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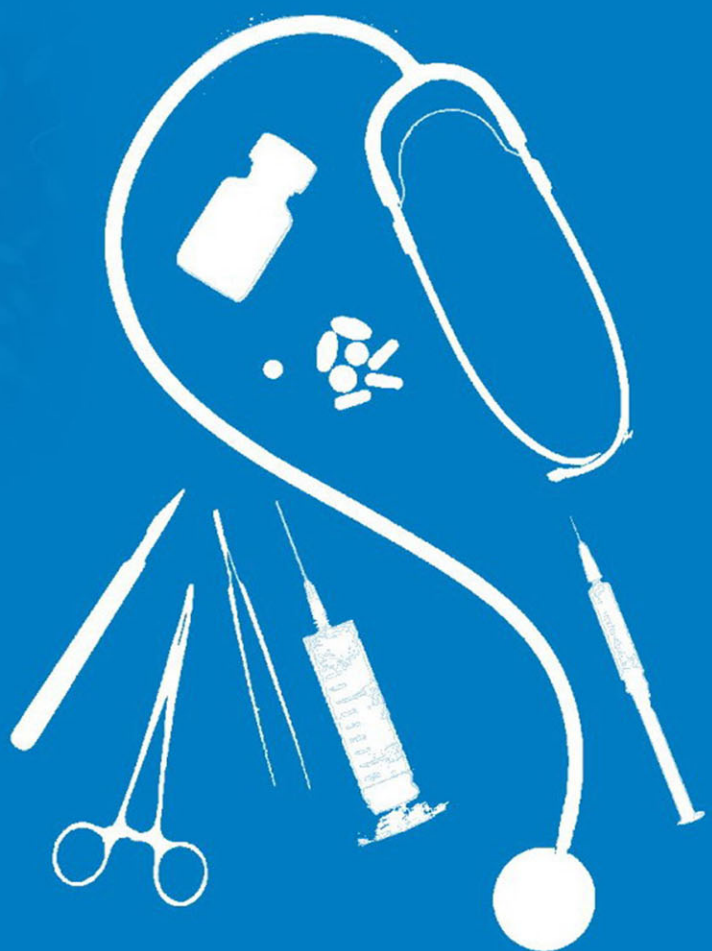

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New Technology of Forming of Jejuno-Mesenterial Free Flap

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Abstract: Original method of forming combine free flap included 2 segments: proximal segment of jejunum and part of mesenterium is developed by authors. Three jejunal branches – 3rd, 4th, 5th – are used. Formation of this flap component is carried out by reducing resection of the removed intestinal segment. Optimal parameters of flap were definite with topographic-anatomical studies. Clinical experience includes 14 pre-treated patients with head and neck cancer. All of them had huge defects of soft tissues of neck and oro-pharyngo-esophageal zone. Jejunal segment of flap was used for reconstruction of pharynx. Soft tissues of neck were recreated with mesenterial segment. Necrosis of flap, salivary fistula and complications of abdominal wall and cavity were not observed. The only one hematoma and one pneumonia were recorded. Autoflap allows restoring anatomy and function of proximal part of digestive tract in condition of the deficit of soft tissue of neck.

Key words: Jejuno-mesenterial free flap, pharynx, reconstruction.

1. Introduction

Using of the jejuno-mesenterial free flap (JMFF) for patients with head and neck cancer enables to solve many important tasks of oropharyngeal reconstruction for a long time [1-5]. Availability and technical simplicity of the flap formation and a minimal number of postoperative complications contributed to a wide-spread method application [6-11]. However, despite the reasonable demand for this flap, indications for pharyngoplasty in oncologic patients were clearly limited by the defect of neck soft tissues and exposures of great vessels. Getting over technical difficulties, the surgeon is encouraged to look for an additional plastic material. Attempts to mobilize the available neck external tissues, exposed to X-ray therapy, and to compare tissue edges with various degrees of tension generally result in compression of the vascular pedicle flap and its necrosis as well as in trophic disturbances occurred in the recipient wound. Formation of second flaps and their transfer to the neck area leads to the increasing number of postoperative complications and additional operative traumas in the donor area (chest wall, limbs, abdominal wall, etc.). In our opinion, it is possible to develop pharyngoplasty further using transplants that consist a fragment of mucosae and an isolated autologous patch within one vascular system [12, 13]. Current publications showed us absence technical details and anthropometrical parameters of preparing of flap.

2. Materials and Methods

We develop original combine free flap, included 2 segments: proximal segment of jejunum and part of mesenterium. It means that not one as usual but three vessels – 3rd, 4th and 5th jejunal branches – are used (Fig. 1). For free flap revascularization, only 4th arcade artery and vein are used. Due to stability of vascular interactions with the pedicle, the 3rd and 5th vessels are included in the flap system for blood supply of the mesenteric fragment. Formation of this flap component is carried out by reducing resection of the removed intestinal segment (Fig. 1).

Topographic-anatomical studies of 10 human post mortal organic complexes showed that the volume of

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intestinal fragment reduction in its proximal and distal parts should not be less than 15-20 cm from both sides. Thus, with the required length of intestinal fragment 10 cm, total extension of intestinal reduction should not less than 40-50 cm. Otherwise; mesenteric fragment area may be insufficient for neck tissue isolation. With significant defects of neck soft tissues, the area of mesenteric fragment formation should be reasonably increased by increasing reduced resection of the small intestine.

During the analysis of the JMFF parameters, no geometric dependence of the intestinal reduction, length and width of the mesenteric fragment, length of the formed flap fragment in the intestine or its vascular pedicle was observed (Fig. 1). This can be explained by a specific mesenteric anatomy – folding of its edges at intestinal binding sites. Due to this, the small intestine forms loops and increases its own length with no harm exposed to blood supply. A significant number of inflow and forming branches of intestinal arteries and veins are located in multiple mesenteric folds. Available observation results did not reveal compliance between the length of the mesenteric fragment and intestinal reduction. It is only obvious that the more intensive the small intestine is reduced, the longer mesenteric fragment is observed. The width of the mesenteric fragment is mainly determined by the length of vascular pedicle and extension of its collateral interactions to the adjacent arcade vessels (Fig. 1).

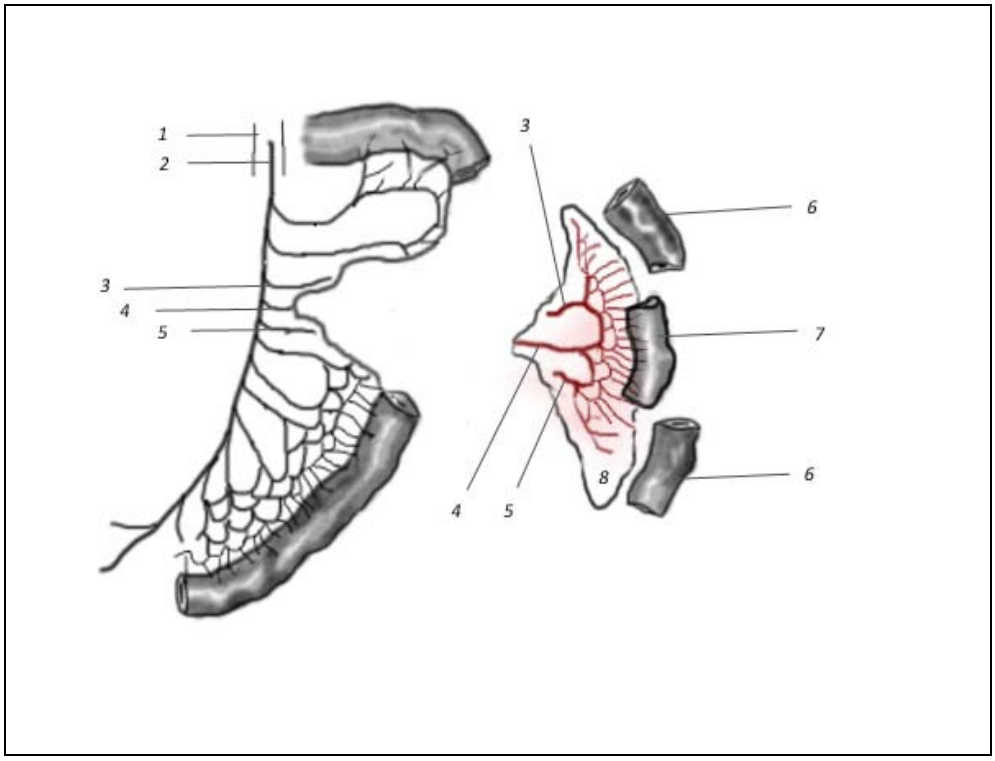

Fig. 1 Shaping circuit of jejuno-mesenterial free flap. 1: aorta, 2: superior mesenteric a., 3: 3rd jejunal branch, 4: 4th jejunal branch, 5: 5th jejunal branch, 6: reducible segment of jejunum, 7: jejunum segment of flap, 8: mesenterial segment of flap.

In total, 14 patients who underwent surgery using this method (Table 1) were of able-to-work age – on average 55 years. In all cases, larynx and laryngopharynx were completely removed. In 5 cases, oropharynx walls were also removed (root of tongue, lateral and/or posterior walls of oropharynx). Additionally to laryngopharynx, cervical esophagus was resected in 3 patients.

Due to the prevalence of the tumor and clinical course prognosis, 9 patients experienced pharyngoplasty with the resected stage, 5 patients' experienced delayed pharyngoplasty (Table 1).

Contradictions to pharyngoplasty were low-differentiated tumors, large two-sided lesions of neck or mediastinal lymph nodes as well as distant metastases. When the relapsing tumor was removed, reconstructive operations were performed in a delayed manner.

Lack of neck soft tissues was observed in all postoperative patients (Table 2). During operative therapy, all patients experienced interventions on neck lymph nodes. However, in most cases these interventions were both-sided.

A cicatricle process was known to complicate the choice for the source of JMFF revascularization as well as determination of optimal surgical access to the neck. A typical clinical sign was an additional X-ray or chemotherapy (Table 2). Thus, during preoperative stage, a significant number of our patients experienced X-ray therapy. Approximately a half of all postoperative patients received various chemotherapy schemes.

Table 1 General characteristics of postoperative patients.

Defects	Total number of postoperative patients		Prevalence of tumor (TNM)							
	Men/women	Age	One-stage operation				Delayed reconstruction			
			T1-T2	T3-T4 N0	T3-T4 N+	Relapse	T1-T2	T3-T4 N0	T3-T4 N+	Relapse
Laryngopharynx + oropharynx	5/0	55.2	-	-	3	-	-	-	1	1
Laryngopharynx	5/1		-	2	3	-	-	1	-	-
Laryngopharynx + Cervical esophagus	3/0		-	-	1	-	-	-	2	-
Total	13/1	-	9				5			

Table 2 Estimation of the current status of general surgery of patients.

Defect extension in mucosae	Total number of postoperative patients	Characteristics of clinical observations			
		Neck lymphadenectomy		X-ray therapy	Chemo-therapy
		One- sided	Both-sided		
Laryngopharynx + oropharynx	5	1	4	4	2
Laryngopharynx	6	1	5	4	2
Laryngopharynx + cervical esophagus	3	-	3	3	1
Total	14	14		11	5

In all cases, a video endoscopic method was used. Paraumbilical access was enough to form a free flap and intestinal anastomosis.

There is a clinical case of delayed pharyngoplasty carried out under the proposed method.

Man, 54 years old. Diagnosis: Laryngeal carcinoma, stage I T1N0M0. Endolaryngeal resection and radiotherapy 66 Gy. Relapse in September 2008. Urgent tracheostomy on March 10th 2009. Laryngectomy with resection of hypopharynx and 4th rings of trachea. Thyroidectomy, wide lymph nodes dissection in right side. Reconstruction of soft tissue of neck with pectoral major flap. Orostomy, esophagostomy on March 26th 2009. Lymph nodes dissection in left side on April 30th 2009. Follow-up 6 months – no relapse. There is strong fibrosis on the soft tissue of the neck (Fig. 2). The tongue is moved. Extension of defect is 8 cm.

On October 1, 2009 the patient experienced a delayed microsurgical pharyngoplasty with JMFF. The flap is formed due to developed technology with video endoscopic technique (Fig. 3). Mesenterial fragment area is 40.0 × 7.0 cm, jejunal fragment length is 15 cm and length of the vascular pedicle is 7 cm. Volume of reduction of jejunum is 70.0 cm. Microvascular anastomoses are formed end-by-end between 4th jejunal

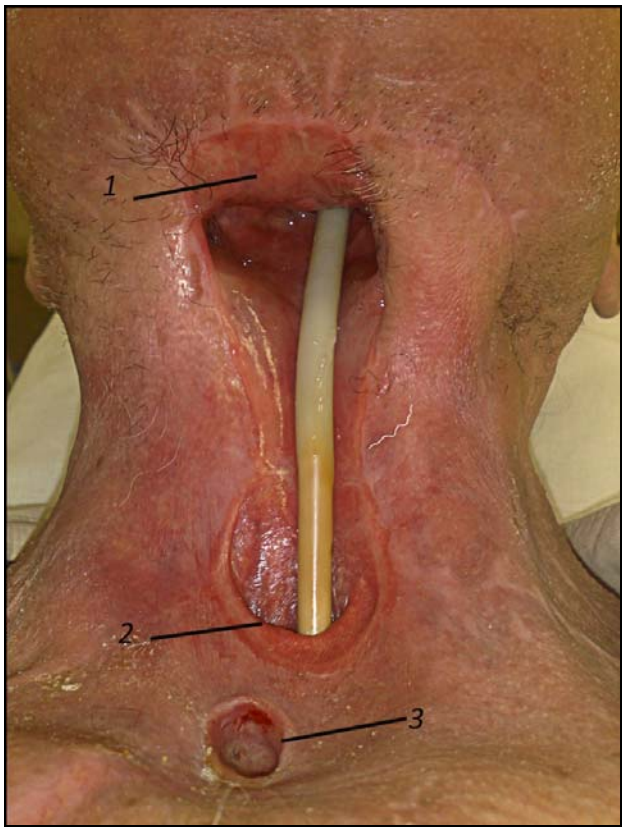

Fig. 2 Patient before pharyngoplasty. Great fibrosis of soft tissue of the neck. 1: root of tongue, 2: low edge of mucosa of pharyngostoma, 3: tracheostoma.

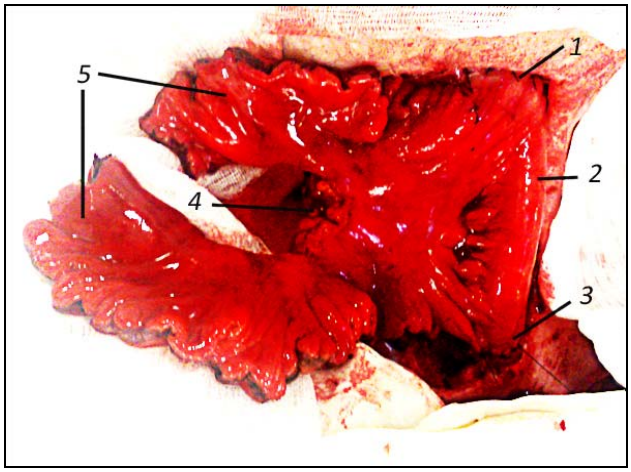

Fig. 3 Operative wound with jejuno-mesenterial free flap after pharyngoplasty. 1: suture's line of oro-jejunal anastomosis, 2: jejunal segment of flap, 3: suture's line of jejuno-esophageal anastomosis, 4: zone of microsurgical anastomoses, 5: mesenterial segment of flap.

vein and the right facial vein as well as 4th jejunal artery and the right upper thyroid artery. Blood circulation is started. The jejunal segment recover hypopharynx, while the mesenterial fragment isolates suture lines of organ and vascular anastomoses, and recover soft tissue contours of the neck. Skin is partially recovered with a free split-thickness flap. No adverse event was observed, and complete restoration of feeding in 14 days (Fig. 4). On March 1, 2010 voice prosthesis is implanted between trachea and jejunal segment of flap. Voice rehabilitation is completed (Fig. 5).

There is no relapse In 12 month after pharyngoplasty (Fig. 6). Body weight gain is 9 kg.

3. Results

In all cases, we succeed to get a required volume of the mesenterial fragment of the flap to solve essential neck problems. The jejunal fragment, lines of organ's anastomoses and vessels were securely isolated with it.

Table 3 shows clinical parameters obtained during anthropometric measurements of the JMFF that was formed using the developed technologies. Obviously, anatomic characteristics of the transplant are quite stable and eligible for its application as a plastic material in

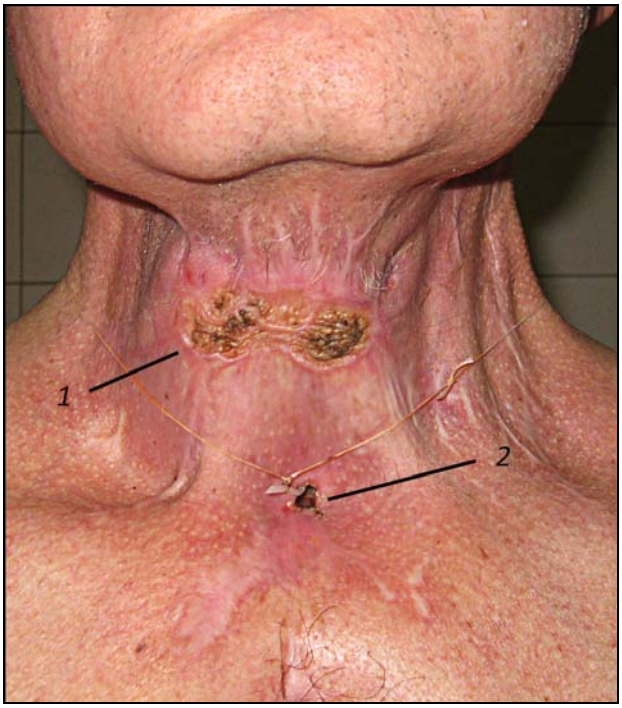

Fig. 4 Patient after microsurgical pharyngoplasty with JMFF. Form of the neck is recreated. 1: scars in the area of free split-thickness skin's flap, 2: tracheostoma.

