Research on Care of Postoperative Patient based on Rough Sets Theory

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ABSTRACT
In this paper, the rough set theory is used to deal with the relations between patient's temperature, oxygen saturation, blood pressure and decision ADM-DECS in care of postoperative patients, we select 28 postoperative patients as a sample, take ADM-DECS as a decision attribute and take patient's temperature, oxygen saturation, blood pressure as condition attributes. We are based on rough-set theory to research importance of condition attributes with respective to decision attribute and strength of condition attributes supporting decision attribute. Results of this research will be helpful for nurses to raise quality of care.

Keywords
rough set; importance; strength; blood pressure

1. INTRODUCTION
In order to extract useful information hidden in the sea of data, many methods in addition to classical logic have been proposed. Rough set theory, which was proposed by Z. Pawlak in 1982[5], plays an important role in applications of these methods. Their significance has been demonstrated by many successful applications in pattern recognition and artificial intelligence[1][3][5][7][9][10][12]. An important application of rough set theory is to induce decision rules that indicate the decision class of an object based on its values on some condition attributes [6][8].

The data obtained from the clinical diagnosis and care contain a large amount of information. The algorithm which uses the data mining technique, especially the technique based on the rough set theory, can be trained through the training data set and can be applied to determine the state of an illness with a very high accuracy[2][4][11]. In this paper we use rough sets theory to deal with the relations between patient's temperature, oxygen saturation, blood pressure and decision ADM-DECS, to research what is the most important in care of postoperative patients, then find what nurses should focus on in nursing. For this purpose, we selected 28 postoperative patients from a hospital at random as a sample and recorded their internal temperature, oxygen saturation, lase measurement of blood pressure, stability of core temperature and stability of blood pressure as the following table.

Table 1: Postoperative Patient Data

PATIENT	CORE	O_2	BP	CORE STBL	BP STBL	ADM DECS
No1	mid	excel	mid	stable	stable	A
No2	mid	excel	high	stable	modsta.	S
No3	high	excel	high	stable	stable	A
No4	mid	good	high	stable	modsta.	S
No5	mid	excel	high	stable	stable	A
No6	high	good	mid	stable	unstable	S
No7	mid	excel	high	stable	stable	A
No8	high	excel	mid	unstable	modsta.	S
No9	mid	good	mid	stable	modsta.	S
No10	high	excel	mid	stable	stable	A
No11	mid	good	mid	stable	stable	A
No12	mid	good	high	stable	modsta.	S
No13	high	excel	high	stable	unstable	A
No14	mid	good	mid	stable	modsta.	A
No15	mid	good	high	unstable	modsta.	S
No16	high	excel	high	stable	unstable	A
No17	low	good	high	stable	stable	A
No18	mid	good	low	stable	stable	A
No19	mid	good	mid	stable	unstable	A
No20	mid	good	mid	modsta.	modsta.	S
No21	low	good	mid	stable	stable	A
No22	low	excel	high	stable	unstable	A
No23	mid	good	mid	stable	unstable	A
No24	low	good	high	stable	stable	A
No25	high	good	mid	stable	modsta.	A
No26	high	good	low	stable	modsta.	A
No27	high	good	mid	unstable	unstable	I
No28	mid	good	mid	stable	unstable	I

Where "CORE" denotes patient's internal temperature in C: high(> 37), mid(≥ 36 and ≤ 37), low(< 36).
"O_2" denotes oxygen saturation in %: excel.(excellent)(≥ 98), good (≥ 90 and < 98), fair (≥ 80 and < 90), poor (< 80).
"BP" denotes last measurement of blood pressure: high(>130/90), mid(≥ 130/90 and ≥ 90/70), low(< 90/70).
"CORE-STBL" denotes stability of patient's internal temperature: stable, modstab.(mod-stable), unstable.
"BP-STBL" denotes stability of patient's blood pressure: stable, modstab.(mod-stable), unstable.
ADM-DECS: I(patient set to Intensive Care Unit), S(patient prepared to go home), A(patient sent to general hospital floor).

