencyjny	Stage Etap (Model)	{1}	{2}	{3}	{4}	{5}	{6}
			$\bar{X}=4.0430$	$\bar{X}=3.8225$	$\bar{X}=3.9981$	$\bar{X}=3.7823$	$\bar{X}=4.0195$	$\bar{X}=3.7054$
1	I ^e	Information processing (Analytical) Przetwarzanie informacji (Analityczny)		0.000003	0.354873	0.000004	0.605276	0.000004
2	I ^e	Information processing (Intuitive) Przetwarzanie informacji (Intuityjny)	0.000003		0.000010	0.375971	0.000011	0.013529
3	II ^e	Information processing (Analytical) Przetwarzanie informacji (Analityczny)	0.354873	0.000010		0.000011	0.636790	0.000003
4	II ^e	Information processing (Intuitive) Przetwarzanie informacji (Intuityjny)	0.000004	0.375971	0.000011		0.000003	0.090539
5	III ^e	Information processing (Analytical) Przetwarzanie informacji (Analityczny)	0.605276	0.000011	0.636790	0.000003		0.000004
6	III ^e	Information processing (Intuitive) Przetwarzanie informacji (Intuityjny)	0.000004	0.013529	0.000003	0.090539	0.000004	

$F(2.1628)=5.31$; $p=0.005^*$

It was also noted that in hospitals of I referential level, the analytical model ($\bar{X}=4.04$) and intuitive model ($\bar{X}=3.82$) were characterized by the highest mean values, compared to the remaining hospitals. The intuitive model was most rarely used in hospitals with III referential level ($\bar{X}=3.71$), while the analytical model showed the lowest mean values in hospitals of II referential level ($\bar{X}=4.00$). However, the differences observed were statistically insignificant (Table III).

A statistically significant relationship was also noted between the referential level of a hospital and the decision making model at the *stage of planning* ($F(2.1628)=5.50$, $p=0.004163$). Similar to the stage of information processing, also at the stage of planning, in

all hospitals in the study the analytical model of decision making was significantly dominant statistically ($p < 0.001$) (Table IV). The intuitive model was significantly most often applied statistically in hospitals of I referential level at the stage examined (Table IV).

Table IV. *Stage of planning and analytical and intuitive models vs. hospitals of various referential levels*

Tabela IV. *Etap planowania i model analityczny i intuicyjny a szpitale o różnym stopniu referencyjności*

No. Lp.	Referential level Poziom referencyjny	Stage Etap (Model)	{1}	{2}	{3}	{4}	{5}	{6}
			$\bar{x}=4.0664$	$\bar{x}=3.6316$	$\bar{x}=4.0504$	$\bar{x}=3.5389$	$\bar{x}=4.0142$	$\bar{x}=3.4610$
1	I ^o	Planning (Analytical) Planowanie (Analityczny)		0.000003	0.727471	0.000004	0.284951	0.000004
2	I ^o	Planning (Intuitive) Planowanie (Intuicyjny)	0.000003		0.000011	0.042864	0.000009	0.000291
3	II ^o	Planning (Analytical) Planowanie (Analityczny)	0.727471	0.000011		0.000003	0.427997	0.000004
4	II ^o	Planning (Intuitive) Planowanie (Intuicyjny)	0.000004	0.042864	0.000003		0.000011	0.088828
5	III ^o	Planning (Analytical) Planowanie (Analityczny)	0.284951	0.000009	0.427997	0.000011		0.000003
6	III ^o	Planning (Intuitive) Planowanie (Intuicyjny)	0.000004	0.000291	0.000004	0.088828	0.000003	

$F(2,1628)=5.50; p=0.005^*$

In hospitals of I reference level, the analytical model ($\bar{X}=4.07$) and intuitive model ($\bar{X}=3.63$) were most frequently applied, compared to the remaining hospitals. The analytical model ($\bar{X}=4.01$) and intuitive model ($\bar{X}=3.46$) were most rarely used in hospitals of III referential level (Figure 1); however, no statistically significant relationships were noted ($p > 0.05$).

A statistically significant relationship was observed between the decision making model and the referential level of a hospital at the *stage of implementation of nursing, and monitoring and evaluation* ($p=0.002$). In all the hospitals in the study, the analytical model was significantly more often used statistically than the intuitive model ($p < 0.05$) (Table V).

No statistically significant differences were found in the frequency of application of analytical and intuitive models in the hospitals in the study at the stage of implementation of nursing, and monitoring and evaluation ($p > 0.05$).

DISCUSSION

Decision making is a complex process in everyday nursing practice. Riley stated that decision making is an essential element in

work of a nurse because the decision concerning a patient is closely related with the goals of this patient's care. Therefore, the skills of making clinical decisions are very important in nursing practice [12], and the knowledge concerning decision making is very important. Understanding the way nurses make decisions is an indispensable precondition for the development of effective decision making by nurses.