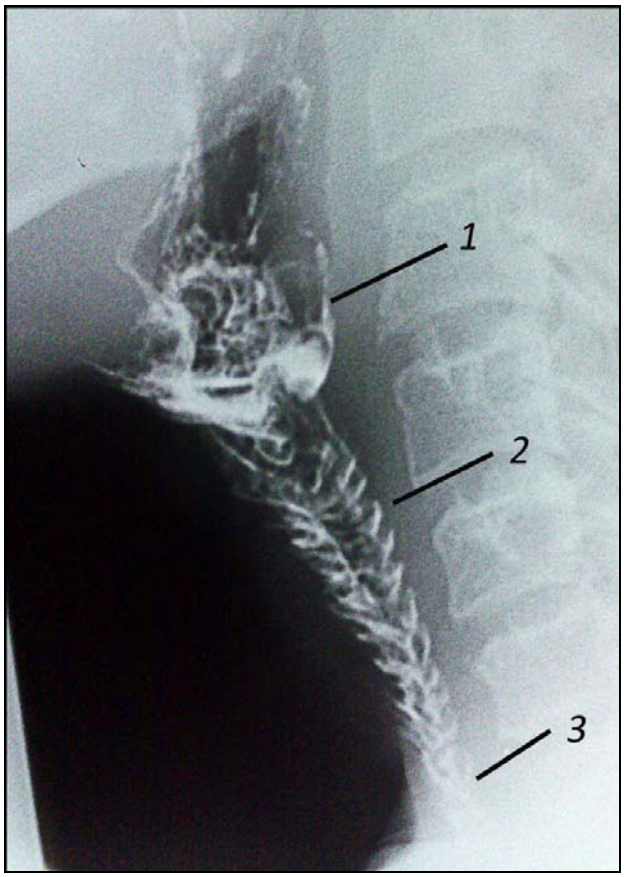

Fig. 5 Passage of barium into neopharynx (14th day after operation). 1: zone of oro-jejunal anastomosis, 2: filling of jejunal segment of flap, 3: zone of jejuno-esophageal anastomosis.

pharyngoplasty in case of lacking local plastic material of neck. Dimensions of the mesenteric fragment 300-450 cm^2 are enough to isolate the flap with organ and vascular anastomoses.

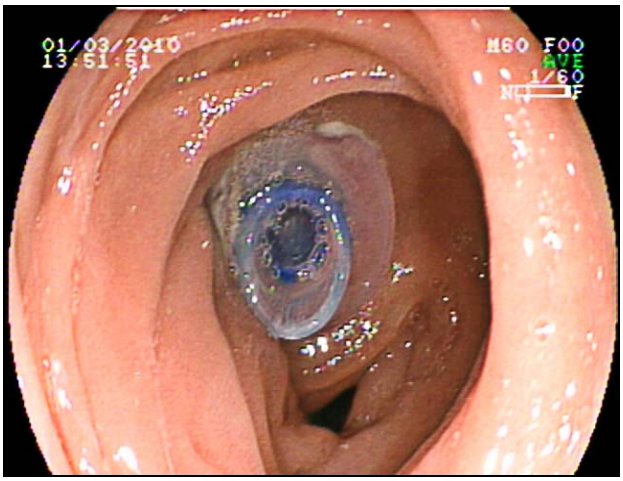

Fig. 6 Endovideoscopic view of jejunal segment of flap with voice prosthesis.

Results of our investigations showed that jejunal fragment dimensions differed due to the extension of pharyngeal defects and was about 8 to 18 cm. The length of the vascular pedicle remained unchanged. It is important to note that optimal dimensions of the flap in our observations were as follows–vascular pedicle length about 8 cm, mesenteric fragment area (35-40) × (7-10) cm, intestinal fragment length 10-15 cm. Optimal intestinal reduction was about 50 to 90 cm (Table 3).

No ischemic or necrotic events in transplanted tissues were observed (Fig. 7). No line lacking for organ anastomoses on the neck or abdominal cavity was noted. During one examination against a marked incoagulability, a hematoma on the neck was seen and

Table 3 Clinical parameters of jejuno-mesenterial free flap.

Size of JMFF	Total number of patients	Parameters of JMFF								
		Total length of jejunum segment (cm)						Length of mesenterial fragment (cm)		
		Jejunal reduction			Length of jejunal fragment					
		30.0	30.1-50.0	50.1-90	8.0-10.0	10.1-15.0	15.1-18.0	30.0-35.0	35.1-40.0	40.1-45.0
Small	3	2	1	-	3	-	-	3	-	-
Medium	7	-	5	2	1	5	1	-	6	1
Large	4	-	-	4	-	1	3	-	-	4
Total	14	2	6	6	4	6	4	3	6	5
		14			14			14		

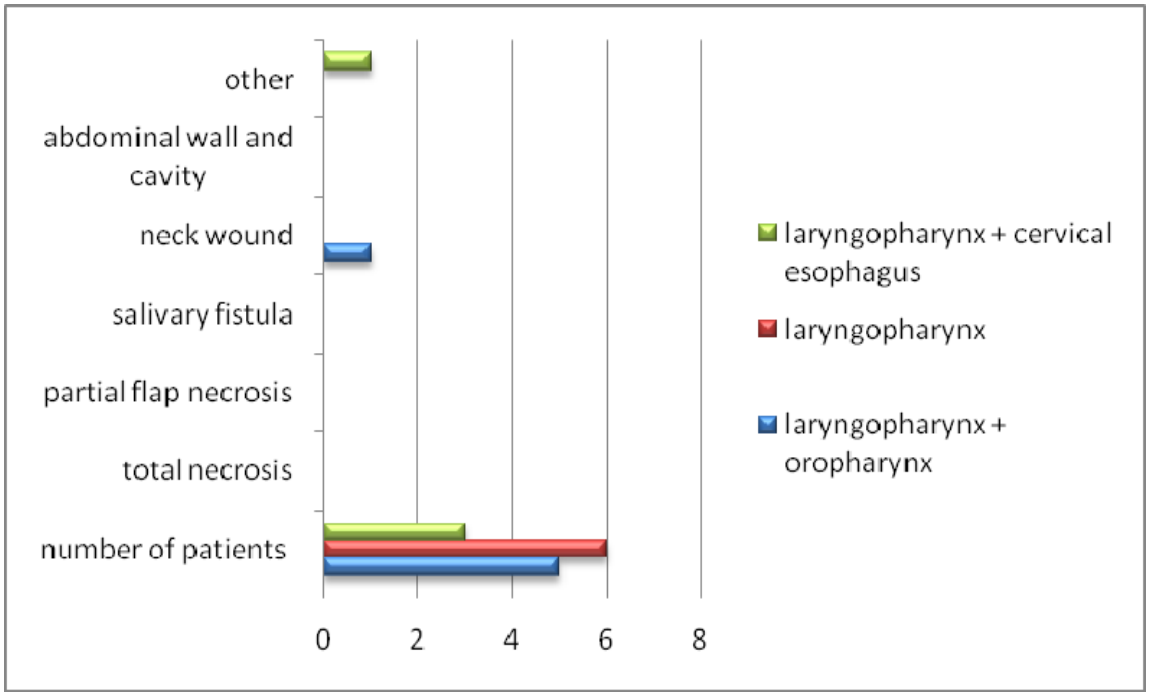

Fig. 7 Characteristics of the postoperative period after pharyngoplasty with a jejuno-mesenterial free flap.

drained. This hematoma was not of clinical significance during the postoperative period. Pneumonia was observed in one patient and resolved at its early stage. No other complications were reported.

Feeding was restored in 13 patients in 14 days after the operation. In one patient with absents muscles of the mouth floor feeding was restored in two months due to impairing of bolus movement and the mechanism of its formation. Prosthetic devices for vocal cords were implanted in 4 patients in various time periods after pharyngoplasty. All the patients demonstrated good results of vocal rehabilitation.

Based on the analysis of quality of life of patients who underwent surgery, it can be concluded that in all cases questionnaires showed patients' satisfaction of the operations performed. No complaints related to food intake, swallowing and digestion, no signs of dyspepsia and other events were observed.

4. Discussion

Our clinical practice gained experience in pharyngoplasty with circular defects of proximal parts of digestive tract in 450 patients. Analysis of the obtained results demonstrates reasonable advantages of visceral free flaps using for this purpose. We have a great experience in application of various mucosae-containing flaps in 152 patients with the only defects of hypopharynx: gastro-omental-72, colon-omental-56, jejunal fragments-10, jejuno-mesenterial-14. We claim that visceral flaps have some advantages from tectorial flaps. Autoflaps, contains additional isolated material except mucosae is the most important. The idea of isolation of anatomical zones of neck with the help of fascial structures defines and realizes by the nature. The principle under consideration may be used to reconstruct the organs of proximal part of digestive tract in patients with head and neck cancer. Mesenterial fragment of JMFF gives a possibility to implement it, because mesenterium has similar features with omentum. Due to the absence of chemical aggression and equal diameters of pharynx/cervical esophagus with jejunal fragment JMFF is more preferable than other visceral flaps.

As for the level of formation of the flap it's necessary to emphasize the pluralism of views in this problem. In our opinion the ileac level of donor's area

is more intricate and less reliable than JMFF. Multiple types of the vessels of mesenterium of the ileum [14-16] to a certain extent exaggerates the technic of formation of the flap [17]. The vascular system of JMFF is simple. Due to this fact it's useful.

No clinical signs of digestive disorders and disease progression were observed in all cases.

5. Conclusions

(1) Jejuno-mesenterial free flap has a constant vessels system

(2) The stability of angioarchitecture gives an opportunity to form a flap as provided by individual parameters such as: size, configuration and proportion of jejunal and mesenterial fragments.

(3) Autoflap allows to restore anatomy and function of proximal part of digestive tract in condition of the deficit of soft tissue of neck.

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Gender Difference of the Effects of Medical Therapy for Smoking Cessation: The Experience of Health Promotion Program at a Teaching Hospital in Taiwan

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Abstract: Background: The aim of this study is to assess whether there were gender difference in the effects of medical therapy for smoking cessation according to the hospital-based study in Taipei, Taiwan. **Methods:** A nationwide tobacco control practice was conducted in 2002 by Bureau of Health Promotion, Department of Health Taiwan. We studied one of the smoking cessation units in this health promotion program. All the participants were visited at outpatient department (OPD) and further evaluated by a structured questionnaire included personal information, disease history, dependence on nicotine, and outcome evaluation. To evaluate the effect of cessation program, routine phone interviews in third, sixth, and twelve month were performed. The smokers had smoking behavior in last seven days by phone interview were defined as smoking cessation failure. **Results:** There were four hundred and twenty-seven subjects visited OPD for smoking cessation during 2002-2007. Three hundred and twenty-six subjects completed the three telephone interviews with 76.3% follow-up rate. The three-month, six-month, and twelve-month continuous success rate of smoking cessation were 33.6%, 23.7%, 19.5% in males and 35.9%, 28.1%, 26.6% in females, respectively. From the multiple logistic regression, side effect or withdrawal symptoms was a significant factor of smoking cessation in both males (OR = 3.04, 95% CI: 1.34-6.89) and females (OR = 3.91, 95% CI: 1.22-12.58). The smoking cessation was also strongly affected by nicotine addiction in males (severe vs. mild or moderate, OR = 0.38, 95% CI: 0.20-0.72) and females (OR = 0.77, 95% CI: 0.45-0.91). The number of cigarettes (≧30 vs. <30, OR = 0.48, 95% CI: 0.22-0.71) was a significant factor of smoking cessation in males but not in females. **Conclusions:** Gender differences in the effects of medical therapy for smoking cessation were demonstrated in the present study. Follow-up study should be conducted to explore the long term effects and side effects such as psychological symptoms of the health promotion program.

Key words: Fagerström tolerance questionnaire, gender difference, smoking cessation.

1. Introduction

Cigarette smoking is one of the important public health problems due to more than five million deaths related to smoking yearly in the worldwide. In the United States, cigarette is the leading cause of preventable death and disability and 20.8% of the U.S. adult population smoked with much higher rates among medically underserved and uninsured populations [1-3]. Cigarette smoking and exposure to tobacco smoke are associated with premature death from chronic diseases, economic losses to society, and a substantial burden on health-care system [4]. It has been projected that tobacco will cause around 10 million deaths globally by the year 2020, with more deaths occurring in developing countries rather than in developed countries [5]. Smoking cessation decreases the mortality and morbidity of all smoking related diseases, both for the smoker and for the around people,

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that is, the risk of ischemic stroke is increased by 30% among non-smokers living with smokers [6].

From the viewpoint of preventative medicine, it is not only important to be cognizant of the background smoking cessation rate of smoking population regionally, but also to explore the complete spectrum of factors which may be related to smoking cessation. Further, to the best of our knowledge, some uncertainty still exists as regards whether the smoking cessation of and the associated factors for smoking population reveal gender difference amongst a sub-population. Thus, in order to identify the smoking cessation of and associated factors for smoking population, a health promotion programme was considered. The present study was designed so as to attempt to explore the potential for condition-related gender difference, because it was considered that such difference might underscore important implications for the understanding of the overall scenario. The purpose of this study was to determine the smoking cessation rate of each gender and to identify the associated factors related to smoking cessation among Chinese adult smoking population.

2. Materials and Methods

2. 1. Study Population

Between October 2002 and February 2007, the Fagerström Tolerance Questionnaire (FTQ) score more than five or more than ten cigarettes per day were administered to a sample of 479 adult smokers recruited to evaluate at the smoking cessation clinic, Cheng-Hsin General Hospital, a fully certified regional and teaching hospital with 1000 beds in Taipei, Taiwan. Of the 479 participants, 52 (10.9%) were excluded due to double visits or not be contacted with telephone. The remaining 427 subjects were the eligible population. Of 427 subjects, 326 participated in the evaluation with 76.3% response rate.

2.2 Intervention and Follow-up

In this study, interventions included health education counseling and nicotine patch. Every subject received the outpatient smoking cessation treatment included health education for the first time about 20 minutes and bi-weekly brief counseling by well-training physicians. The contents of health education included: (1) What is smoking addiction. (2) The dangers of smoking. (3) The benefits of smoking. (4) Effective way to quit smoking. (5) How to use the nicotine patch. As the nicotine patch to quit smoking has been used in the consensus and have the advantage of easier use, the subjects were received smoking cessation treatment recommendations, that is, 24 hours of drug in the nicotine patch (net tobacco patch) [7, 8]. The nicotine patch was used once a day. Subjects who smoked more than 20 cigarettes per day were received No. 15 per day in six weeks and No. 10 in last two weeks. Subjects who smoked less than 20 cigarettes per day were received No 15 per day in two weeks, No 10 per day in four weeks, and No. 10 or No. 5 in last two weeks. In principle each subject were given up to 8 weeks of treatment [9]. The duration of smoking cessation treatment in outpatient cases was not limited and the case could stop treatment at any time.

Telephone interviews were used to follow the cases and the basis was the quit date for the first out-patient day. To evaluate the point prevalent abstinence, the quit smoking and related behaviors at 3rd month, 6th month, and 12th month were recorded through telephone interviews by the health educators. Try to quit smoking referred to at least no smoke for 24 hours. The quit attempt meant completely no smoke past seven days [10]. In addition, access to hospital records was approved by the hospital human subjects review board at Cheng-Hsin General Hospital.

2.3 Statistical Analysis

Statistical analysis was performed using SPSS 14.0 software. Associated predictors and smoking cessation were determined by univariate and multivariate techniques. In the univariate analysis, chi-square testing was applied for discrete variables, respectively.

Multiple logistic regression was used to investigate the independence of factors associated with smoking cessation when variables were significant by univariate analysis. A p-value of <0.05 was considered statistically significant. The results are presented as frequency and percentage.

3. Results

Table 1 shows the majority of baseline factors associated with the risk of adult smokers at the smoking cessation clinic in the males were similar to those in the group of females. However, male subjects were older ($p < 0.004$), had a higher proportion of year of smoking ≧30 yrs (22.9% vs. 1.6%, $p < 0.0001$), and higher proportion of quitting to smoke more than 24 hours in one year (45.0% vs. 28.1%, $p = 0.01$) than did the female respondents. Other baseline factors such as daily cigarette consumption, times of quitting smoking more than 24 hours in one year, times of visiting smoking cessation clinic, complications, nicotine dependence, back to the clinic times, and side effects or withdrawal symptoms for males were not significantly different from females.

Table 1 The demographic characteristics among adult smokers at the smoking cessation clinic (n = 326).

Variable	Male (n = 262)		Female (n = 64)		p-value
	n	%	n	%	for χ^2-test
Age(yrs)					0.004
<50	172	65.6	54	84.4	
≧50	90	34.4	10	15.6	
Year of smoking (yrs)					<0.0001
<30	202	77.1	63	98.4	
≧30	60	22.9	1	1.6	
Daily cigarette consumption					0.44
<30	201	76.7	52	81.3	
≧30	61	23.3	12	18.8	
Quit to smoke more than 24 hours in one year					0.01
No	124	47.3	41	64.1	
Yes	118	45.0	18	28.1	
Times of quitting smoking more than 24 hours in one year					0.09
<2	190	72.5	53	82.8	
≧2	72	27.5	11	17.2	
Times of visiting smoking cessation clinic					0.15
<2	199	76.0	54	84.4	
≧2	63	24.0	10	15.6	
Complications					0.07
No	135	51.5	42	65.6	
Yes	115	43.9	21	32.8	
Nicotine dependence					0.56
Mild or moderate(<7)	88	33.6	24	37.5	
Severe (≧7)	174	66.4	40	62.5	
Back to the clinic times					
<2	196	74.8	54	84.4	0.11
≧2	66	25.2	10	15.6	
Side effects or withdrawal symptoms					0.59
No	165	63.0	38	59.4	
Yes	97	37.0	26	40.6	

The gender specific distribution of 3rd month, 6th month, and 12th month smoking cessation success rate of adult smokers at the smoking cessation clinic is shown in Fig. 1. The proportion of smoking cessation in females was not statistically higher than in males. From the trend test, the proportion of smoking cessation decreased in males ($p = 0.001$) but not in females ($p = 0.47$).

Table 2 shows the association of smoking cessation with baseline characteristics of each gender among adult smokers. In males, from the χ^2-test, the significantly associated factors of smoking cessation included daily cigarette consumption, times of visiting smoking cessation clinic, nicotine dependence, back to the clinic times, and side effects or withdrawal symptoms. In females, the significant factors related to smoking cessation included number of cigarettes and side effects or withdrawal symptoms.

The independent associations between baseline factors and successful smoking cessation in each gender after adjustment for confounding factors were examined by the multiple logistic regression model. As Table 3 shows, side effect or withdrawal symptoms was a significant factor of smoking cessation in both males (OR = 3.04, 95% CI: 1.34-6.89) and females (OR = 3.91, 95% CI: 1.22-12.58). The smoking cessation was also strongly affected by nicotine addiction in male (severe vs. mild or moderate, OR = 0.38, 95% CI: 0.20-0.72) and females (OR = 0.77, 95% CI: 0.45-0.91). Daily cigarette consumption (≧30 vs. <30, OR = 0.48, 95% CI: 0.22-0.71) was a significant factor of smoking cessation in males but not in females.