2. PRELIMINARIES

In this section, we recall some basic concepts from rough set theory[5][6][7][8].

Definition 1: $S=(U,A,V,f)$ is called an information system.

(1) *U*, a nonempty finite set, is called the universe of discourse.

(2) $A=C\bigcup D$ is a finite set of attributes, where *C* and *D* are disjoint nonempty sets of condition attributes and decision attributes respectively.

(3) $f:U\times A\rightarrow V$ is an information function.

(4) $V=\bigcup\{V_\alpha:\alpha\in A\}$, where $V_\alpha=\{f(u,\alpha):u\in U\}$.

If we distinguish in the information system two disjoint classes of attributes, called condition and decision attributes, respectively, then system will be called a decision table and will be denoted by *S* = (*U, C, D*), where *C* and *D* are disjoint sets of condition and decision attributes, respectively, and $C\bigcup D=A$. Columns of a decision table are labeled by elements of *A*, rows of a decision table are labeled by elements of *U*.

Definition 2: Let $S=(U,C\bigcup D,V,f)$ be an information system.

(1) For $a\in C\bigcup D$, we define an equivalence relation ~ on *U* as follows:

$$u_i\sim u_j\Leftrightarrow f(u_i,a)=f(u_j,a).$$

U/a denotes the family consisting of all equivalence classes with respect to ~. Notation $[u]$ denotes the equivalence class with respect to ~ containing $u\in U$.

(2) For $B\subset C\bigcup D,\bigcap\{U/b:b\in B\}$ is a partition of *U,* which is denoted U/B. The equivalence relation induced by U/B is also denoted by *B*.

Definition 3: Let *R* be an equivalence relation on an universe *U* of discourse, and $X\subset U$.

Put $\underline{R}(X)=\bigcup\{[u]\,|\,[u]\in U/R,[u]\subset X\}$.

$\underline{R}(X)$ is called lower approximation of X.

Definition 4: Let *R* be a family of equivalence relations on *U* and $R^0\subset R$. Let *Q* be an equivalence relation on *U*.

(1) Put $pos_R(Q)=\bigcup\{\underline{R}(X):X\in U/Q\}$. $pos_R(Q)$ is called positive region of *Q* with respect to *R*.

(2) Put $\gamma_R(Q)=\frac{|\,pos_R(Q)\,|}{|\,U\,|}$ is called dependable degree of *Q* with respect to *R*. where $|\,U\,|$ denotes the cardinal of *U*.

(3) Put $\sigma_{RQ}(R')=\gamma_R(Q)-\gamma_{R-R'}(Q)$. $\sigma_{RQ}(R')$ is called importance of R' with respect to *Q*.

Definition 5: For information system $S=(U,C\bigcup D)$, let $W\subset U$ and $c\subset C$.

(1) Put $S_c(W)=\bigcup\{[u]:[u]\in U/c\text{ and }[u]\subset W\}$. $S_c(W)$ is called a support subset of *W* with respect to condition attribute c.

(2) Put $spt_c(W)=\frac{|\,S_c(W)\,|}{U}$ is called the support degree of *W* with respect to condition attribute c.

(3) Put $S_c(d)=\bigcup\{S_c(W):W\in U/d\}$. $S_c(d)$ is called a support subset of decision attribute *d* with respect to condition attribute c.

Theorem 1: Let *S* = (*U, C S D*) be an information system, $c\in C$ and $D=\{d\}$. Then the following hold.

(1) $S_c(d)=S_c(W_1)\bigcup S_c(W_2)\bigcup S_c(W_3)$.

(2) $S_c(W_i)\bigcap S_c(W_j)=\phi$ for all $i,j=1,2,3$ and $i\neq j$.

(3) $spt_c(d)=spt_c(W_1)\bigcup spt_c(W_2)\bigcup spt_c(W_3)$.