The presented study, conducted in Poland for the first time, allowed the determination of decision making models applied by nurses if the referential level of a hospital exerts an effect of the decision making models used.

Analysis of the results of this study showed that charge nurses

Table V. *Stage of implementation of nursing, monitoring and evaluation, and analytical and intuitive models vs. hospitals of various referential levels*

Tabela V. *Etap wprowadzania pielęgnowania, monitorowania i oceny i model analityczny i intuicyjny a szpitale o różnym stopniu referencyjności*

No. Lp.	Referential level Poziom referencyjny	Stage Etap (Model)	{1}	{2}	{3}	{4}	{5}	{6}
			$\bar{x}=4.0311$	$\bar{x}=3.9390$	$\bar{x}=4.0583$	$\bar{x}=3.9001$	$\bar{x}=4.0019$	$\bar{x}=3.9531$
1	I ^o	Implementation of nursing, and monitoring and evaluation (Analytical) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Analityczny)		0.000018	0.522100	0.000213	0.492489	0.025893
2	I ^o	Implementation of nursing, and monitoring and evaluation (Intuitive) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Intuicyjny)	0.000018		0.000830	0.359867	0.074817	0.741509
3	II ^o	Implementation of nursing, and monitoring and evaluation (Analytical) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Analityczny)	0.522100	0.000830		0.000004	0.212849	0.002972
4	II ^o	Implementation of nursing, and monitoring and evaluation (Intuitive) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Intuicyjny)	0.000213	0.359867	0.000004		0.004153	0.242597
5	III ^o	Implementation of nursing, and monitoring and evaluation (Analytical) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Analityczny)	0.492489	0.074817	0.212849	0.004153		0.017965
6	III ^o	Implementation of nursing, and monitoring and evaluation (Intuitive) Wprowadzanie do pielęgnowania oraz monitorowanie i ocena (Intuicyjny)	0.025893	0.741509	0.002972	0.242597	0.017965	

$F(2,1628)=6.70; p=0.002^*$

employed in hospitals of various referential levels used four main models of decision making, i.e. analytical-intuitive, intuitive-analytical, analytical and intuitive.

A significant relationship was found between the model of decision making and referential level of a hospital. It was observed that analytical-intuitive model dominated in all hospitals in the study. The intuitive model was most frequently used by nurses employed in hospitals of III referential level. The analytical model was most often applied in hospitals of III and II referential levels. The intuitive-analytical model most often occurred in hospitals of I referential level, whereas the analytical-intuitive model – in hospitals of II referential level.

In each group of hospitals, a statistically significant scheme of the model was observed. In all hospitals in the study, the intuitive model of decision making was most frequently used at the stage of collecting information, while the analytical model prevailed at the stage of implementation and evaluation of nursing, information processing and planning. It was observed that at the stage of collecting information the analytical model was significantly most often applied statistically in hospitals of I referential level, followed by hospitals of II and III referential levels. Similar differences were noted in the case of the intuitive model at the stage of information processing and planning.

The reasons for the occurrence of the differences should be sought for in the scope of medical care provided, typical of individual referential levels of hospitals. Hospitals of I referential level provide care within elementary medical specialties; however, this care becomes more precise with an increase in the referential level of a hospital. In hospitals of III referential level, highly specialist procedures prevail and, in consequence, the complexity of nursing care and decision making increase. This is an important factor which may affect the decision making model applied.

According to Hammond, the more structured the task requiring a large amount of hardly available information, the greater the probability that the nurse would use the intuitive model of decision making. Nevertheless, the tasks which are known to the decision maker and require easily available data, where it is greatly possible to foresee the effects of the decision, will be solved in an analytical way [13].

The selection of the model applied may also be associated with the specificity of work in a given hospital, scope of the tasks assigned, as well as the

requirements in the area of nurses' knowledge and skills, which increase with the referential level of hospital.

Bucknall, in her studies, confirmed the significant effect of the referential levels of hospitals on the way of making decisions in nursing [14]. Australian researchers also emphasized the effect of the graduation of care on making nursing decisions [15]. Some researchers indicate that the classification of the levels of care is of great importance for the quality of the decisions made [16].

Considering the results obtained, it may be presumed that the way of making decisions is conditioned by the scope of authority, skills and knowledge of nurses typical of individual referential levels of hospitals.

Decision making is commonly accepted as an integral part of nursing practice. The prevailing opinion was that the way of making decisions in clinical situations is the same. Analysis of the results of the presented study shows that nurses employed in hospitals of various referential levels use various models of decision making.

CONCLUSIONS

1. Nurses working in hospitals of various referential levels use four models of decision making.
2. Decision making models differ at individual stages of the decision making process, according to the referential level of hospital.
3. A statistically significant relationship is observed between the model of decision making applied and the referential level of a hospital.

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