4. Discussion

4.1 The Implications of Associated Factors for Smoking Cessation

The smoking cessation should be the prime objective of medical treatment for people who smoke, particularly since most smokers who require treatment are dependent on tobacco. The dependence-producing effects of nicotine have been beyond doubt now for a number of years. The degree of nicotine dependence of smokers could be deduced on the basis of their daily cigarette consumption, the time when the first cigarette is smoked in the morning and possibly their need to smoke during the night [11]. In addition, smokers also confirmed that the first cigarettes smoked in the day produce general relax action, especially in stressful situations [11, 12]. In this study, daily cigarette consumption and nicotine dependence were independently associated with

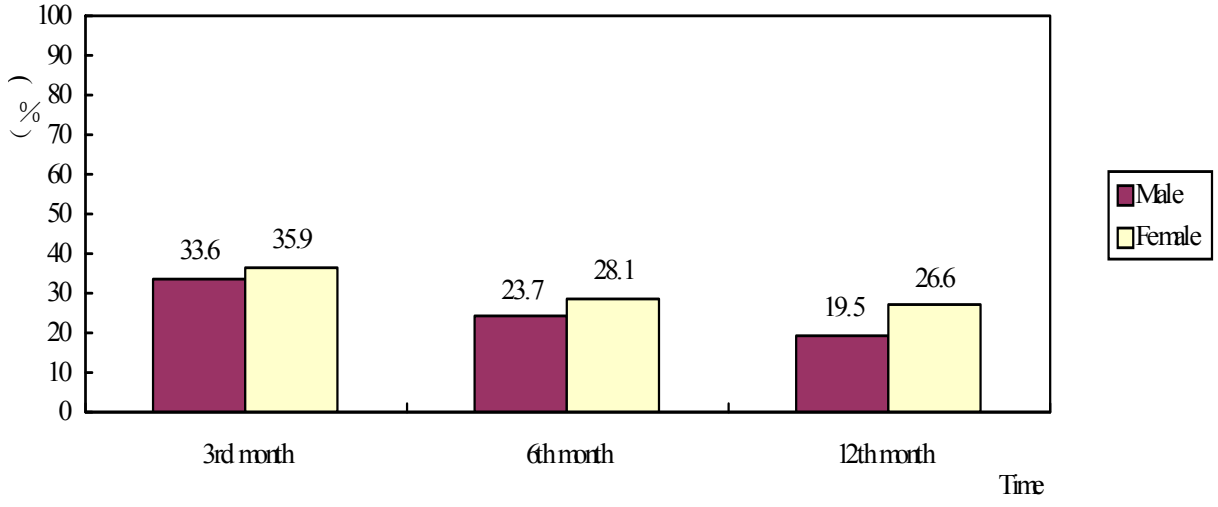

Fig. 1 The gender distribution of 3rd month, 6th month, and 12th month smoking cessation success rate.

Table 2 The univariate analysis of factors related smoking cessation success rate (n = 326).

	3rd month abstinence				6th month abstinence				12th month abstinence			
Variables	Male (n = 262)		Female (n = 64)		Male (n = 262)		Female (n = 64)		Male (n = 262)		Female (n = 64)	
	%	χ^2-test p-value	%	χ^2-test p-value	%	χ^2-test p-value	%	χ^2-test p-value	%	χ^2-test p-value	%	χ^2-test p-value
Age(yrs)		0.37		0.67		0.48		0.89		0.62		0.79
<50	35.5		37.0		25.0		27.8		20.3		25.9	
≧50	30.0		30.0		21.1		30.0		17.8		30.0	
Year of smoking(yrs)		0.72		0.45		0.45		0.53		0.80		0.54
<30	34.2		36.5		24.8		28.6		19.8		27.0	
≧30	31.7		0.0		20.0		0.0		18.3		0.0	
Daily cigarette consumption		0.0001		0.12		0.01		0.33		0.07		0.04
<30	39.3		40.4		27.4		30.8		21.9		30.8	
≧30	14.8		16.7		11.5		16.7		11.5		8.3	
Quit to smoke more than 24 hours in one year		0.58		0.81		0.48		0.94		0.65		0.78
No	34.7		36.6		25.0		26.8		21.0		24.4	
Yes	31.4		33.3		21.2		27.8		18.6		27.8	
Times of quitting smoking more than 24 hours in one year		0.96		0.16		0.74		0.16		0.72		0.12
<2	33.7		32.1		24.2		24.5		20.0		22.6	
≧2	33.3		54.5		22.2		45.5		18.1		45.5	
Times of visiting smoking cessation clinic		0.003		0.31		0.02		0.09		0.04		0.07
<2	28.6		33.3		20.1		24.1		16.6		22.2	
≧2	49.2		50.0		34.9		50.0		28.6		50.0	
Complications		0.33		0.71		0.52		0.69		0.73		0.41
No	36.3		33.3		25.2		28.6		20.0		28.6	
Yes	30.4		38.1		21.7		23.8		18.3		19.0	
Nicotine dependence		0.0001		0.46		0.0001		0.20		0.001		0.34
Mild or moderate (<7)	50.0		41.7		37.5		37.5		30.7		33.3	
Severe (≧7)	25.3		32.5		16.7		22.5		13.8		22.5	
Back to the clinic times		0.001		0.31		0.01		0.09		0.03		0.07
<2	28.1		33.3		19.9		24.1		16.3		22.2	
≧2	50.0		50.0		34.8		50.0		28.8		50.0	
Side effects or withdrawal symptoms		0.0001		0.05		0.0001		0.008		0.0001		0.02
No	23.6		26.3		16.4		15.8		12.7		15.8	
Yes	50.5		50.0		36.1		46.2		30.9		42.3	

Table 3 Multiple logistic regression of association between associated factors and successful smoking cessation in males and females at the smoking cessation clinic (n = 326).

Variables			Daily cigarette consumption (≧30 vs. <30)	Times of visiting smoking cessation clinic (≧2 vs. <2)	Nicotine dependence (severe vs. mild or moderate)	Back to the clinic times	Side effects or withdrawal symptoms (yes vs. no)
3rd month abstinence	Male (n = 262)	OR	0.32	0.32	0.44	3.63	3.01
		95% CI	0.14-0.73	0.02-4.05	0.24-0.79	0.27-48.12	1.44-6.32
	Female (n = 64)	OR	0.77	0.79	0.68	2.11	2.23
		95% CI	0.46-3.80	0.55-2.06	0.43-1.99	0.51-60.08	0.67-8.71
6th month abstinence	Male (n = 262)	OR	0.46	0.72	0.41	1.45	2.73
		95% CI	0.19-1.14	0.06-8.82	0.22-0.78	0.11-18.39	1.25-5.96
	Female (n = 64)	OR	0.69	0.77	0.66	1.98	4.57
		95% CI	0.52-2.00	0.31-7.08	0.37-2.41	0.23-20.47	1.43-14.6
12th month abstinence	Male (n = 262)	OR	0.48	0.55	0.38	1.64	3.04
		95% CI	0.22-0.71	0.05-6.66	0.20-0.72	0.13-20.30	1.34-6.89
	Female (n = 64)	OR	0.70	0.51	0.77	1.14	3.91
		95% CI	0.44-1.92	0.07-5.13	0.45-0.91	0.08-25.12	1.22-12.58

successful smoking cessation. Other evidence-based study also indicated that whether a smoker succeeds in stopping smoking depended on the balance between that individual's motivation to stop smoking and his or her degree of dependence on cigarettes [13].

Although the proportion of smoking cessation in females was not statistically higher than in males, the proportion of smoking cessation decreased in males but not in females. This implies that relapse smoking occurs very early on more often in males than females. It appears the main problem in stopping smoking is not late relapse but initiating a period of abstinence [14]. In addition to immediate referral of the patients to a smoking cessation clinic, by facilitating the appointment, should improve the efficacy [6], further epidemiological and etiologic investigations are needed to clarify the pathophysiological mechanisms between associated factors and successful smoking cessation among smoking populations.

Withdrawal symptoms very in severity from person to person and may last for several weeks to months [11]. Many ex-smokers are severely at risk due to the least cause, for example, going to a restaurant and having an alcoholic drink, meeting up with smokers, and stress situations, may trigger a return to smoking. Many smokers, however, "merely" miss the manual cues associated with the activity of smoking [11]. In addition, withdrawal symptoms are commonly misinterpreted as AEs of nicotine products, especially where the symptoms are of a psychological nature [11]. In this study, side effects or withdrawal symptoms was independently associated with smoking cessation. The withdrawal symptoms and side effects were simultaneously assessed by questionnaire and therefore unable to confirm whether a single factor leading to withdrawal symptoms in smoking cessation. From the clinical practice viewpoint, patients with withdrawal symptoms are usually more difficult to quit smoking successfully, but after using smoking cessation medications combined with symptoms of the disease, probably because of dizziness or nausea and so less likely to smoke. We did not analyze the drug side effects and whether could affect smoking cessation success rate. The clinical relationships between drug side effects, withdrawal symptoms, and smoking cessation are still needed to be clarified.

Using both univariate analysis and the multiple logistic regression model, our study demonstrated that daily cigarette consumption is a major risk factor for the smoking cessation in males but not in females. Previous study showed that there was a strong dose-response relationship between the intensity of tobacco dependence counseling and its effectiveness [14]. It also implied that the updated smoking cessation guideline should be addressed the treatment of tobacco use as it related to special populations.

4.2 Methodological Considerations

A major limitation to this study is the potential self-selection bias due to the hospital-based study design with the smallness of its sample size, that is, of it not being exactly representative of the whole general smoking population. Second, it is well established that a large proportion of smoking subjects therefore often ignored for interventions to smoking cessation. Thus the present study may be representative of the clinical and not of the true smoking cessation rate. Third, we did not investigate some risk factors such as career (manual labour, brainworker), education level, living environments (at home, at work, etc.), and friendly relations (especial in having smoking friends) that suspect to be relevant with the failure in smoking cessation. Finally, our measurements were done only at a one-year time and would not be able to be used to reflect long-term exposure to various demographic or biochemical aspects or factors, factors which might be important influencers of smoking cessation. Should continue to follow-up in the longer time (e.g., in 24 months) in order to evaluate the effects of medical therapy for smoking cessation in two genders because there were many cases who were failure in smoking cessation after 12 and/or 24 months. The solution to such a quandary is to conduct a number of prospective longitudinal analogous studies, the results of which would be expected to complement the findings of this study.

5. Conclusions

In conclusion, gender differences in the effects of medical therapy for smoking cessation were demonstrated in the present study. Follow-up study should be conducted to explore the long term effects and side effects such as psychological symptoms of the health promotion program.

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Empathy vs. Professional Burnout in Health Care Professionals

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Abstract: Background: Results of empirical studies on empathy confirm us in our belief that mature empathy affects creating therapeutic relationships, which come down to sharing emotions experienced by another person without loosing personal identity. When defining empathy after J. M. Morse et al. (1992) the following components shall be concerned: emotional, cognitive and behavioural (mature empathy). When these negative reactions become chronic, as a consequence they can lead to professional burnout. Ch. Maslach (1980) defines professional burnout as a syndrome of emotional fatigue, depersonalisation and low sense of personal achievements, which can occur in individuals working with other people in a concrete way. **The aim:** The main objective of the study was to determine the relation of empathy level with level of professional burnout as well as with the chosen independent variables among the health care employees. **Methods:** The following instruments were used: the Maslach Burnout Inventory (MBI), the Mehrabian-Epstein Empathy Scale, selected H.A. Murray-TAT cards, and a socio-demographic questionnaire. **Results:** Results prove existence of negative relation between level of empathy and professional burnout and existence of significant differences of these variables in participants representing different specializations. Among independent variables, which may be related to empathy level in a statistically significant way, satisfaction (declared by the respondents) was the only one confirmed in every component element and each empathy scale. Significantly strong ($p \leq 0.001$) negative relation between empathy level according to Mehrabian and Epstein Scale and emotional exhaustion level (EEX), depersonalisation (DEP) and loss of sense of personal achievements (PAR) was found for all respondents. Also negative, but not so significantly strong relation was found between the level of cognitive empathy component according to Murray TAT test and the level of emotional exhaustion ($p \leq 0.01$) and depersonalisation ($p \leq 0.05$). **Conclusion:** Professional group described as non-operative was characterised with the highest levels of empathy. The analysis of differences in given burnout dimensions showed that non-operative group had the best results. Therefore, since the level of empathy correlates with burnout level negatively, it may be assumed that developing empathy prevents professional burnout. Hence, making health care professionals realise what the causes and effects of burnout are, seems to be important. It is being planned to carry further, longitudinal research, in which causes of burnout will be investigated as far as correlation with empathy level is concerned.

Key words: Empathy, professional burnout syndrome, doctors, nurses.

1. Introduction

Many authors believe empathy to be a good predictor of good professional realization of medical doctors and nurses. However, their work with and for people may result not only in satisfaction, energy, and professional realization, but it may also cause discouragement, emotional burden and lack of satisfaction. Frequent professional burnout observed among doctors and nurses encourages researchers to start studies verifying professional burnout model, proposed by Ch. Maslach [2]. In its wider version it presupposes burnout's relation with three dimensions of empathy (emotional, cognitive, and behavioural). The researchers assume that empathy counteracts the process of burnout in health service workers.

1.1 Empathy

Using J. M. Morse's et al. [1] definition of empathy, three component elements must be considered; emotional, cognitive and behavioral. Mature empathy understood in this way affects relations with patients, co-workers, and supervisors. Those relations come

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down to co-experiencing emotions with another person, understanding them, and also solving problems.

1.2 Professional Burnout

Ch. Maslach [2] defined professional burnout as a syndrome of emotional exhaustion (EEX), depersonalisation (DEP) and lowered sense of personal achievements (PAR), which may occur in people working with others in a specific way. Maslach's point of view assumed that excessive and long-lasting emotional engagement, together with impossibility to fulfil emotional demands of other people lead to fatigue and burnout. According to E. Wilczek-Rużyczka [3, 4] main causes of the burnout syndrome include environmental factors, professional stress, and personal features of the subject. The causes may be divided into three groups [5]:

- Individual (low self-esteem, uncertainty, defensiveness, dependence, passivity);
- Interpersonal (relations carer – the subject of carer's services, relations with co-workers, and supervisors);
- Environmental (environment and working methods, responsibility, professional development).

1.3 The Aim of the Study

The main objective of the study was to determine the relation of empathy level with level of professional burnout as well as with the chosen independent variables among the health care employees.

2. Methods

The research has been held in 2004-2006 in a Malopolska province. 256 physicians and 410 nurses (total 666) of various specialties were researched (Fig. 1). They have been divided into three groups, that is: surgical (operative), non-surgical (non-operative) and primary health care according to ward specialisation and work specification. 548 of the subjects were female (82.3%) and 118 male (17.7%). Almost half of them (49.7%) had a higher education. The average age of the researched was 36.89 (standard deviation 9.46). The average length of service was 13.14 years (standard deviation 8.87). The majority of the subjects, that is 403 (60.51%) were nursing employees, one in six (16.91%) having higher education level. This group consisted mainly of women (98.81%). In the physicians group women outnumbered men as well (57%).

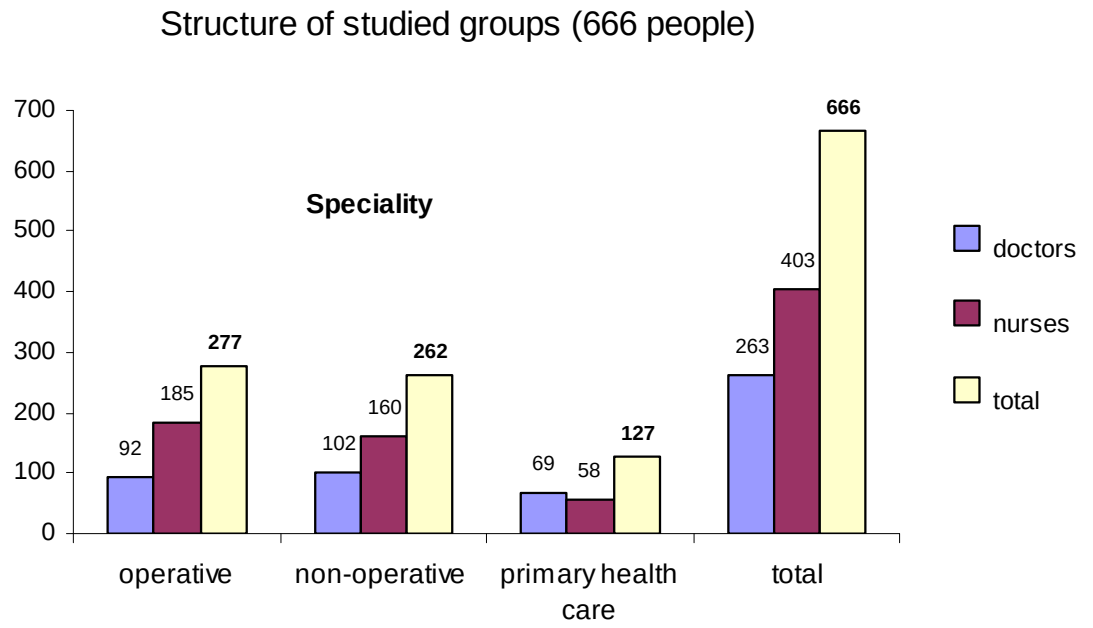

Fig. 1 Study group characteristics and the choosing criteria.

The following instruments were used:

- the Maslach Burnout Inventory (MBI) consists of 22 affirmations, which define situations and corresponding emotions [6]. It enables to estimate three dimensions of burnout: emotional exhaustion (EEX - 9 affirmations), depersonalization (DEP - 5 affirmations) and loss of sense of personal achievements (PAR - 8 affirmations). The answers are marked on a seven grade scale of emotion occurrence frequency ranging from "never" to "daily".
- the Mehrabian-Epstein Empathy Scale, this scale includes 33 affirmations, describing the way the researched reacts to certain situations. The subject marks one of nine answers organized according to Likert scale, that is from „full acceptance" to „total rejection" [7];
- selected tables of H. A. Murray-TAT were chosen for the researched to describe. On the basis of the picture they were to state what had happened, what is happening, what are the thoughts and feelings of the presented people and what will the situation result in. These descriptions were evaluated by three conversant and independent judges, according to three components of empathy - emotional, cognitive and behavioral. Up to three points could be scored for each component. The total score could be up to 12 points for 4 tables, and the total TAT score could not exceed 36 points [1];
- socio-demographic questionnaire, self-constructed questionnaire concerning attitude towards people, consists of 37 yes-no questions, socio-demographic part includes 8 questions and problems – 29 questions, focuses on contact, problem solving, co-perceiving, awareness of the points of view of others, reception of roles of other persons, motivation and professional work satisfaction, received supports and joy from different spheres of activities.