3. ROUGH SET MODEL AND DECISION TABLE

In this section, we establish a rough set model of Postoperative Patient Data for our investigation, which is expressed by the following decision table. we transform Table 1 into a decision table(Table 2) of our rough set model.

Table 2: Decision Table

U	c_1	c_2	c_3	c_4	c_5	d
u_1	c_{21}	c_{12}	c_{23}	c_{14}	c_{15}	d_3
u_2	c_{21}	c_{12}	c_{13}	c_{14}	c_{25}	d_2
u_3	c_{11}	c_{12}	c_{13}	c_{14}	c_{15}	d_3
u_4	c_{21}	c_{22}	c_{13}	c_{14}	c_{25}	d_2
u_5	c_{21}	c_{12}	c_{13}	c_{14}	c_{15}	d_3
u_6	c_{11}	c_{22}	c_{23}	c_{14}	c_{35}	d_2
u_7	c_{21}	c_{12}	c_{13}	c_{14}	c_{15}	d_3
u_8	c_{11}	c_{12}	c_{23}	c_{34}	c_{25}	d_2
u_9	c_{21}	c_{22}	c_{23}	c_{14}	c_{25}	d_2
u_{10}	c_{11}	c_{12}	c_{23}	c_{14}	c_{15}	d_3
u_{11}	c_{21}	c_{22}	c_{23}	c_{14}	c_{15}	d_3
u_{12}	c_{21}	c_{22}	c_{13}	c_{14}	c_{25}	d_2
u_{13}	c_{11}	c_{12}	c_{13}	c_{14}	c_{35}	d_3
u_{14}	c_{21}	c_{22}	c_{23}	c_{14}	c_{25}	d_3
u_{15}	c_{21}	c_{22}	c_{13}	c_{34}	c_{25}	d_2
u_{16}	c_{11}	c_{12}	c_{13}	c_{14}	c_{35}	d_3
u_{17}	c_{31}	c_{22}	c_{13}	c_{14}	c_{15}	d_3
u_{18}	c_{21}	c_{22}	c_{33}	c_{14}	c_{15}	d_3
u_{19}	c_{21}	c_{22}	c_{23}	c_{14}	c_{35}	d_3
u_{20}	c_{21}	c_{22}	c_{23}	c_{24}	c_{25}	d_2
u_{21}	c_{31}	c_{22}	c_{23}	c_{14}	c_{15}	d_3
u_{22}	c_{31}	c_{12}	c_{13}	c_{14}	c_{35}	d_3
u_{23}	c_{21}	c_{22}	c_{23}	c_{14}	c_{35}	d_3
u_{24}	c_{31}	c_{22}	c_{13}	c_{14}	c_{15}	d_3
u_{25}	c_{11}	c_{22}	c_{23}	c_{14}	c_{25}	d_3
u_{26}	c_{11}	c_{22}	c_{33}	c_{14}	c_{25}	d_3
u_{27}	c_{11}	c_{22}	c_{23}	c_{34}	c_{35}	d_1
u_{28}	c_{21}	c_{22}	c_{23}	c_{14}	c_{35}	d_1

where c_1, c_2, c_3, c_4, c_5 are five condition attributes in the information system, c_1, c_2, c_3, c_4, c_5 denote patient's internal temperature, oxygen saturation, last measurement of blood pressure, stability of core temperature and stability of blood pressure. *d* is the decision attribute, d denotes decision ADM-DECS.

Remark 1: (1) c_{11} indicates patient's internal temperature more than 37, c_{21} indicates patient's internal temperature between 36 and 37, c_{31}indicates patient's internal temperature lower than 36.

(2) c_{12} indicates patient's oxygen saturation more than 98%, c_{22} indicates patient's internal temperature between 90% and 98%, c_{32} indicates patient's internal temperature between 80% and 90%, c_{42} indicates patient's internal

temperature lower than 80%.