In order to verify the objective of the study the basic statistic procedures describing variables has been used, such as arithmetic mean, standard deviation, Pearson R correlation coefficient, Student T test, Anova test.

3. Results

The outcomes of the research and their analysis pointed out the outstanding results of the non-operative group.

Professional group described as non-operative was characterised with the highest levels of empathy (Figs. 2-3). However, the significance of those differences was not confirmed by some component elements and scales (Table 1).

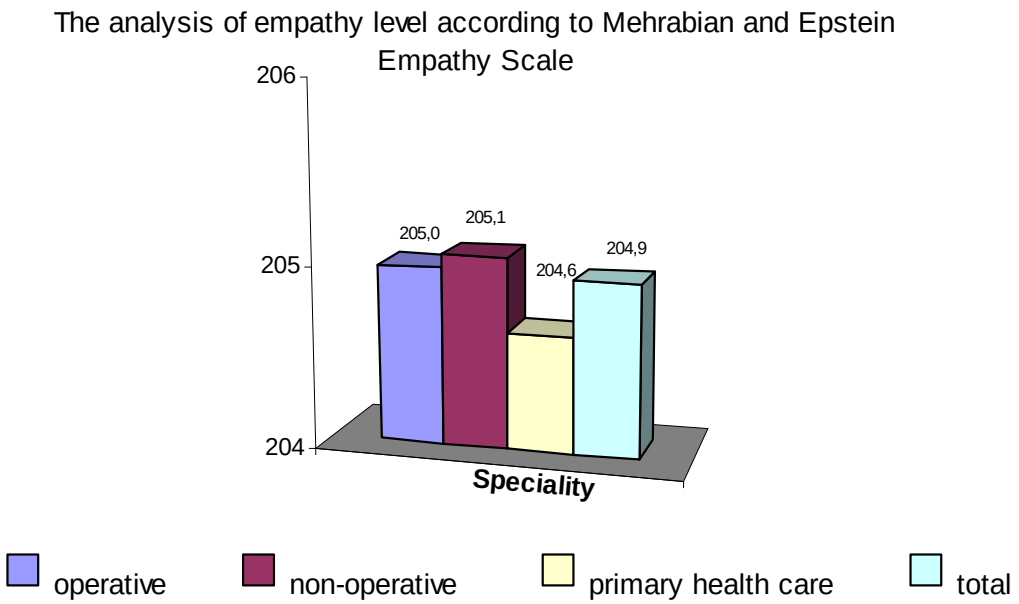

Fig. 2 Empathy level according to mehrabian and epstein empathy scale.

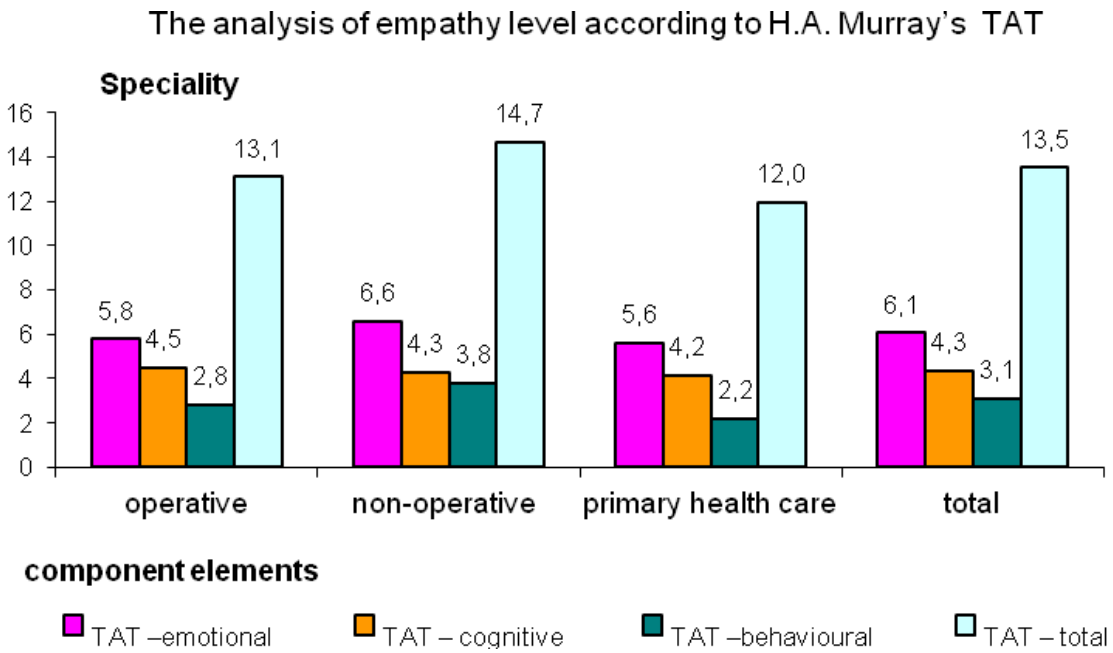

Fig. 3 Empathy level according to H.A. Murray's TAT.

Table 1 Significance of relation between professional speciality and empathy level (ANOVA variance analysis).

Empathy level according to the Scales while considering component elements	ANOVA F (2.663)	Relation significance p
Mehrabian and Epstein Empathy Scale	0.012	0.988
TAT – emotional	7.498	0.001
TAT – cognitive	1.089	0.337
TAT – behavioural	26.288	<0.001
TAT – total	8.939	<0.001

The analysis of differences in given burnout dimensions showed that non-operative group had the best results (Fig. 4).

Among the independent variables, which may be related to empathy level in a statistically significant way, satisfaction (declared by the respondents) was the only one confirmed in every component element and on each empathy scale (Tables 2-3).

Significantly strong ($p \leq 0.001$) negative relation between empathy level according to Mehrabian and Epstein Scale and emotional exhaustion level (EEX), depersonalisation (DEP) and loss of sense of personal achievements (PAR) was found for all respondents.

Also negative, but not so significantly strong relation, was found (Table 4) between the level of cognitive empathy component according to Murray TAT test and the level of emotional exhaustion ($p \leq 0.01$) and depersonalisation ($p \leq 0.05$).

4. Discussion

Comparing the above results to the results of Dutch research [8], it should be noticed that loss of sense of personal achievement is higher for Dutch physicians and nurses, but as far as the two remaining burnout dimensions are concerned, they got better results than their Polish colleagues. The average results of emotional exhaustion EEX for doctors and nurses of all specialties were lower (19.91 relatively to 22.19) in comparison to health care employees researched by Maslach, Jackson and Leiter [6], whereas the two remaining dimensions, that is depersonalization DEP (7.41 do 7.12) and loss of sense of personal achievements PAR (30.78 do 36.53)

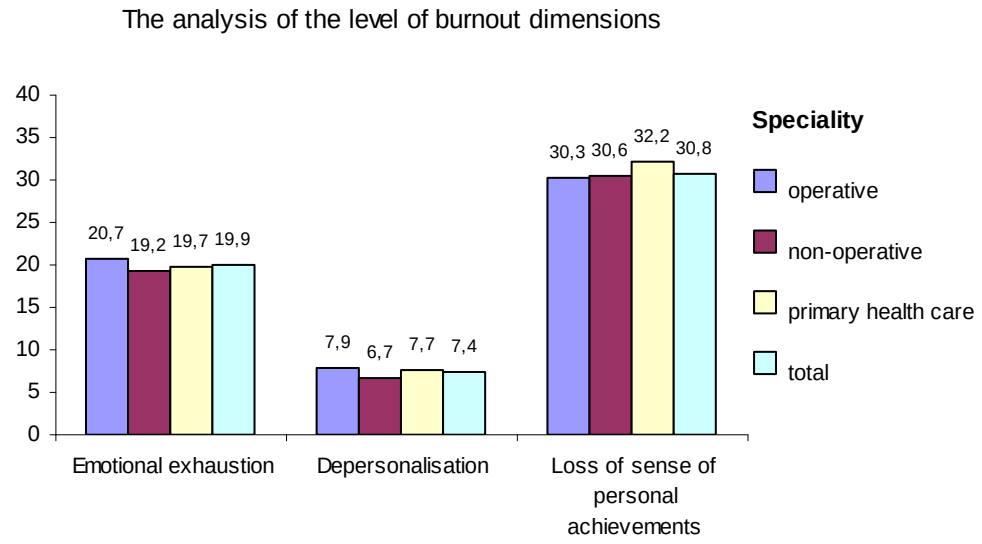

Fig. 4 Level of professional burnout.

Table 2 Values of Pearson's correlation factor r and the significance of relation between empathy level and years at work.

Empathy level according to the scales while considering component elements	Age	Years at work
Mehrabian and epstein empathy scale	-0.064 (0.098)	-0.0658 (0.086)
TAT – emotional	-0.156 (0.002)	-0.129 (0.005)
TAT – cognitive	-0.049 (0.216)	-0.063 (0.101)
TAT – behavioural	-0.042 (0.276)	-0.050 (0.213)
TAT – total	-0.101 (0.009)	-0.102 (0.009)

Table 3 Values of the Student t test and the significance of relation between independent variables and empathy level.

Empathy level according to the scales while considering component elements	Independent variable									
	Sex		Profession		Motivation		Satisfaction		Support	
	W	M	Nurse	Medical doctor	Yes	No	Yes	No	Yes	No
Mehrabian and epstein empathy scale	206.26	198.81	206.52	202.53	206.80	202.28	207.52	187.11	206.81	193.43
Values of the student t test (relation significance)	2.997 (0.003)		2.044 (0.041)		-2.321 (0.021)		7.339 (<0.001)		4.913 (<0.001)	
TAT – emotional	6.13	5.79	6.16	5.92	5.98	6.15	6.16	5.32	6.08	5.91
Values of the student t test (relation significance)	1.199 (0.231)		1.101 (0.271)		0.772 (0.440)		2.578 (0.010)		0.532 (0.595)	
TAT – cognitive	4.38	4.19	4.38	4.30	4.53	4.05	4.46	3.46	4.39	3.97
Values of the student t test (relation significance	0.742 (0.458)		0.404 (0.687)		-2.502 (0.013)		3.469 (0.001)		1.538 (0.125)	
TAT – behavioural	3.13	2.90	3.07	3.10	3.04	3.14	3.18	2.38	3.13	2.78
Values of the student t test (relation significance	0.972 (0.331)		-0.154 (0.877)		0.556 (0.578)		2.979 (0.003)		1.345 (0.179)	
TAT – total	13.64	12.85	13.62	13.31	13.54	13.33	13.79	11.14	13.60	12.66
Values of the student t test (relation significance	1.230 (0.219)		0.619 (0.536)		-0.423 (0.672)		3.634 (<0.001)		1.341 (0.180)	

Table 4 Values of Pearson's correlation factor r and the significance of relation between empathy level and the level of professional burnout.

Empathy level according to the scales while considering component elements	Professional burnout dimension		
	Emotional exhaustion	Depersonalisation	Loss of sense of personal achievements
Mehrabian and epstein empathy scale	-0.1553	-0.2623	-0.1601
relation significance	<0.001	<0.001	<0.001
TAT – emotional	-0.0274	-0.065	-0.002
relation significance	0.479	0.094	0.958
TAT – cognitive	-0.1011	-0.0891	-0.0453
relation significance	0.009	0.021	0.243
TAT – behavioural	-0.0642	-0.0423	-0.0048
relation significance	0.098	0.276	0.902
TAT – total	-0.076	-0.0806	-0.0209
relation significance	0.05	0.038	0.591

were higher. Identical observations can be formed from comparison with results of Italian research of physicians and nurses [9] of different specialties (their average result dimension of burnout is EEX-20.2; DEP-7.0; PAR- 32.5). However, professional burnout (EEX-26.4; DEP-9.9; PAR-27.3) for South Korean nurses [10] was higher in all dimensions relatively to author's research group.

The non-operative group from authors research (including doctors and nurses from psychiatric wards) got worse average results in all three dimensions than the employees of psychiatric departments researched by Maslach, Jackson and Leiter [6]. Comparison with several European centers of psychiatric heath care (Poland, Norway, Finland, Denmark) [11] also brings a conclusion that the subjects of the authors researched got unfavourable results.

Authors from various countries (South Korea, Sweden; Lithuania) [10, 12, 13]. have confirmed that there is a statistically significant opposite relation between some of the burnout dimensions and the empathy.

From among independent variables, included in socio-demographic questionnaire, the most frequently mentioned satisfaction correlates in a significant way with every component of empathy TAT scale and with empathy level of Mehrabian-Epstein Empathy Scale. Satisfaction frequently was in opposite relation to the burnout dimensions.

The outcome of the author's research remains in some accordance with research by Aiken et al [14] and Ramirez et al [15] dealing with protective influence of satisfaction against professional burnout. Relationships of satisfaction and burnout dimensions have been also proved in research carried out in Italy (Renzi et al) [9].

5. Conclusions

Therefore, since the level of empathy correlates with burnout level negatively, it may be assumed that developing empathy prevents professional burnout. Hence, making health care professionals realise what the causes and effects of burnout are, seems to be important. It is being planned to carry further, longitudinal research, in which causes of burnout will be investigated as far as correlation with empathy level is concerned.

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How Research in Public Health Could be More Effective? An Innovative Example of Mathematical and Spatial Analysis of Mortality Rates of Ischemic Heart Disease, in Greece in 2007

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Abstract: Background: Ischemic heart disease is one of the major causes of death worldwide. The present study aims at detecting and determining the characteristics of mortality indicators of ischemic heart disease in 2007 in Greece per Prefecture. Additionally, it intends to estimate the dimensionality of under examination phenomena, which may describe them, and may be helpful for assumptions towards an explanatory framework about the type of factors and their effect on the particular indicators. **Methods:** Spatial Structure Function theory and mathematical methods are applied on mortality rates of 2007. After proving their deterministic nature, cluster analysis and spatial analysis (kriging interpolation) is fulfilled. Socioeconomic factors are also co-calculated in order to achieve any modeling. **Results:** Through the spatial structure function it is proved that the phenomenon (the general indicator of mortality of ischemic heart disease) is conditioned by a non linear spatial dynamic system (with a dimension of about 2.06). Finally, by the cluster analysis that followed was proved the phenomenon's non spatial periodicity which can be adopted. **Conclusions:** Ischemic heart disease is a mathematical deterministic phenomenon that should be analyzed with the appropriate methods. This analysis is a proper tool for epidemiologic interpretation of mortality for decision-making in public health, focusing on the promotion of local political strategies.

Key words: Mortality rates, ischemic heart disease, deterministic phenomenon, Spatial Structure Function, spatial analysis-kriging interpolation.

1. Introduction

Ischemic heart disease is one of the major causes of mortality worldwide, although it varies among countries, Prefectures or states, sexes, age groups and socioeconomic status. In Europe the results of a relevant cross-sectional study underline the highly variable nature of socioeconomic inequalities in ischemic heart disease mortality in eleven European countries. These inequalities appear to be highly sensitive to social gradients in behavioral risk factors [1].

Indicators of mortality are usually analyzed by using classic statistical methods, mainly simple correlations between various indicators and their corresponding limits of confidence, without checking their underlying dynamics and characteristics [2]. On the other hand if they emanate from deterministic dynamics, the study's methods owe to be supplemented with special mathematic methods and to calculate the minimal dimension of space of immersion. Such methods tend to detecting and taking advantage of mathematic determinism, so that the results of classic analysis and forecasting are improved. As a result they are proper

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for recoding algorithms of equivalent natural, biological, economic and other systems.

Extensive research and results on these matters is essential for development of national and international health policies for prevention and control of disease and injury. Non-communicable diseases are already a major public health challenge in all regions particularly in Greece [3]. Epidemiologists and public health researchers have a long tradition of using printed atlases and presenting data on maps in order to communicate population-based diseases. The availability of geographic information systems (GIS) with comprehensive mapping and spatial analysis capability has greatly expanded the number of producers and consumers of health maps, including policymakers and the public [4-7].

Purpose of the present study is to detect and determine the characteristics of mortality indicators of ischemic heart disease in 2007 in Greece per Prefecture. Additionally, it intends to estimate their dimensionality which is a primary condition for any to explanatory view. This analysis is a proper tool for epidemiologic interpretation of mortality, for decision-making in public health, focusing on the promotion of local political strategies.

2. Material and Methods

2.1. Data Source

The Greek National Statistical Authority obtained in the 2001 census was the source of our data [8]. Both sets of data were selected. Number of deaths is collected, per cause (specifically ischemic heart disease) and Prefecture, in 2007 and secondly socioeconomic factors for 2001 per Prefecture. Coding of causes of death is applied according to the ICD 10 classification and then grouped into the 65 groups that are used by the Eurostat of the European Union4 (G27) [9, 10]. Socioeconomic data are consisted of geographical location (urban, rural, lowland, semi-mountainous, and mountainous), GDP, education level (secondary, postsecondary and other education level), marital status (single, married, or other), and number of clinic beds in particular regions (per prefectures). On the other hand, spatial data were collected from the National geographical data organization (geodata.gov) including the coastline of the whole Greece and its Prefectures formed in the EGSA 87 (Greek National Georeference datum 87 with projection: Greek Grid) [11].

2.2. Epidemiological and Mathematical Analysis

At first, standardised mortality ratios for each Prefectures of Greece were calculated according to the direct method of standardization, [12] stratifying the data by Prefecture.

Then, Quantitative and Qualitative study of data was carried out, so that results of classic analysis and forecasting of corresponding biological system are improved, in order to study the behavior of indicators of mortality in each prefecture. This was fulfilled with the use of Spatial Structure Function (SSF) that was applied for these mortality rates in Matlab environment. The methods of SSF are proportional and, hence, conceived from corresponding this method for time series of Provenzale. In continuous and relation to our theory that was presented in a previous paper [2], we present the function below.

Let S a 2D (two dimensioned) measured compact space, where for each pair of real numbers (x,y) ϵRXR one and only one point of S with value z is represented. (Therefore, the coordinating function f: R^2->S is presumed).

Through the coordinating function g the R^2->R is defined as: g(x,y)=z.

For each axis of coordinates, we take N samples of semi-straight lines, and in each semi-straight line prices z with step of sampling Δs. The ordered set of numbers Δ(v) are calculated for each semi-straight using the equation:

$$\acute{O}\ddot{A}(\acute{\imath}) = \sum_{i=1}^{v}\left[\left(z(x,y)+v\bullet\Delta s\right)-z(x,y)\right]^2 \in R$$

where n is the total amount of points in each semi-straight line N1, N2, ……. Nκ.

The log(ν), logΔ(ν) graphs are indicative of the structure of the space S, in regards to values z.