(3) c_{13} indicates patient's last measurement of blood pressure more than 130/90, c_{23} indicates patient's last measurement of blood pressure between 130/90 and 90/70, c_{33} indicates patient's internal temperature lower than 90/70.

(4) c_{14} indicates that patient's core temperature is stable, c_{24} indicates that patient's core temperature is mod-stable, c_{34} indicates that patient's core temperature is unstable.

(5) c_{15} indicates that patient's blood pressure is stable, c_{25} indicates that patient's blood pressure is mod-stable, c_{35} indicates that patient's blood pressure is unstable.

Remark 2: d_1 indicates that patient is sent to Intensive Care Unit, d_2 indicates that patient prepare to go home, $d_3$indicates that patient is sent to general hospital floor.

Let $U=\{u_1,u_2,\dots,u_{28}\}, C=\{c_1,c_2,c_3,c_4,c_5\}, D=\{d\}$, $S=\{U,C\bigcup D\}$ is a decision table of an information system. Some related partitions of *U* and related rough sets are following.

3.1 Related partitions of U

By some simple calculating, we have the following related partitions of *U*.

(1) $U/c_1=\{\{u_3,u_6,u_8,u_{10},u_{13},u_{16},u_{25},u_{26},u_{27}\},\{u_1,u_2,u_4,u_5,u_7,u_9,u_{11},u_{12},u_{14},u_{18},u_{19},u_{20},u_{23},u_{28}\},\{u_{17},u_{21},u_{22},u_{24}\}\}$.

(2) $U/c_2=\{\{u_1,u_2,u_3,u_5,u_7,u_8,u_{10},u_{13},u_{16},u_{27}\},\{u_4,u_6,u_9,u_{11},u_{12},u_{14},u_{15},u_{17},u_{18},u_{19},u_{20},u_{23},u_{24},u_{25},u_{26},u_{27},u_{28}\}\}$.

(3) $U/c_3=\{\{u_2,u_3,u_4,u_5,u_7,u_{12},u_{13},u_{15},u_{16},u_{22},u_{24}\},\{u_1,u_6,u_8,u_9,u_{10},u_{11},u_{14},u_{19},u_{20},u_{21},u_{23},u_{25},u_{27},u_{28}\},\{u_{18},u_{26}\}\}$.

(4) $U/c_4=\{\{u_1,u_2,u_3,u_4,u_5,u_6,u_7,u_9,u_{10},u_{11},u_{12},u_{13},u_{14},u_{16},u_{17},u_{18},u_{19},u_{21},u_{22},u_{23},u_{24},u_{25},u_{26},u_{28}\},\{u_8,u_{15},u_{27}\}\}$.

(5) $U/c_5=\{\{u_1,u_3,u_5,u_7,u_{10},u_{11},u_{17},u_{18},u_{21},u_{24}\},\{u_2,u_4,u_8,u_9,u_{12},u_{14},u_{15},u_{20},u_{25},u_{26}\},\{u_6,u_{13},u_{16},u_{19},u_{22},u_{23},u_{27},u_{28}\}\}$.

(6) $U/C=\{\{u_1\},\{u_2\},\{u_3\},\{u_4,u_{12}\},\{u_5,u_7\},\{u_6\},\{u_8\},\{u_9,u_{14}\},\{u_{10}\},\{u_{11}\},\{u_{13},u_{16}\},\{u_{15}\},\{u_{17},u_{24}\},\{u_{18}\},\{u_{19},u_{23},u_{28}\},\{u_{20}\},\{u_{21}\},\{u_{22}\},\{u_{25}\},\{u_{26}\}$.

(7) $U/D=\{\{u_{27},u_{28}\},\{u_2,u_6,u_4,u_8,u_9,u_{12},u_{15},u_{20}\ \{u_1,u_3,u_5,u_7,u_{10},u_{11},u_{13},u_{14},u_{16},u_{17},u_{18},u_{19},u_{21},u_{22},u_{23},u_{24},u_{25},u_{26}\}\}$.