If the phenomenon is completely randomly distributed, then the graphic representation will by definition have an exponential form (in an ordered set of random numbers, each following value adds as much information, as the already existing in the previous number series). If the phenomenon may be considered as colored noisy, then the graphic representation is approached satisfactorily by one increased straight line (each following value adds as much information, the previous one did). If periodicity appears, it is presented as a small scale oscillation on this straight line. However, for a nonlinear deterministic phenomenon, for small prices of log(ν) an escalation of exponential form is presented followed by an intense oscillation (valley effect)– (next values are predicted from the previous numbers) [2].

Continuously, these mortality rates were used combined with the previously mentioned socioeconomic factors through cluster analysis (K–means) in Statistica 8.00, per Prefecture [13, 14]. Mortality rates were grouped in four categories for 2007 (group 1, group 2, group 3, group 4). The number of clusters was defined by the optimum centroid of each cluster through the cluster curve.

2.3. Spatial Analysis

The results of the cluster analysis in 2007 were finally distributed in a map of spatial clusters in regional level (Fig. 1, left-up).

At the same time, we use an interpolation method in order to determine spatial variance of the mortality rates in the whole area of Greece (Fig. 1, right-up). This was applied through Interpolation methods in ArcGis (ArcMap 9.2), –specifically according to exponential kriging – prediction maps [15, 16]. Kriging is based on statistical models that include autocorrelation which refers to the statistical relationships among the measured points. This method is able to produce a prediction surface but also provides some measure of the certainty or accuracy of the predictions. It uses semivariogram, the regression function for cross-validation and the neighborhoods [17-20]. The variogram is the key function in geostatistics because it will be used to fit a model of the temporal/spatial correlation of the observed phenomenon. The variogram model that is further used to define the weights of the kriging function and the cross-validation is used to describe correlation of different variables.

3. Results

After having applied all the above methodologies and techniques, our results ensure once again the mathematical deterministic nature of the phenomenon.

Through the spatial structure function it is proved that the phenomenon (the general indicator of mortality of ischemic heart disease) is conditioned by a non linear spatial dynamic system. The phenomenon was found to be without spatial periodicity and it appears to decrease the entropy of the data, in any direction. As a conclusion, the analysis of wavelets supplements the statement that only local linear admissions are possible. There were discontinuities noticed, which outlines the low-frequency spatial generalizations or periodicity or even self-similarity to exist. The dimensionality of the phenomenon was calculated equal to 2.06 for 2007.

Continuously, before cluster analysis was applied, the phenomenon appeared to be of high intensity among most of Greece's Prefectures, based only on mortality rates. If we analyze them in relation with various socioeconomic factors through cluster analysis, the result changes the view of the epidemiological impact of the disease in Greece.

Results of cluster analysis depict a grouping of Prefectures that are of similar behavior according to mortality rates and socioeconomic factors. In 2007, this grouping is consisted of four cluster groups (cluster 1, cluster 2, cluster 3, and cluster 4) and is represented in Fig. 1 by different colors (Fig. 1, left-up). Prefectures

of same color are actually of similar behavior and they are grouped into the same cluster. Most of the Prefectures are grouped in groups 2 and 3, whereas Pr. of Attiki and Pr. of Thessaloniki is in group 1 and group 4, respectively. It is obvious that the behavior of each Prefecture cannot be grouped according to administrative limits. We find Prefectures of high geographical distance to be of the same group. For instance, Pr. of Iraklion, Pr. of Chania and Pr. of Dodekanisos are in the same groups with Pr. of Evros or other Prefectures of Northern or central Greece.

At the next step of the analysis, we estimated and predicted the variance of the phenomenon in 2007 in the whole surface of Greece (Fig. 1, right-up), through exponential kriging- prediction map. This map suggests an answer to the following researcher's question. "Which is the prediction of the spatial variance of the mortality rates in 2007?" This refers to a spatial prediction which could be applied both in a national and regional level. In our study, we detected the values of the rates in the total surface of Greece and not only in certain points (as was previously by using the mortality rates as a general number per Prefecture). These values range from 2.60 to 13.59. Higher values may be detected in the area of Attiki, Evros, Grevena and Trikala. On the other hand, lower values are presented in Pr. of Kerkyra, Samos and Kyklades.

In Fig. 2, details from the kriging process are distributed. The semivariogram at the left, the cross validation at the right and down in the middle the neighborhoods. The regression function is: 0.045 * x + 3.760, the mean value is equal to 0.0159 and the average standard error is equal to 1.42. The least neighbors that should be included are two and the number of lags is twelve.

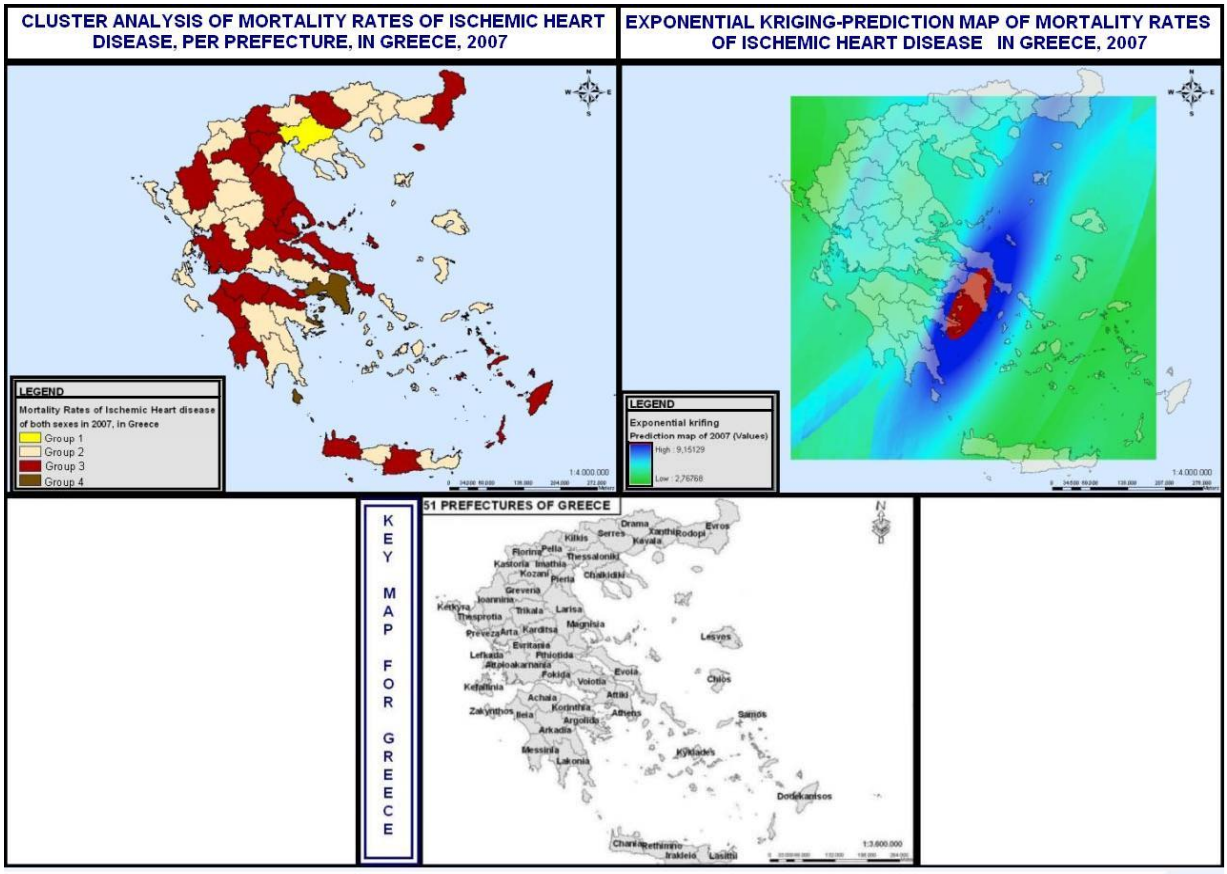

Fig. 1 Left-up: Map of cluster analysis of mortality rates in Greece in 2007, per Prefecture for ischemic heart disease; Right-up: Prediction map of mortality rates of ischemic heart disease, in Greece in 2007; Down-middle: Names of 51 Prefectures of Greece.

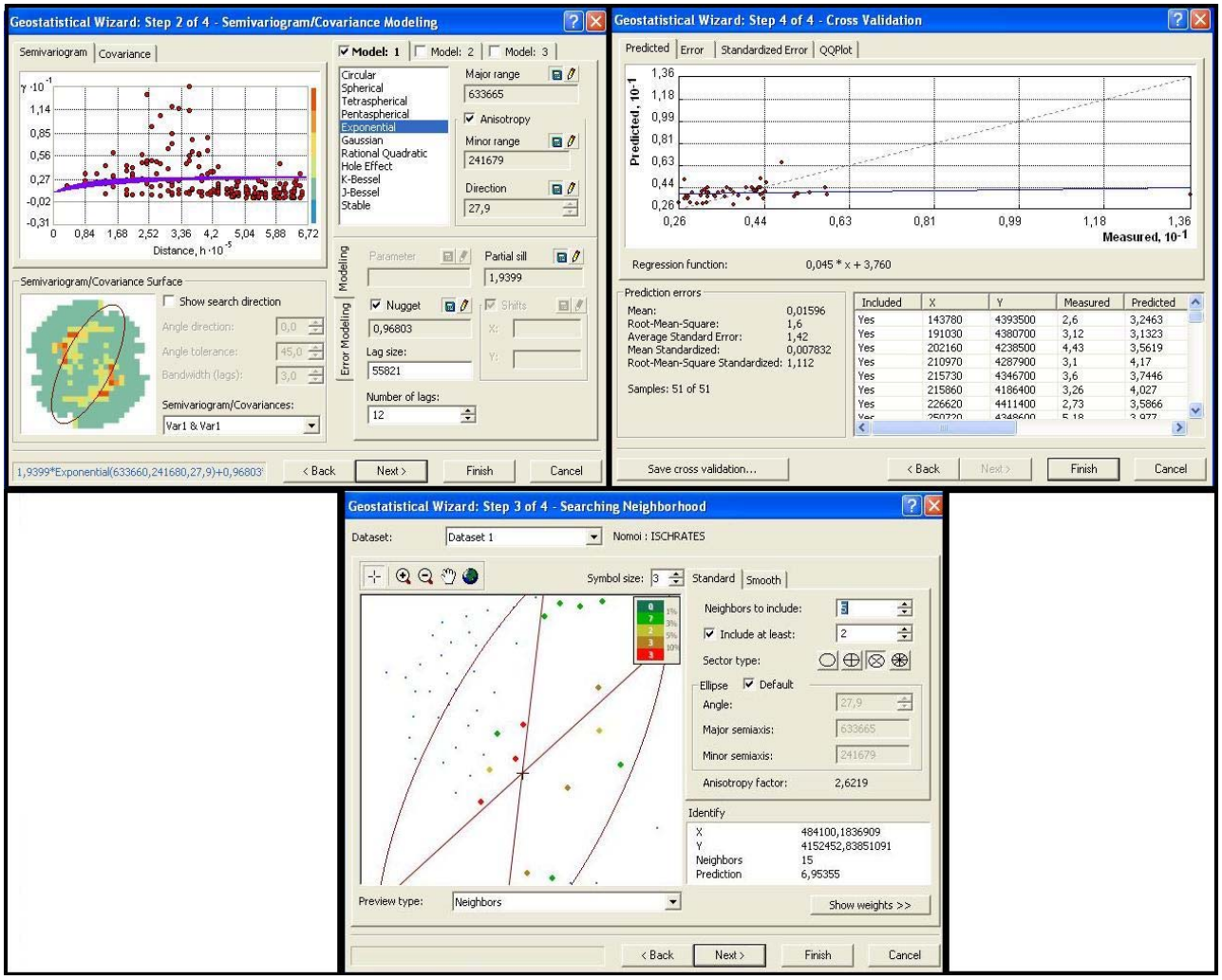

Fig. 2 Images of semivariogram cross validation and neighborhoods for exponential kriging in 2007.

4. Discussion

The usefulness of this methodology, which is based on mathematic significances and techniques of non linear dynamics, has to do with the fact that plenty of systems cannot be analyzed by probabilistic methods and techniques. They refer to deterministic dynamics of low dimensions.

Such evidence is met in many fields such as natural, biological and economic systems e.g., in the area of education (curve learning and the threshold of chaos), in the area of health (fractals, chaos and heart rate collapse cascade), in the area of art (chaotic music), in the area of economy (Stock Exchange), of meteorology (forecast of time-phenomenon of fly of the butterfly), etc [21]. As it has been proved, the given data can be used to predict the behavior of these biological systems, without involving other factors in the first phase. The nature of one's data should primarily be determined before the decision of the appropriate methods and techniques for further analysis.

Our data perform a non-linear dynamic behavior which led us to analyze them according to mathematical methods. An extremely important fact we should examine is the number of variables that are necessary in order to explain the examined phenomenon. In our study this number was almost two.

In general, regional mortality rates are complex phenomena that are affected by socioeconomic and environmental parameters [22, 23]. Association

between socioeconomic factors and mortality has been recognized since the Middle Ages. However, health policies have proved to be ineffective in eliminating disparities that contribute to mortality [24, 25]. Hence, the question about what could be possibly the reason of inefficiency of health policies arises. As far as Greece is concerned, it is proven (by the study of malignant ischemic heart disease mortality rates), that political strategies should be taken after a specialized extensive epidemiological research in a local level and by the use of mathematical and geospatial analyses. This refers to promotion of application of measures inspired from local special needs and regional characteristics, taking into consideration both socioeconomic and environmental factors.

Through the present study the goal of examination and proof of the existence of regional spatial inequalities in health, which should be scientifically approved through the study of the present data, as well as, through the reference of future trends, is set. Such consideration may be useful in other disease studies, as well as, in other fields, apart from Health and Epidemiology. Some examples are financial markets, management and economic behaviors, politics, education or even religion.

5. Conclusions

Analysis of various types of data should be applied carefully and properly according to their nature and behavior and not according to the usual functions of statistics (if they are not necessary). We suggest a proper process that refers to the examination of each phenomenon's nature through algorithms. Such an approach is performed here and promotes the new Spatial Structure Function. If the data are deterministic they should be analyzed through mathematical methods and spatial ones due to their nature. Every analysis should be as closer as it is possible to the real environment of the phenomenon.

Generally, an integral fact for Public Health policies is that this kind of phenomena – such as diseases – are of local characteristics and require local political strategies in order to be effective.

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Effects of Health Behavioral Modification Program on Metabolic Diseases in Non-Government Organizations

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Abstract: The recent health screening for metabolic diseases in Thai workers, Bangkok reported that health behavior of workers aged 25-59 years were at risk overweight. **Objectives:** (1) To evaluate managing for health behavioral modification program (HBMP) of non-governmental organizations (NGOs), (2) to compare behavior change and biochemical indicators between before and after program, and study factors affecting program success and barrier to the program implementation. **Materials and Methods:** Totally, there were 8 HBMPs conducted by NGOs between May, 2009-January, 2010. A sample of 3414 participants who were at risk for metabolic diseases. The study instruments were developed based on CIPP Model to collect data during program from 3 groups of respondents, including 8 program leaders, 8 administrators of program leaders, and some participants and health behavior questionnaires for assessing behavior change from the sample. **Results:** Opinions on the context, input, process, and product (CIPP) were at the good to very good level in total among 3 groups of respondents; including program leaders, administrators of program leaders, and participants. In addition, the factors affecting program success were a budget from the National Health Security Office, high potential staff, awareness and willingness of participants, cooperation of participants, activities relevant to lifestyles of participants, provision of ongoing information, good relationship between program leaders and participants, motivation and rewards for participants. Barriers to the program implementation included participants drop out from the program due to work load, unawareness about their health problem, and insufficiency of budget. After participating in the program, health behaviors of the participants (in self-efficacy, self-regulation, and self-care) were statistically significantly higher than before their participation, with p-value at 0.05 level. The participants had demonstrated an improvement in some health indicators: BMI, systolic blood pressure, and waistline measurement. These indicators were statistically significantly lower in comparison with pre –intervention data, with p-value at 0.05 level. **Conclusions**: HBMPs conducted by NGOs were successful and effective at improved health behaviors and decreased in biochemical indicators.

Key words: Behavioral modification, metabolic disease, CIPP model, health behavior, program evaluation.

1. Introduction

The recent health screening for metabolic diseases in 273,171 Thai workers in Bangkok reported that 85% of these workers were at risk of cardiovascular disease, showed the highest proportion (40%), and diabetes, with (35%) [1]. According to a data from the Bureau of Policy and Strategy, 2009, heart diseases with hypertension and cardiovascular disease ranked the third and the fourth leading causes of death in 2008 [2]. Obesity and overweight, which are the major risk factors for the metabolic diseases have high and increasing prevalence in Thailand, especially in Central Thailand (37%) and in Bangkok (36%). Healthy diet, regular physical activity and stress relaxation were suggested to prevent obesity and its unwanted consequences [3].

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2. Literature Review

2.1 HBMP Based on Promise Model

To effectively prevent and control metabolic diseases in Thailand, especially in Bangkok, the behavioral and managerial model, named PROMISE Model was developed collaboratively between the National Health Security Office (NHSO) and the Behavioral Science Research Institute, Bangkok in

2008. PROMISE Model was the abbreviation for Positive Reinforcement (P), Result-Based Management (R), Optimism (O), Motivation (M), Individual or Client-Centered (I) and Self-Esteems (SE). The major characteristics of the PROMISE Model were as follows: (1) primarily aimed at modifying 3-Self behaviour which included self-efficacy (refers to a participant's belief in their own ability to perform healthy diet, regular physical activity and stress management), self-regulation (refers to the use of planning processes that activate and sustain thoughts, take note their own behaviors, and affects in order to attain goals of decreasing BMI, systolic blood pressure, and waistline) and self-care (refers to their skills focus healthy eating behavior, and physical activity and stress management). (2) Be a guidance for health professionals or individuals to develop health behavioral modification program (HBMP) and managing program aimed to enhance 3-Self behavior [4, 5]. In addition, results of this program evaluation based on CIPP Model including context, input, process and product which were collected from participants, program leaders and administrators of program leaders showed that opinions on the context, input, process, and product were at the very good level [6]. The objectives of this research were (1) to evaluate managing for HBMP of non-governmental organizations (NGOs) (2) to compare behavior change and biochemical indicators between before and after program completion, and study factors affecting program success and barrier to the program implementation.

2.2 The HBMP Evaluation Based on the CIPP Model

The evaluation model was composed of context, input, process and product, was applied to evaluate the HBMP. In addition, 360 degree feedback was also used by collecting data from NGOs administrators, program leaders, and participants. Overall conceptual framework of the program evaluation was presented in Fig. 1.