(8) $U/(C-\{c_1\})=\{\{u_1,u_{10}\},\{u_2\},\{u_3,u_5,u_7\},\{u_4\},\{u_6,u_{19},u_{23},u_{28}\},\{u_8\},\{u_9,u_{14},u_{25}\},\{u_{11},u_{21}\},\{u_{12}\},\{u_{13}\ u_{16},u_{22}\},\{u_{15}\},\{u_{17},u_{24}\},\{u_{18}\},\{u_{20}\},\{u_{26}\},\{u_{27}\}\}$.

(9) $U/(C-\{c_2\})=\{\{u_1,u_{11}\},\{u_2,u_4,u_{12}\},\{u_3\},\{u_5,u_7\},\{u_6\},\{u_8\},\{u_9,u_{14}\},\{u_{10}\},\{u_{13},u_{16}\},\{u_{15}\},\{u_{17},u_{24}\},\{u_{18}\},\{u_{19},u_{23},u_{28}\},\{u_{20}\},\{u_{21}\},\{u_{22}\},\{u_{25}\},\{u_{26}\},\{u_{27}\}\}$.

(10) $U/(C-\{c_3\})=\{\{u_1,u_5,u_7\},\{u_2\},\{u_3,u_{10}\},\{u_4,u_9,u_{12},u_{14}\},\{u_6\},\{u_8\},\{u_{11},u_{18}\},\{u_{13},u_{16}\},\{u_{15}\},\{u_{17},u_{21},u_{24}\},\{u_{19},u_{23},u_{28}\},\{u_{20}\},\{u_{22}\},\{u_{25}\},\{u_{26}\},\{u_{27}\}\}$.

(11) $U/(C-\{c_4\})=\{\{u_1\},\{u_2\},\{u_3\},\{u_4,u_{12},u_{15}\},\{u_5,u_7\},\{u_6,u_{19},u_{27}\},\{u_8\},\{u_9,u_{14},u_{20}\},\{u_{10}\},\{u_{11}\},\{u_{13},u_{16}\},\{u_{17},u_{24}\},\{u_{18}\},\{u_{19},u_{23},u_{28}\},\{u_{21}\},\{u_{22}\},\{u_{25}\},\{u_{26}\}\}$.

(12) $U/(C-\{c_5\})=\{\{u_1\},\{u_2,u_5,u_7\},\{u_3,u_{13},u_{16}\},\{u_4,u_{12}\},\{u_6\},\{u_8\},\{u_9\},\{u_{10}\},\{u_{11},u_{14},u_{19},u_{23},u_{28}\},\{u_{15}\},\{u_{17},u_{24}\},\{u_{18}\},\{u_{20}\},\{u_{21}\},\{u_{22}\},\{u_{25}\},\{u_{26}\},\{u_{27}\}\}$.

3.2 Related rough sets of U

By Definition 3, we have the following positive regions by some simple calculating.

(1) $pos_C(D)=\{u_1,u_2,u_3,u_4,u_5,u_6,u_7,u_8,u_{10},u_{11},u_{12},u_{13},u_{15},u_{16},u_{17},u_{18},u_{20},u_{21},u_{22},u_{24},u_{25},u_{26},u_{27}\}$.

(2) $pos_{C-\{c_1\}}(D)=\{u_1,u_2,u_3,u_4,u_5,u_7,u_8,u_{10},u_{11},u_{12},u_{13},u_{15},u_{16},u_{17},u_{18},u_{20},u_{21},u_{22},u_{24},u_{26},u_{27}\}$.

(3) $pos_{C-\{c_2\}}(D)=\{u_1,u_2,u_3,u_4,u_5,u_6,u_7,u_8,u_{10},u_{11},u_{12},u_{13},u_{15},u_{16},u_{17},u_{20},u_{21},u_{22},u_{24},u_{25},u_{26},u_{27}\}$.

(4) $pos_{C-\{c_3\}}(D)=\{u_1,u_2,u_3,u_5,u_6,u_7,u_8,u_{10},u_{11},u_{13},u_{15},u_{16},u_{17},u_{18},u_{20},u_{21},u_{22},u_{24},u_{25},u_{26},u_{27}\}$.

(5) $pos_{C-\{c_4\}}(D)=\{u_1,u_2,u_3,u_4,u_5,u_7,u_8,u_{10},u_{11},u_{12},u_{13},u_{15},u_{16},u_{17},u_{18},u_{21},u_{22},u_{24},u_{25},u_{26}\}$.

(6) $pos_{C-\{c_5\}}(D)=\{u_1,u_3,u_4,u_6,u_8,u_9,u_{10},u_{12},u_{13},u_{15},u_{16},u_{17},u_{18},u_{20},u_{21},u_{22},u_{24},u_{25},u_{26},u_{27}\}$.

4. IMPORTANCE AND SUPPORT DEGREES

For an information system $S=(U,C\bigcup D)$, let $c\in C$. Put

$$\sigma_{CD}(\{c\})=\gamma_C(D)-\gamma_{C-\{c\}}(D).$$

According to Z. Pawlak rough-set theory, $\sigma_{CD}(\{c\})$ is the importance of condition attribute *c* with respect to decision attribute *d*. By Definition 5 and some simple calculating, we have the following proposition .

Proposition 1: The following hold.

(1) $\gamma_C(D)=\dfrac{|pos_C(D)|}{|U|}=0.82$.

(2) $\gamma_{C-\{c_1\}}(D)=\dfrac{|pos_{C-\{c_1\}}(D)|}{|U|}=0.75$.

(3) $\gamma_{C-\{c_2\}}(D)=\dfrac{|pos_{C-\{c_2\}}(D)|}{|U|}=0.79$.

(4) $\gamma_{C-\{c_3\}}(D)=\dfrac{|pos_{C-\{c_3\}}(D)|}{|U|}=0.75$.

(5) $\gamma_{C-\{c_4\}}(D) = \frac{|pos_{C-\{c_4\}}(D)|}{|U|} = 0.71$.

(6) $\gamma_{C-\{c_5\}}(D) = \frac{|pos_{C-\{c_5\}}(D)|}{|U|} = 0.71$.

By Proposition 1, we have the following proposition, which gives the importance of condition attribute *C* with respect to decision attribute *d*.

Proposition 2: The following hold.

(1) $\sigma_{CD}(\{c_1\}) = \gamma_C(D) - \gamma_{C-\{c_1\}}(D) = 0.07$.

(2) $\sigma_{CD}(\{c_2\}) = \gamma_C(D) - \gamma_{C-\{c_2\}}(D) = 0.03$.

(3) $\sigma_{CD}(\{c_3\}) = \gamma_C(D) - \gamma_{C-\{c_3\}}(D) = 0.07$.

(4) $\sigma_{CD}(\{c_4\}) = \gamma_C(D) - \gamma_{C-\{c_4\}}(D) = 0.11$.

(5) $\sigma_{CD}(\{c_5\}) = \gamma_C(D) - \gamma_{C-\{c_5\}}(D) = 0.11$.

For an information system $S = (U, C \bigcup D)$, let $c \in C$. Put $spt_c(d) = \frac{|S_c(d)|}{|U|}$. According to rough-set theory, $spt_c(d)$ reflects the strength of condition attribute $c \in C$ supporting decision attribute *d*.

Let $W_1 = \{u_{27}, u_{28}\}, W_2 = \{u_2, u_6, u_7, u_8, u_9, u_{10}, u_{15}, u_{20}\}, W_3 = \{u_1, u_3, u_4, u_5, u_{11}, u_{12}, u_{13}, u_{14}, u_{16}, u_{17}, u_{18}, u_{19}, u_{21}, u_{22}, u_{23}, u_{24}, u_{25}, u_{26}\}$. Then $U/D = \{W_1, W_2, W_3\}$.