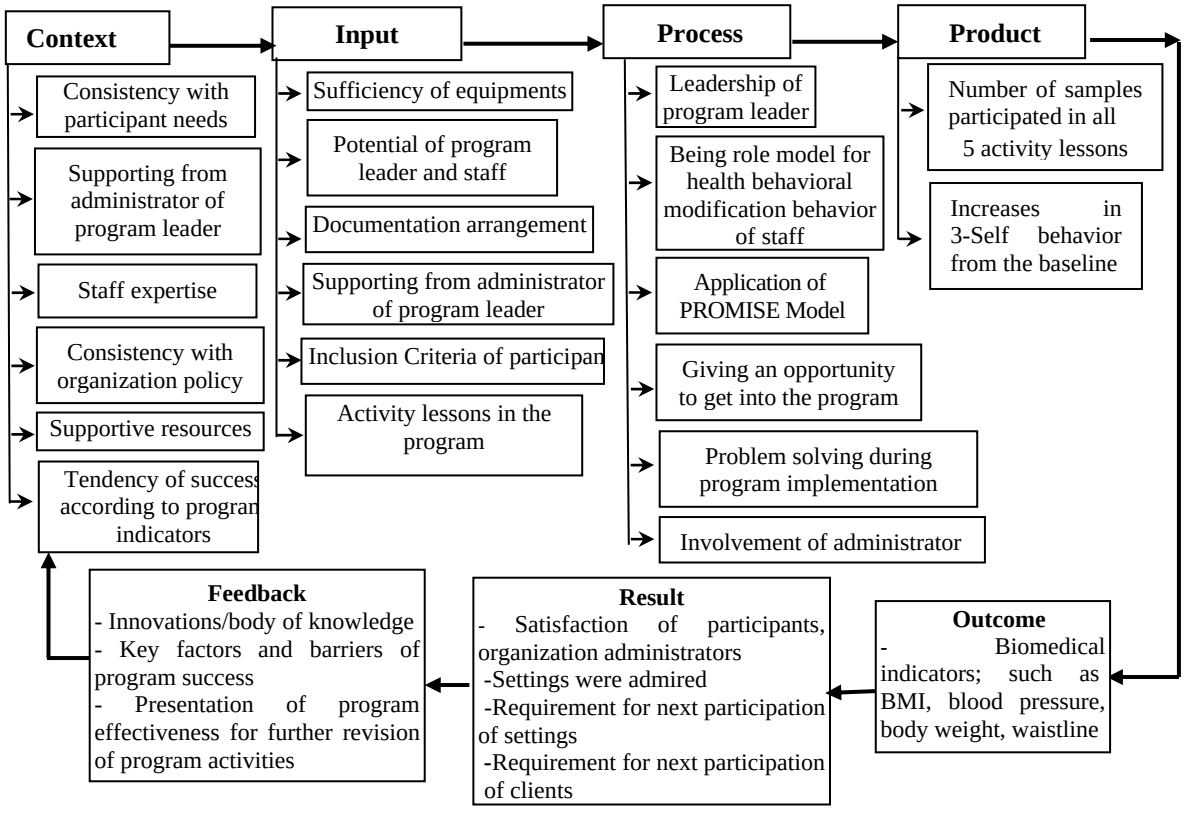

Fig. 1 Conceptual framework of the evaluation of HBMP administration.

3. Materials and Methods

3.1 Samples

The informants of this research consisted of 3 groups, including 8 HBMP leaders, 8 NGO administrators, and 32 client representatives. The target participants of HBMP were 3,414 people in the participating NGOs in Bangkok. The inclusion criteria for eligible participants were that: (1) they volunteer to participate in the 5-lesson program during period of 4-7 months, and (2) they were at risk of the following metabolic diseases; cardiovascular diseases, hypertension, obesity, stroke, and diabetes based on NHSO health screening questionnaire.

3.2 Settings

8 NGOs in Bangkok were funded by the National Health Security Office (NHSO), Bangkok, to conduct HBMP for changing 3-Self behaviors (self-efficacy, self-regulation and self-care) in the at risk clients. Overall, 8 programs applying PROMISE Model were implemented under the supervision by Srinakharinwirot University.

3.3 Measurement

Instruments for program evaluation were described below:

Questionnaire measuring feasibility and program success based on 4 components of CIPP Model. Responses were made on a 4-point rating scale. Respondents to this questionnaire were program leaders, administrator of program leaders, and clients. This measure was used by supervisory committee during the program supervision.

Semi-structured interviewing form about the effectiveness of HBMP applying the PROMISE Model. Indicators of program success based on CIPP Model.

Measures of 3-Self behavior. Measure of 3-Self behavior consisted of 17 items assessing self-efficacy, self-regulation, and self-care of participants. Reliability with the Cronbach's alpha coefficients is between 0.73-0.85 and item-total correlation between 0.29-0.76. The participants were tested before and after participation in the program.

3.4 Methods

Ethics approval was obtained from Srinakharinwirot University (SWU), Thailand. The research design was evaluative research and mixed method was used as a technique to collect data. The overall research procedure was sequentially summarized as follows.

Process of evaluation of HBMP in June -November 2009. The criteria for HBMP were developed through concepts derived from a good literature review and submitted by NGOs in Bangkok metropolis for scrutiny by experts using evidence based criteria. Feedbacks were sent to program hosts for revision before a formal contract for HBMP were approved. A manual for implementation of HBMP and a manual for financial management for program leaders and staff were developed to guide implementation and management. A manual for program supervision and evaluation was also made available for use by the supervisory committee. Program leaders and staff were trained to implement the PROMISE Model. Periodic supervisions and monitoring to ensure the quality of implementation of each HBMP were undertaken. An exclusive conference on program success after completion of all programs was carried out. It was participated by the leaders and staff of each programs and also supervisory committee.

4. Results

4.1 Demographic of the Samples

Overall, most clients were female (63.24%), aged between 25-59 years (92.62%), reported high school as the highest level of education (42.53%). Regarding health risk, around half of the participants were at risk of obesity.

4.2 Supervision and Evaluation of the Program Success Factors (Objective 1)

The results of descriptive statistics from questionnaires collected by the supervisory committee revealed that program leaders, administrator of program leaders, and clients rated good or very good level (mean 3.76, 3.76 and 3.47 respectively) of total opinion scores on the context, input, process, and product.

Factors affecting program success consisted of budget from the National Health Security Office (NHSO), high potential staff, awareness and willingness of participants, cooperation of participants, activities relevant to lifestyles of participants, provision of ongoing information, good relationship between program leaders and participants, motivation and rewards for participants.

Barriers to the program implementation included participants drop out from the program due to work load, unawareness about their health problems and insufficiency of budget.

Suggestions based on the program evaluation were: the program should be continually implemented and follow up the participants, motivate by rewards, the database program should be improved, should support enough budget, and should set change leaders and network of participants.

4.3 3-Self Behavior and Biomedical Indicators Comparison between before and after Participating in the Program (Objective 2)

The results of paired t-test for 3-Self behavior between before and after the program implementation. The paired t-test results demonstrated that after the application of the PROMISE Model: self-efficacy, self-regulation, and self-care significantly increased from the before participating in HBMP (Table 1).

The results of paired t-test for all biomedical indicators between before and after the program implementation. The paired t-test results revealed that after the application of the PROMISE Model: biomedical indicators, except waist, significantly decreased from the baseline (Table 2).

Table 1 Comparison of 3-self behaviors between before and after participating in the program (N = 3,414)

3-Self behavior (Range 5 – 20)	Before		After		MD.	t	p
	$\overline{X}$	S.D.	$\overline{X}$	S.D.			
Self-efficacy (Range 5–20)	14.58	2.63	16.65	2.77	-2.071	-48.276	0.000*
Self-regulation(Range 5 –20)	14.14	2.90	16.37	2.69	-2.227	-50.821	0.000*
Self-care (Range 7–28)	18.42	3.83	21.25	4.10	-2.831	-45.438	0.000*

* Significant at .05 level

Table 2 Comparison of biomedical indicators between before and after participating in the program.

Biomedical indicators	N	Before		After		MD.	t	p
		$\overline{X}$	S. D.	$\overline{X}$	S.D.			
BMI	3,119	23.36	4.74	22.92	4.26	.440	16.268	0.000*
Systolic BP	2,125	119.44	17.18	118.99	15.54	.449	2.150	0.032*
Waist	494	33.24	5.05	32.79	4746	.456	6.337	0.000*

* Significant at .05 level

5. Discussion

We were able to demonstrate that program leaders, administrator of program leaders, and clients rated good or very good level of opinion scores on the context, input, process, and product as outlined in Objective 1. This result suggested that HBMP based on PROMISE Model in Bangkok metropolis were considered successful. There were several key factors of program success. First, the support of the hospital administrators or administrators of program leaders was essential. Secondly, the enthusiasm of the staff and

their intention to efficiently manage and deliver activity lessons for clients was considered very important. The third factor was the determination and coordination of clients. Finally, the expertise of instructors as well as the characteristic of activity lessons (e.g., clarity, easy to understand, integrated knowledge, well organized, appropriate for target group, well publicized, continually monitored and innovated) were critical elements. In addition, the activity lessons should include development of networks among clients. Regarding barriers, insufficient time to participate in the program, carelessness in health providers, the lack of powerful leader, and insufficient income of clients were perceived to be barriers for the program success.

Regarding the *objective2, our results* revealed that after the application of the PROMISE Model, self-efficacy, self-regulation, and self-care significantly increased from the baseline, and biomedical indicators significantly improved. These results were consistent with the results of program evaluation conducted in 2008-2009 [5] and also in line with the results of objective, indicating that HBMP based on PROMISE Model were effective in producing an increase of 3-self behavior and an improvement in biomedical indicators. Some explanations of the findings are put forward here. First, the programs were developed based on some positive psychological and managerial variables; including positive reinforcement, result-based management, optimism, motivation, individual-centered, and self-esteem which were integrated into the PROMISE Model. Second, the success may be due to changes in health behavior, particularly the increases in 3-self behavior. This was supported by previous studies suggesting that when health behavior such as healthy eating and regular exercise increased, risk factors for metablic diseases decreased [7-10].

6. Recommendation

Health practitioners or professional interventionists, who require increases in 3-self behavior and decreases in risk factors of metabolic diseases, could apply PROMISE Model to develop HBMP. The overall model of this evaluative research and HBMP management could apply CIPP Model. The key factors and barriers for program success previously mentioned should be carefully considered when future programs are contemplated. There may be other factors affecting effectiveness of the programs, for example social support, perceived health information, reward and motivation. Thus, future research should investigate these factors. Since insufficient time to participate in the program was perceived as a main barrier to the program success, there should be studies examining determinants of participating in the HBMP among participants having different demographic data.

7. Conclusion

The HBMP based on PROMISE Model conducted by the participating organizations were considered successful and effective at producing an increase in HBMPs and an improvement in biomedicine indicators.

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Prevalence of HCVAb and HBsAg in Incident Hemodialysis Patients in Suburban Areas of Cairo

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Abstract: Introduction and Aims: Despite screening of blood products for anti-HCV and implementation of precaution measures, HCV infection is still a major problem in hemodialysis (HD) units. The overall prevalence of hepatitis C infection among adult Egyptian population is about 22.6%. This prevalence tremendously increases to reach nearly 89% among patients kept on regular hemodialysis for more than 6 months (prevalent hemodialysis patients). It is not known if this very high prevalence among the dialysis population is due to increased risk of infection during dialysis or possible increase of infection among CKD patients even before admission to dialysis. The aim of this epidemiological trial is to study the HCV infection rate among incident CKD patients coming from suburban areas around Cairo and admitted to a hemodialysis unit for the first time (incident hemodialysis patients). **Methods:** This single center study was conducted to 1000 incident hemodialysis patients. They were enrolled from 16/1/2008 to 30/7/2009, during their first presentation to our dialysis unit. All the patients of this study were subjected to history taking including the history of previous immunization against hepatitis B, they were investigated by using rapid chromatographic immunoassay for the qualitative detection of Hepatitis B surface antigen, and by using the HCV One Step Test Device which is a rapid chromatographic immunoassay for the qualitative detection of antibody to Hepatitis C virus in serum or plasma as a routine check up before dialysis. Patients included are 18 years or older who are dialyzed for their first time and have no history of renal transplantation before. **Results:** The age of recruited patients ranged between 18 and 82 years with mean of 49.42 years. The commonest age group recruited was between 51 and 60 years old. 512 of the patients were males and 488 were females (51.2%, 48.8% respectively). The prevalence of HCV Ab positive status among the whole group is 22.9%, HCV Ab positive was more in males than females (26.2% versus 19.5% respectively, $p = 0.013$) and the commonest age of prevalence of HCVAb was between 51 and 60 years old and the mean age was 49.5 years. The lowest prevalence of hepatitis C was at the age of 70 years old. There were 14 (1.4%) HBsAg positive patients, the prevalence was more common in males than in females (0.0159 versus 0.0122 respectively, $p = 0.790$). We had only 4 patients (2 males and 2 females) having both HCVAb and HBsAg (0.4%). **Conclusions:** The similarity in the prevalence of HCV infection among the general population on one side and the incident hemodialysis patient on the other dictates that the increased prevalence of hepatitis C infection among prevalent hemodialysis patients is acquired during the dialysis period.

Key words: HCVAb, HBsAg, incident hemodialysis.

1. Introduction

Hepatitis C virus (HCV) belongs to the *Flaviviridae* family of viruses. Its genome is a single-stranded RNA molecule (genomic HCV-RNA). Despite screening of blood products for anti-HCV and implementation of precaution measures, Hepatitis C Virus (HCV) infection remains prevalent in patients receiving regular dialysis all over the world [1].

Epidemiology, dialysis practice and reimbursement are significantly different across the world. With the notable exception of parts from Eastern Europe, hepatitis C incidence and prevalence are low among the European countries [2].

As in the general population, the prevalence of HCV in CKD Stage 5D patients varies worldwide, ranging from as low as 1% to as high as over 70%. Overall, the current prevalence of HCV is below 5% in most of Northern Europe, around 10% in most of Southern Europe and the US, between 10 to 50% and up to 70% in many parts of the developing world, including many

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Asian, Latin American, and North African countries. It is important to emphasize that the prevalence of HCV is highly variable from unit to unit within the same country, with recent reports from some dialysis units in the US reporting prevalence above 20% [3].

The overall prevalence of hepatitis C infection among adult Egyptian population ranges between 14.4% [4] to 22.5% [5]. However, this prevalence tremendously increases to reach nearly 87.5% among patients kept on regular hemodialysis for more than 6 months [6]. It is not known if this increase is due to acquisition of infection during dialysis or the possible increase of prevalence of infection among CKD patients.

There is paucity of data looking for the prevalence of HCVAb or HBsAg among incident (less than 30 days of starting dialysis) hemodialysis patients.

The aim of this epidemiological trial was to study the prevalence of HCVAb among incident hemodialysis patients coming from suburban areas around Cairo who are admitted to hemodialysis unit for the first time.

2. Patients and Methods

2.1 Patients

This single center study was conducted to 1000 patients, who started hemodialysis for the first time in Cairo city, coming from urban and suburban areas around Cairo. They were enrolled from 16/1/2008 to 30/7/2009, during their first presentation to the dialysis unit. This dialysis unit is known as a charity unit offering dialysis service for the 1st 2 weeks till they can settle in maintenance hemodialysis firm. The local ethics committees approved the study and all patients enrolled in the study provided informed consent. The patients included in the study were subjected to history taking including the history of previous immunization against hepatitis B, history of operations, blood transfusion etc.

They were investigated by using ultra fast rapid test (for detecting antibodies against hepatitis C, [The HCV One Step Test Device (Serum/Plasma) is a rapid chromatographic immunoassay for the qualitative detection of antibody to Hepatitis C Virus in serum or plasma], and antibodies against HIV I.II, [the HIV 1/2 Ultra Rapid Test Device (Serum/Plasma) is a rapid chromatographic immunoassay with a double antigen system for the qualitative detection of antibodies to HIV 1 and/or HIV 2 in serum or plasma]. In addition to hepatitis B surface antigen (HBsAg) [The HBsAg One Step Hepatitis B Surface Antigen Test Device (Serum/Plasma) is a rapid chromatographic immunoassay for the qualitative detection of Hepatitis B Surface Antigen in serum or plasma] ,as a routine check up before dialysis as a recommendation of the KDOQI and KDIGO beside the regulations imposed by the local Egyptian health authorities. All incident hemodialysis patients (i.e., patients starting chronic hemodialysis treatment for ≤30 days) aged ≥18 years were eligible for inclusion in the study. Patients were excluded if they had undergone renal replacement therapy previously, were already receiving hemodialysis (≥30 days) or peritoneal dialysis, or had received a kidney transplant.

2.2 Statistical Analysis

Data were statistically described in terms of range, mean ± standard deviation (± SD), median, frequencies (number of cases) and percentages when appropriate. Comparison of quantitative variables between the study groups was done using Student *t* test for independent samples in comparing 2 groups when normally distributed and Mann Whitney *U* test for independent samples when not normally distributed. For comparing categorical data, Chi square (χ^2) test was performed. Exact test was used instead when the expected frequency is less than 5. A probability value (*p* value) less than 0.05 was considered statistically significant. All statistical calculations were done using computer programs Microsoft Excel 2003 (Microsoft Corporation, NY, USA) and SPSS (Statistical Package

for the Social Science; SPSS Inc., Chicago, IL, USA) version 15 for Microsoft Windows.

3. Results

The age of recruited patients ranged between 18 and 82 years with mean of 49.42 years. The commonest age group recruited was between 51 and 60 years old. 512 of the patients were males and 488 were females (51.2%, 48.8% respectively). The prevalence of HCV Ab positive status among the whole group is 22.9%, HCV Ab positive was more in males than females (26.2% versus 19.5% respectively, p = 0.013) and the commonest age of prevalence of HCVAb was between 51 and 60 years old and the mean age was 49.5 years. The lowest prevalence of hepatitis C was at the age of 70 years old. There were 14 (1.4%) HBsAg positive patients, the prevalence was more common in males than in females (0.0159 versus 0.0122 respectively, p = 0.790). We had only 4 patients (2 males and 2 females) having both HCVAb and HBsAg (0.4%) (Tables 1-4).

Table 1 HBsAg positive and HCV positive cases.

	Frequency	Percent
HBsAg Positive	14	1.4
HCV Positive	229	22.9

Table 2 Prevalence of HCV Ab in both genders.

			HCV Ab Positive
Gender	F	Number of +ve cases	95/488
		Prevalence	19.5%
	M	Number of +ve cases	134/512
		Prevalence	26.2%
Total			229

P value: 0.013

4. Discussion

Hepatitis C virus (HCV) is the most common liver disease among hemodialysis (HD) patients. The seroprevalence of HCV infection among HD ranged from 1.9% to 80% in reports published since 1999. Evaluating the natural history of HCV infection among HD patients faces great controversy because the onset is rarely recognized; the course of HCV is usually indolent and extends over decades rather than years. The mortality hazard associated with HCV infection among hemodialysis patients is 1.25 (95% confidence interval 1.12 to 1.39; P < 0.001) compared to HCV –ve patients. Mortality hazards are higher among incident than prevalent patients [7].

As part of infection control strategy, patients on hemodialysis should be tested when they first start

Table 3 Age distribution of the recruited group.

		Frequency	Percent
Valid	18-30 ys	142	14.2
	31-40 ys	119	11.9
	41-50 ys	205	20.5
	51-60 ys	290	29.0
	60-70 ys	177	17.7
	> 70 ys	61	6.1
	Total	994	99.4
Missing	System	6	0.6
Total		1,000	100.0

Table 4 Relation between the age and HCV Ab alone, the commonest age group of the patients who had HCV Ab positive at the start of dialysis was between51-60 years.

			HCVAb alone	Total
			Positive	
Age G	18-30 ys	Count	27	142
		% among age group	19.0%	
	31-40 ys	Count	27	119
		% among age group	22.6%	
	41-50 ys	Count	47	205
		% among age group	22.9%	
	51-60 ys	Count	71	290
		% among age group	24.5%	
	60-70 ys	Count	43	177
		% among age group	24.3%	
	> 70 ys	Count	8	61
		% among age group	13.1%	
Total		Count	223	994
		% among age group	100.0%	100.0%

hemodialysis or when they transfer from another hemodialysis facility [8].

In our study we tried to estimate the prevalence of hepatitis C antibody and Hepatitis B surface antigen among incident hemodialysis patients in suburban population around the capital Cairo.

In this observational prospective cohort trial, 1000 patients including 512 males, the 6th decade of age is the most common age for starting hemodialysis**.** In Japan, the most prevalent age at the start of dialysis is the 7th decade [9]. While in Spain the commonest age is between 65 and 74 years [10]. In a study done by Sawhney et al. 2009 [11], the age of starting hemodialysis in Scottish and British columbia is around 62 years. The data were little bit different among the Australian patients where most of the cases started hemodialysis between 40 and 59 years [12].

The prevalence of HCV, in new patients starting renal replacement therapy, ranged from 3% to 7% [13]. In our study, 229 patients were HCV Ab positive (22.9%), a figure comparable to that encountered in Tunisian hemodialysis patients (about 20%) [14].

The prevalence of HCV infection varies greatly among various populations of patients on HD from different geographic regions. In a review by Wreghitt et al., 1999 [15], HCV prevalence among HD population ranging from 4% in the UK to 71% in Kuwait [16]. In Egypt, HCV infection was found in 87.5% of hemodialysis patients [6] and Gohar et al., 1995 [17]. The seroconversion rates during dialysis treatment varied between 1% and 16% per year according to the duration of the dialysis with increasing rate of seroconversion with increasing years on dialysis [18].

Infection control measures have been developed to reduce risk for transmission of blood-borne viruses within the ESRD population. These measures include protocols for handling body fluids, isolation policies, and use of erythropoietin to minimize blood transfusions, however HCV persists within hemodialysis units. Differences in patient behavior and community exposures, such as intravenous drug abuse, may contribute to persistence of HCV in hemodialysis units and also to variation in HCV prevalence and seroconversion among units. Application of infection control protocols also may differ among units, it is likely that facility level practice patterns affect HCV transmission in dialysis units, even in the current environment of infection control measures [13].

The rate of seroconversin is high among the Egyptian hemodialysis units because of lack of erythropoietin treatment with consequent high rate of blood transfusion, failure of application of infection control protocols, and absence of isolation policies. In addition, most of the dialysis facilities are hospital based where acute and chronic dialysis share the same facility.

Our study has some limitation as we did not search for the prevalence of HCVAb in the same suburban population, but based on recent data the prevalence of HCV Ab among the rural villages and the suburban areas were 18.1% [19], compared to 22.9%, among incident hemodialysis patients from suburban areas in the present study. Previous data by Fabrizi had shown the prevalence of HCV infection tends to be higher in patients with CKD not yet on dialysis than in the general population [20].

In our study there were 14 (1.4%) HBsAg positive patients (10 had HBsAg alone, and 4 had HCVAb in addition)**.** In comparison to other countries like Spain the prevalence of HBsAg in incident hemodialysis is 1% [10] almost similar to our study. This figure is lower than that encountered in both Saudi Arabia and Bahrin, (HBsAg +ve cases are 5.88% of hemodialysis patients) [21]. In Oman, the prevalence of HBV among Omani hemodialysis patients is 7.7% [22]. In December 2002, all U.S. chronic hemodialysis centers were surveyed regarding selected patient care practices and dialysis-associated diseases, the incidence of HBV infection was higher among patients in centers where injectable medications were prepared on a medication cart or medication area located in the treatment area compared to a dedicated medication room [23].

We conclude that:

- The prevalence of HCV infection is high in incident haemodialysis patients coming from suburban areas around the Capital Cairo.
- The prevalence of HBV in the same group is low.
- The commonest age starting hemodialysis in this study is 49.42 years.

The similarity in the prevalence of HCV infection among the general population on one side and the incident hemodialysis patient on the other dictates that the increased prevalence of hepatitis C infection among prevalent hemodialysis patients is due to the high rate of seroconversion.

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CNS Depressant Studies on Methanolic Extract of Adenanthera Pavonina Seed

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Abstract: Objective: A methanolic extract of *Adenanthera pavonina* was evaluated for CNS depressant effect. **Materials and methods:** The methanolic extract of *Adenanthera pavonina* seeds was subjected to pharmacological screening in various animal models to ascertain its depressant effect on the CNS. **Results:** Phytochemical analyses of the extract shows the presence of cardiac glycosides, tannins, flavonoids, essential oils, phlobatanins and saponins. The LD_{50} of the extract was found to be 1360 mg/kg. The extract produced a significant potentiation of the phenobarbitone sleeping time in mice in a dose related pattern. At 200 mg/kg, the extract produced a greater depressant activity than the reference drug (chlorpromazine-10 mg/kg) and also offered 80% protection against leptazol-induced convulsion in mice. A dose dependent reduction in spontaneous locomotors activity indicating a CNS depressant effect in mice was also exhibited by the extract. Significant reduction in writhing induced by acetic acid in mice and inhibition of increased in paw size in carrageenan-induced paw oedema in rats were also observed. **Conclusion:** The study has established the anti-inflammatory, analgesic, anti-convulsant and CNS depressant activities of the methanolic extract of *Adenanthera pavonina* seed.

Key words: Adenanthera pavonina, CNS, depressant, seed extract.

1. Introduction

Plants have been a valuable source of medication and gradually becoming popular throughout the world. Plant secondary metabolites play an important role in medical care for a good percentage of world population. Approximately half of the worlds 25 best selling pharmaceuticals agents are derived from natural products [1]. Thus, emphasis is now given on the standardization of herbal medicines by screening of biological activities of medicinal plants and isolation of active principles from them.

Adenanthera pavonina L. syn. Red Sandalwood, (Fabaceae) is an unarmed deciduous tree [2]. The red lens shaped circassian seed are curiosities with travelers and are used as necklaces and ornamentals. The tree is sometimes called peacock flower, fence or sandalwood tree. The tree produced large quantities of red seed which are used as beads. According to Mabbery [3], the plant is also called coral wood, red wood, coral pea, Barbados pride. *Adenanthera pavonina* L. (Family: Fabaceae) commonly known in Bangladesh as "Rakta Kombol", is an important medicinal plant native to tropical Asia, Western and Eastern Africa as well as in most islands of both the Pacific and Caribbean regions [4]. Traditionally it had been used to treat many diseases such as asthma, boil, diarrhoea, gout, inflammations, rheumatism, tumour and ulcers, and as a tonic [4-6]. Several parts of the plant have been verified for its medicinal important hence, the bark and leaves are astringent, vulnerary, anthelmintic and aphrodisiac and are used in gonorrhea, ulcers, pharyngopathy, vitiated conditions of vata and gout and rheumatism. The seeds are bitter, astringent, sweet, cooling, aphrodisiac, anti-emetic and febrifuge.

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They are useful in gout, burning sensation, hyperdipsia, vomiting, fever and giddiness. Powder of the seed is applied as a poultice to abscess to promote suppuration. The heart wood is astringent, aphrodisiac, haemostatic and is useful in dysentery, haemorrhages and vitiated condition of vata. The roots are reported to be emetic in nature [2, 7]. Adenanthera pavonina trypsin inhibitor through its anti-metabolic action retard growth of Anagasta kuehniella (Lepidoptera: Pyralidae) [8].

Previous phytochemical investigation of the plant reported the presence of robinetin, chalcone**,** butin and flavanol ampelopsin**,** stigmasterol glucosides**,** oleanolic acid, echinocystic acid, sapogenins and many other bioactive phyto-constituents [9-11]. The analgesic, anti-inflammatory, antibacterial, antifungal, antioxidant, cytotoxic and blood pressure reducing activities of the leaf and seed extracts and its isolated compounds have been reported [11-15].

Drugs acting on the CNS were among those first to be discovered by primitive humans and are still the most widely used group of pharmacological agents known [16]. *Adenanthera pavonina* falls into the category of pharmacologically unclassified group of plants as there are little documented studies on the plant. In this study, the methanol extract of the seed of the plant was studied for its pharmacological properties.

2. Materials and Methods

2.1 Plant Material

The seed of *Adenanthera pavonina* were picked from one tree in the botanical garden of University of Ibadan (Ibadan, Nigeria) in the month of November. The seeds were sun dried, grounded in a mill to a powdery form and then sieved. A weighed amount (995 g) of the powdered sample was exhaustively extracted in methanol using a Soxhlet extractor. The resulting oily extract was concentrated in vacuum using a rotary evaporator. This was dried to a constant weight (yield 12.8%) and stored in an airtight bottle at room temperature until analysis. The extract was prepared fresh in 0.9% saline for pharmacological studies.

2.2 Animal Materials

Swiss albino mice (weighing 20-25 g) of either sex were collected from the animal house of Department of Pharmacology & Therapeutics (University of Ibadan) and fed with standard pellet (Ladokaun feed, Ibadan, Nigeria). Water was provided *ad libitum* and the animals were kept in polyvinyl cages in groups of five animals each under controlled room temperature (25±2°C) in the laboratory environment (12 h dark/12 h light cycle) for seven days for acclimatization. Animals were fasted overnight and weighed before the experiment. The design and performance of research study involving mice have been approved by the Ethical Review Committee, Faculty of Biological Science, University of Ibadan, Nigeria.

2.3 Phytochemical Analysis

The methanolic extract of *Adenanthera pavonina* seed was analyzed for the presence of the following; saponins, cardiac glycosides, phlobatannins, tannins, anthraquinones, alkaloids, carbohydrates and flavonoids. The methanolic extract of adenanthera pavonina seed was qualitatively tested by standard phytochemical methods [4, 17-19].

2.3.1 Saponins

Small quantity of each extract was boiled with 5mL of distilled water, filtered and cooled.

(1) Frothing: To the filtrate (2.5 mL) about 10 mL of distilled water was added and shaken vigorously for 2minutes. Frothing observed indicates a positive test.

(2) Emulsification: To the filtrate (2.5 mL) added 3 drops of olive oil and shaken vigorously for 2 minutes. An emulsified layer indicates a positive test.

2.3.2 Alkaloids

Small quantity of each extract was stirred with 5 mL of 1% hydrochloric acid for five minutes on a water bath and then filtered. Of the filtrate of each extract was divided into two portions. Mayer's reagent was added

to one portion; occurrence of creamy white precipitate was taken as positive. To the second portion few drops of Dragendorff's reagent was added and appearance of orange red precipitate was regarded as positive for the presence of alkaloids.

2.3.3 Carbohydrates

Molisch's test: Small quantity of each extract was dissolved in 5 mL of distilled water and taken in a test tube. Two drops of freshly prepared 10% alcoholic solution of α-naphthol was added and mixed thoroughly. Conc. H_2SO_4 (2 mL) was allowed to flow down the side of the test tube. A red or reddish violet ring in the two layers indicates a positive test. It was shaken and allowed to stand for 2 minutes and diluted with 5 ml of water. The appearance of a dull violet precipitate which appears immediately is an indication of carbohydrates presence.

2.3.4 Cardiac Glycosides (Keller-killiani Test)

Small quantity of each extract was diluted in 5 mL of distilled water. 2 mL of glacial acetic acid containing one drop of ferric chloride solution (3.5%) was added to each. This was underlay with 1mL of concentrated sulfuric acid. A reddish brown ring is formed at the interface and upper layer turns bluish green on standing indicates the presence of a deoxy sugar characteristic of cardiac glycosides.

2.3.5 Cyanogenetic Glycosides

Small quantity of each extract moistened with 5 mL in distilled water and filtered. Few drops of chloroform were added to each (to enhance enzymatic activity). A sodium picrate–saturated filter paper strip was hanged at the neck of the flask with the help of the cork and warmed the flask. The filter paper strip if turned brick-red or maroon indicates the presence of cyanogenetic glycosides.

2.3.6 Tannins

(1) Ferric Chloride Test: Small quantity of each extract was boiled in 10 mL of water in a test tube and then filtered while hot and a few drops of 0.1% ferric chloride solution were added to the filtrate. A brownish green or a blue-black coloration indicates positive test.

(2) Lead Acetate Test: Small quantity of each extract was taken in a test tube and diluted with 5 mL of distilled water. Few drops of a 1% solution of lead acetate were added. A yellow or red precipitate indicates a positive test.

2.3.7 Flavonoids

Two methods were used to determine the presence of flavonoids in the extracts.

(1) Method-1: Few drops of 1% aluminium solution were added to aqueous filtrate of the each extract. A yellow coloration indicates the presence of flavonoids.

(2) Method-2: A small portion of the each extract was heated with 10 mL of ethyl acetate over a steam bath for 3 minutes. The mixture was filtered and 4 mL of the filtrate was shaken with 1 mL of dilute ammonia solution. A yellow coloration indicates the presence of flavonoids.

2.3.8 Anthraquinones

A small portion of each extract was boiled with 10 mL of sulfuric acid, traces of ferric chloride solution was added and filtered while hot. The filtrate was shaken with 5mL of chloroform. The chloroform layer was taken into another test tube and 1 mL of dilute ammonia was added to each portion. Rose-pink color in the aqueous layer indicates the presence of anthraquinones.

(1) Acute Toxicity

Albino mice were divided into 7 groups of 10 animals per group. The control group received 0.2 mL normal saline while the rest of the group received different doses of the test extract (100 mg/kg, 200 mg/kg, 400 mg/kg, 800 mg/kg, 1600 mg/kg and 3200 mg/kg) intraperitoneally. Mortality in each group was observed for 24 h. Percentage lethality was determined for each group by counting the number of dead animals per group.

(2) Phenobarbitone induced Hypnosis

The test as described by Dandiya and Columbine [20] was adopted. Albino mice were starved for 24 h before drug administration. The control group received 0.2 mL normal saline. The reference animals received 10

mg/kg chlorpromazine while the other three groups received 50, 100, and 200 mg/kg of the extract orally. All the animals were then injected 20 mg/kg (I.P.) of phenobarbitone after 30 minutes. The duration of loss and gain of righting reflex was taken as measure of sleeping time.

(3) Anti-convulsant Activity (Leptazol induced seizures)

This was carried out using the method outlined by Saoje-Echaque et al. [21]. Mice were divided into different treatment groups and thereafter treated orally with the extract (50, 100, 200 mg/kg), normal saline and phenobarbitone (20 mg/kg). After 1 h, leptazol (0.8 mg/kg) was administered intraperitoneally to all the animals. Animals were observed for tonic and clonic seizures and for death. Failure to undergo seizures after 60 minutes was considered as protection. Anti-convulsant activity was taken as a measure of seizure latency, death and percentage protection.

(4) Spontaneous Locomotor Activity

The test as described by Saluja and Santani [22] was used. Albino mice divided into different groups received different treatment. Control group received 0.2 mL saline, reference group received 20 mg/kg phenobarbitone and the rest group received 50, 100, 200 and 400 mg/kg varied doses of the extract. The animals were observed for movement, gait, scratching rate and tactile responses 30 minutes after treatment and at hourly intervals for 5 h. Each observation periods consisted of 1minute for each group.

(5) Analgesic (anti-nociceptive) activity: Acetic Acid-induced Writhing Test

The method described by Deraedt et al. [23] was adopted. Albino mice weighing 20-22 g were divided into groups. Reference group received 5 mg/kg indomethacin; the control group received normal saline while the rest received 50, 100, and 200 mg/kg of the extract. Drugs were administered intraperitoneally. 30 minutes later, all received intraperitoneal injections of 0.6% w/v acetic acid solution in water at a dose of 10 mg/kg. The number of writhing and stretching which are characterized by wave of contraction of the abdominal musculature followed by extension of the hind limb occurring between 5 and 15 minutes were counted and recorded. A reduction in the number of writhing as compared to the control group was considered as evidence of analgesic activity expressed as percentage inhibition of writhing. This was calculated using the following formula:

$$\%\text{inhibition}=\frac{\text{Mean No. of Writhing in contr gp}-\text{mean No. of Writhing in Test gp}}{\text{Mean No. of Writhing in control gp}}\times 100$$

(6) Anti-inflammatory activity

Pedal inflammation in albino rats (180-200 g) of either sex was produced according to the method described by Winter et al. [24]. An injection was made of 0.1 mL of freshly prepared suspension of 1% Carrageenan (SIGMA USA) in normal saline into the right hind foot of each rat in the plantar region. Animals were given test agent intraperitoneally 30 minutes before the Carrageenan injection. The reference group received 5mg/kg indomethacin, the control received 0.2 mL normal saline while the test group received 50, 100, and 200 mg/kg of the test extract. Increase in paw circumference which is an index of increase in paw volume which is a measure of oedema [25]. Measurements were taken immediately before and at hourly intervals for 5 h after Carrageenan injection. The inhibitory activity was calculated according to the following:

$$\%\text{inhibition}=\frac{(\text{Ct}-\text{Co})\text{control}(\text{Ct}-\text{Co})\text{treated}}{(\text{Ct}-\text{Co})\text{control}}\times 100$$

Where Ct = linear circumference of paw after Carrageenan injection, Co = linear circumference of paw before Carrageenan injection.

(7) Statistical analysis

The data was analyzed using statistical package for the social sciences (SPSS, version 10.0). The

correlations between variables were performed by Spearman's or Pearson's correlation test. Data are expressed as Mean±SEM. Differences between control and treatment groups were tested using student t-test. Statistical significant was accepted at $p \leq 0.05$.