By Definition 5 and some simple calculating, we have the following support sets.

Proposition 3: The following hold.

(1) $S_{c_1}(W_1) = \phi, S_{c_1}(W_2) = \phi, S_{c_1}(W_3) = \{u_{17}, u_{21}, u_{22}, u_{24}\}$.

(2) $S_{c2}(W_1) = \phi, S_{c_2}(W_2) = \phi, S_{c_2}(W_3) = \phi$.

(3) $S_{c_3}(W_1) = \phi, S_{c_3}(W_2) = \phi, S_{c_3}(W_3) = \{u_{18}, u_{26}\}$.

(4) $S_{c_4}(W_1) = \phi, S_{c_4}(W_2) = \{u_{20}\}, S_{c_4}(W_3) = \phi$.

(5) $S_{c_5}(W_1) = \phi, S_{c_5}(W_2) = \phi, S_{c_5}(W_3) = \{u_1, u_3, u_5, u_7, u_{10}, u_{11}, u_{17}, u_{18}, u_{21}, u_{24}\}$.

By Definition 5 and Proposition 3, we have the following proposition.

Proposition 4: The following hold.

(1) $spt_{c_1}(W_1) = 0, spt_{c_1}(W_2) = 0, spt_{c_1}(W_3) = 0.14.$

(2) $spt_{c_2}(W_1) = 0, spt_{c_2}(W_2) = 0, spt_{c_2}(W_3) = 0.$

(3) $spt_{c_3}(W_1) = 0, spt_{c_3}(W_2) = 0, spt_{c_3}(W_3) = 0.07.$

(4) $spt_{c_4}(W_1) = 0, spt_{c_4}(W_2) = 0.04, spt_{c_4}(W_3) = 0.$

(5) $spt_{c_5}(W_1) = 0, spt_{c_5}(W_2) = 0, spt_{c_5}(W_3) = 0.36.$

From Proposition 4, we get the strength of condition attribute *C* supporting decision attribute *d*.

Proposition 5: The following hold.

(1) $spt_{c_1}(D) = spt_{c_1}(W_1) + spt_{c_1}(W_2) + spt_{c_1}(W_3) = 0.14.$

(2) $spt_{c_2}(D) = spt_{c_2}(W_1) + spt_{c_2}(W_2) + spt_{c_2}(W_3) = 0$.

(3) $spt_{c_3}(D) = spt_{c_3}(W_1) + spt_{c_3}(W_2) + spt_{c_3}(W_3) = 0.07.$

(4) $spt_{c_4}(D) = spt_{c_4}(W_1) + spt_{c_4}(W_2) + spt_{c_4}(W_3) = 0.04.$

(5) $spt_{c_5}(D) = spt_{c_5}(W_1) + spt_{c_5}(W_2) + spt_{c_5}(W_3) = 0.36.$

5. CONCLUSION

By Proposition 2, we have the following conclusions.

(1) Stability of patient's core temperature and Stability of patient's blood pressure to ADM-DECS have the same importance(the importance is 0.20), which are more important than others.

(2) Importance of patient's internal temperature and last measurement of blood pressure to ADM-DECS are equal(the importance is 0.07), which are more than importance of oxygen saturation.

So nurses must pay more attention to the stability of patient's blood pressure and stability of patient's blood pressure in care of postoperative patient.

By Proposition 5, we have the following conclusions. (1) The strength of stability of blood pressure is maximal(the strength is 0.36).

(2) The strength of patient's internal temperature is less than the strength of stability of blood pressure is maximal(the strength(the strength is 0.14) and more than the strength of last measurement of blood pressure(the strength is 0.07).

(3) The strengths of oxygen saturation and stability of core temperature are 0.

Hence nurses make further focus on the stability of patient's blood pressure in care of postoperative patient.

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