3. Results

The result on Table 1 shows that the extract contains cardiac glycosides, phlobatannins, tannins, flavonoids and saponins. Essential oils are also present.

Table 1 Phytochemical profile of methanolic extract of Adenanthera pavonina.

Test	Observation	Inference
Alkaloids	No colour change with Dragendorf's Mayer's reagent	Alkaloids are absent
Anthraquinones	Light brown layer in NH_3 phase. No rose-pink or violet colouration was observed.	Anthraquinones are absent
Phlobatannins	A Reddish-brown precipitate was deposited	Phlobatannins are present
Tannins	Lead Acetate Test: A yellow or red precipitate. Ferric Chloride Test: A brownish green or a blue-black colouration observed	Tannins are present
Saponins	Frothing persisted on warming in a water bath	Saponins are present
Cardiac Glycosides	Keller-killiani Test: A reddish brown ring was observed.	Cardiac glycosides are present
Phenols	No colour change was observed	Phenols are absent
Flavonoids	A yellowish colour change was observed	Flavonoids are present
Carbohydrates	Reddish violet ring or dull violet precipitate	Carbohydrate are absent
Cyanogenetic Glycosides	No colour change was observed in filter paper strip	Cyanogenetic Glycosides are absent

Table 2 Effect of *Adenanthera pavonina* methanol extract on phenobarbitone sleeping time in mice.

Treatment	Sleeping time (minutes) ± SEM
Control (10 ml/kg saline)	72.4 ± 64.8
Adenanthera pavonina (50 mg/kg)	426.6 ± 85.5
Adenanthera pavonina (100 mg/kg)	570.8 ± 53.8
Adenanthera pavonina (200 mg/kg)	720.0 ± 00.0
Chlorpromazine (10 mg/kg)	642.0 ± 69.8

Values are express as mean ± SEM for six independent observations (n=6). Values are statistically significant at $p \leq 0.05$.

Table 3 Effect of *Adenanthera pavonina* methanol extract on leptazol-induced seizures in mice.

Treatment	Seizure latency (min) ± SEM	Death Latency (min) ± SEM	% Protection
Control (10 ml/kg) saline	1.2 ± 0.2	7.8 ± 0.9	0
Adenanthera pavonina (50 mg/kg)	2.1 ± 0.7	29.4 ± 7.2	0
Adenanthera pavonina (100 mg/kg)	3.8 ± 0.8	19.6 ± 5.0	0
Adenanthera pavonina (200 mg/kg)	10.2 ± 1.9	50.6 ± 8.4	80
Phenobarbitone (20 mg/kg)	24.6 ± 8.6	60.0 ± 0.0	100

Values are expressed as Mean ± SEM for six independent observations (n = 6). Values are statistically significant at $P \leq 0.05$.

Table 4A Effect of methanolic extract of *Adenanthera pavonina* on spontaneous locomotor activity in mice.

Treatment	Dose (mg/kg)	30 min		60 min		120 min		180 min		240 min		300 min	
		MV	GA	MV	GA	MV	GA	MV	GA	MV	GA	MV	GA
Control	NS	3	3	3	3	3	3	3	3	3	3	3	3
A. pavonina	50	3	3	3	2	2	2	2	2	3	3	3	3
Adenanthera pavonina	100	3	3	2	2	2	2	2	1	1	1	2	2
Adenanthera pavonina	200	2	2	2	2	2	1	1	1	1	1	0	0
Adenanthera pavonina	400	2	2	1	1	1	1	1	0	1	0	0	0
Phenobarbitone	20	2	2	1	1	0	0	0	0	0	0	0	0

Key/Rating: Movement (MV): 3=highly mobile; 2=moderately mobile; 1=slightly mobile; 0= immobile; Gait (GA): 3=highly stable; 2= moderately stable; 1= slightly stable; 0= unstable.

Table 4B Effect of methanolic extract of *Adenanthera Pavonina* on spontaneous activity in mice.

Treatment	Time (min)											
	30		60		120		180		240		300	
	SR	TS	SR	TS	SR	TS	SR	TS	SR	TS	SR	TS
Control (10 mg/gk)	0	++	0	++	0	++	0	++	0	++	0	++
Adenanthera pavonina (50 mg/kg)	0	++	0	+	0	+	1	_	1	+	0	+
Adenanthera pavonina (100 mg/kg)	0	++	3	+	3	_	3	_	1	_	1	_
Adenanthera pavonina (200 mg/kg)	1	++	3	+	3	_	2	_	1	_	0	_
Adenanthera pavonina (400 mg/kg)	1	+	3	_	2	_	1	_	0	_	0	_
Phenobarbitone (20 mg/kg)	1	+	0	_	0	_	0	_	0	_	0	_

Key/Rating: Scratching Rate (SR): 3=high; 2=medium; 1=low; 0=absent; Tactile Stimuli (TS) ++ well pronounced; + partially present; 0 absent.

4. Discussion

The phytochemical analysis of the methanolic extracts of *Adenanthera pavonina* seed showed the presence of saponins, phlobatannins, flavonoids and cardiac glycosides. The presence of anthraquinones was also detected in methanolic extract while cyanogenitic glycosides were absent **[**4]**.** Considerable analgesic activity was observed in methanolic extract at a dose level of 100 and 200 mg/kg body weight. The methanolic extract contains high concentration of flavonoids and tannins. The analgesic activity showed by methanolic extracts may be due to the presence of flavonoids and tannins which also inhibit the biosynthesis of prostaglandins. Previously it has been observed that tannins, flavonoids and steroidal compounds possess good analgesic activity by inhibiting prostaglandin synthesis [26, 27]. Thus this supports peripheral analgesic activity seen with the extract and the analgesic activity may be because of the inhibition of prostaglandin synthesis. The abdominal constriction is related to the sensitization of nociceptive receptors to prostaglandins. It is therefore, possible that the plant exert analgesic effect probably by either inhibiting bio-synthesis or action of prostaglandins. It is therefore speculated that the extract was able to inhibit the prostaglandins release.

The methanolic extract of *Adenanthera pavonina* at 50, 100 and 200 mg/kg potentiated the phenobarbitone sleeping time in a dose dependent manner by 426.6, 570.8 and 720.0 minutes respectively. The reference drug chlorpromazine (10 mg/kg) and the control drug, normal saline (10 ml/kg) produced sleeping times of 642.0 and 72.4 minutes respectively (Table 2).

In the experiment of leptazol-induced seizures, the extract produced a statistically significant ($P \leq 0.05$) anti-convulsant activity with mean seizure latency of 2.1, 3.8 and 10.2 minutes for 50, 100 and 200 mg/kg of extract as compared to 24.6 and 1.2 minutes for phenobarbitone and normal saline respectively. The mean death latency was recorded as 50.6 minutes compared to 60.0 minutes for chlorpromazine. Therefore at 200 mg/kg of extract, 80% of protection against convulsion was conferred on the animal (Table 3).

Observations in Table 4a revealed that *Adenanthera pavonina* seed extract produced CNS depressant effects in a dose dependent fashion. In sedation, there is a suppression of responsiveness to a continuous level of stimulation with decreased spontaneous activity of *ideativa* [28]. Virtually all of the CNS depressant shares the ability to depress excitable tissue at all levels of the CNS accomplished by stabilization of neuronal membranes, decrease in the amount of transmitter released by the nerve impulse and also depression of post synaptic receptors [29]. Bowman and Rand [30] posit that all drugs with sedative and hypnotic activity act additively with other CNS depressants. *Adenanthera pavonina* extract exhibited CNS depressant effect alone which is comparable to that of

the reference drug phenobarbitone. Also in combination with phenobarbitone, it exhibited a statistically significant depressant effect. Other plants with CNS effects include *newlouldia leavis* and *hoslandia oppoita* as reported by Olajide et al. [31]. Olajide et al. [32] and Oliver-Bever [33] also reported the anti-convulsant properties of *Khaya grandifolia* and *Piper guineense* respectively.

It is not certain which particular group of compounds is responsible for the CNS depressant effects of *Adenanthera pavonina,* however, the focus of further biological studies would be on fractions and pure components isolated from the seed extract.

5. Conclusion

The study has established the anti-inflammatory, analgesic, anti-convulsant and CNS depressant activities of the methanolic extract of *Adenanthera pavonina* seed. From the acute toxicity test in which the LD_{50} of the methanolic extract was found to be 1360 mg/kg, it shows that the extract may be relatively non toxic when considering the amount or quantity taken under normal circumstances.

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Chronic Rejection and CMV Infection in Patients Post Living Donor Liver Transplantation

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Abstract: Objectives: To assess the incidence of chronic rejection and CMV infection and their possible interrelation in patients post living donor liver transplantation. **Patients and Methods:** A Retrospective study that included 77 patients successfully survived living donor liver transplantation (LDLT) and passed more than 3 months post transplant. We did a retrospective study to determine the incidence of chronic rejection and the incidence of CMV infection and the possible relation between them. All cases of chronic rejection were proved by histpatological confirmation with at least 50% or more vanishing bile syndrome in addition to a confirming CMV PCR. **Results:** The 77 patients included in the study were mostly transplanted because of HCV related end stage liver disease age range from 21 to 62years (mean 49years).other indications included primary biliary cirrhosis, primary sclerosing cholangitis, HBV related end stage liver disease, in addition to those transplanted for hepatocellular carcinoma and auto-immune hepatitis. All transplanted patients and donors were CBD IgG +ve before transplant. The incidence of chronic rejection which was all in the HCV group was 4.62% (6 patients). Three (2.31%) patients had CMV infection, all during the first 5 months post transplant. In patients with chronic rejection; 2 (33.3%) patients had CMV infection, 3 (50%) patients were treated with PEG INF and 1 (16.7%) patient was not CMV infected nor treated with interferon and had no obvious predisposing factors. Conclusion: Conclusion: In our series of LDLT, the incidence of chronic rejection is 4.6% and the incidence of CMV infection is 2.3%. Among the important predisposing factors for chronic rejection is CMV infection which will mostly lead to chronic rejection and graft loss. Another possible factor is interferon therapy for HCV as the rate of chronic rejection in the group of patients treated with PEG INF was (13.3%).

Key words: Living donor liver transplantation, chronic rejection, CMV.

1. Introduction

Chronic allograft liver transplantation, also termed vanishing bile duct syndrome (VBDS), develops slowly over a period of months or years and is a main cause of late graft loss. In fact, the onset is usually within several months after transplantation. Diagnostic criteria for chronic rejection are: (1) the presence of bile duct atrophy/pyknosis, affecting the majority of bile ducts, with or without bile duct loss; (2) convincing foam cell obliterative arteriopathy; or (3) bile duct loss affecting greater than 50% of the portal tracts [1]; (4) total fibrous obliteration of main portal vein and portal foam cell venopathy [2]. Risk factors for chronic liver rejection include transplantation for primary sclerosing cholangitis (PSC) [3], primary biliary cirrhosis (PBC) [4], certain patterns of HLA match between donor and recipient [5-7], positive lymphocyte cross-match [8], cytomegalovirus infection, transplantation between donor and recipient of different ethnic origins [9], sex mismatch [10], and absence of azathioprine from the immunosuppressive regimen [11]. Not all these risk factors have subsequently been confirmed. Cytomegalovirus infection is one of the suggested risk factors for chronic allograft liver rejection. Some results showed there was no direct correlation between them, others demonstrated CMV infection somehow implicated in

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mechanisms of chronic rejection and played a key role in the pathological changes of atrophy of bile duct and generation of graft arteriosclerosis, characteristic of chronic rejection [12]. All cases were treated. Thus we considered all patients who were not treated as without CMV disease. treatment was in the form of ganciclovir therapy (5 mg/Kg every 12 hours) was always initiated for 14 days, or until negative antigenemia results were observed For the same reason, the moment of ganciclovir prescription was considered as the onset of CMV disease.

2. Objectives

To assess the incidence of chronic rejection and CMV infection and their possible interrelation in patients post living donor liver transplantation.

3. Patients and Methods

A Retrospective study that included 77 patients successfully survived living donor liver transplantation (LDLT) and passed more than 3 months post transplant. We did a retrospective study to determine the incidence of chronic rejection and the incidence of CMV infection and the possible relation between them. All patients with chronic rejection were proved histopathologically. CMV infection was diagnosed on clinical suspicion and after exclusion of other causes which may lead to similar clinical and lab presentation and was proved by PCR for CMV. All patients received treatment courses for CMV.

4. Results

The 77 patients included in the study were mostly transplanted because of HCV related end stage liver disease age range from 21 to 62years (mean 49 years). The incidence of chronic rejection was 4.62% (6 patients), 5 males and 1 female all were transplanted for HCV, regarding their immunosuppressant regimens, 4 patients had Ciclosporine and 2 patients had tacrolimus. The timing of chronic rejection ranged from 8 month to 15month post transplant. Three (2.31%) patients had CMV infection, all during the first 5 months post transplant. In patients with chronic rejection; 2 (33.3%) patients had CMV infection, 3 (50%) patients were treated with PEG INF and 1 (16.7%) patient was not CMV infected nor treated with interferon and had no obvious predisposing factors. In a patient group that was already treated with interferon 13.3% developed chronic rejection episodes and discontinued treatment with interferon. 2 (66.6%) of the 3 patients with CMV infection and had later during their follow up chronic rejection, were all treated and cured from their CMV infection before the development of chronic ductopenic rejection. In the chronic rejection group; 4 (66.6%) of the 6 patients had graft failure, 3 died and 1 was re-transplanted; the other 2 (33.4%) are having a slowly progressive course and maintained on high levels of immunosuppression and have almost normalized liver chemistries and bilirubin level although their histopathology still shows chronic ductopenic rejection. Statsistical analysis was not done due to small sample size.

5. Discussion

The present analysis reports the incidence of chronic rejection and incidence of CMV infection and we thjnk there might be a casual relationship between as well as follow up after LDLT. The low incidence of CMV hepatitis is in contrast to earlier reports, in which a frequency of up to 17% was found. This difference might be explained by reduced net immunosuppression with increasing use of dual immunosuppression and resulting reduced frequency of CMV infection. And all our patients, sero-positive for IGg CMV had liver grafts from sero-positive donors. However, the use of dual immunosuppression lowered only the overall incidence of CMV infection. The very low incidence in the present series is attributable to a combination of different factors, including a balanced immunmupprasion, and advancement in the

monitoring of CMV infection. The liver was the most common site of CMV disease after liver transplant but one has to consider that other sites are less commonly investigated, for example the gastrointestinal tract (GIT), where it was found 33% prevalence of gastrointestinal CMV infection in routine endoscopic procedures. Many studies have demonstrated a close association between CMV infection and chronic allograft liver transplantation, but it did not prove an etiological role for the virus in this syndrome. CMV infection may be one of the risk factors for development of VBDS. A better understanding of the etiologic role of CMV in VBDS, is important for designing effective therapeutic strategies to ameliorate this process [12]. CMV infection has also been reported as a strong risk factor for the development of CR [13]. This is explained by MHC II antigens on bile duct epithelials and consecutively enhanced immune and inflammatory response. At the same time, adhesion molecules have been shown to increase biliary endothelial cells. Another risk factor was the introduction of interferon- therapy in HCV-positive patients for recurrent hepatitis C. However, of all these factors, we could only confirm a previous acute rejection episode and underlying disease as significant risk factors during a multivariate analysis of our own patient population. Other factors that contribute to the development of CR include donor age > 40 years [14]. The incidence of chronic rejection might be slightly lower than some earlier reports and from the 6 reported case in our study only 1 had no predisposing factors, however the other cases either had interferon treatment 3, and the other 2 had CMV infection which is considered as a predisposing factor. So in conclusion we think that among predisposing factors for Chronic rejection is HCV, CMV infection, low immunosuppression, statistical analysis couldn't be performed due to the low number of the studied group, further larger studied are needed.

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Intensive Care Treatment for Neurosurgically Ill Patients in Sanglah Hospital-Bali

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Abstract: Background: To date it is not known whether a neurointensivist (beside the general intensivist) is required for neurosurgical patient's treatment. The purpose of this study was to evaluate the pattern of intensive care treatment for neurosurgically ill patients in Sanglah Hospital by the general intensivist. **Subjects and methods:** This was a retrospective study based on 1318 neurosurgical patients, 904 males and 414 females with both head and neck trauma and nontrauma, in Sanglah General Hospital, Bali between 2004-2008. The demographics of the patients, sex, age, diagnosis, treatment, ventilated or not, length of stay in ICU, and outcome were recorded. **Results:** Trauma was diagnosed in 908 patients and nontrauma in 412. Neurosurgical operative procedures were conducted in 1109 patients and conservative procedures in 211 patients, 930 patients used a ventilator in the ICU and 1011 patients were treated for less than 7 days in the ICU. The mean ventilator usage was 7.75±3.57 patients per month. The mean ICU treatment less than 7 days was 8.43±3.15 patients per month, 975 lived (73.98%) and were discharged from ICU, 343 (36.02%) patients died. **Conclusion:** The high mortality rate, high use of ventilators, and prolonged stay in ICU create a need for a trained specialist to manage all aspects of the ICU stay of neurologically ill patients. This study suggests that a neurointensivist is necessary to co-manage treatment for neurosurgically ill patients, including head and neck trauma and non trauma cases.

Key words: Intensive care treatment, neurosurgically ill, neurointensivist.

1. Introduction

Recently, head and neck trauma in developing countries has increased due to the increased number of traffic accidents that involve head and neck structures. This is followed by non trauma cases caused by a lack of primary health care, high incidence of infection, nutritional deficiencies leading to congenitally abnormal babies, late detection of tumors and degenerative diseases [1-3]. These conditions affect the outcome of neurosurgery in neurosurgically ill patients. Prolonged hospitalization in an intensive care unit (ICU), including postoperative treatment for intracranial bleeding and neck fractures if present, is necessary. Management of multiple potential neurological and medical complications, such as vasospasm, hydrocephalus, cerebral salt wasting, pressure sore, deep vein thrombosis, hospital associated pneumonia (HAP), sepsis, and ventilatory associated pneumonia (VAP) is also necessary [1, 2].

ICUs with critical care physicians, or intensivists, are known to improve patient recovery. Fulltime employment of an intensivist has been associated with improved recovery for pediatric patients and reduced mortality rates in adult patients following abdominal aortic aneurysm repair. A neurointensivist is a specialist trained to manage all aspects of the ICU stay of neurologically ill patients [2].

2. Subjects and Methods

This study was using retrospective descriptive study. Cases were recruited from the Intensive Care Unit, Department of Neurosurgery, Sanglah Hospital-Denpasar. Target populations were all patients who were neurosurgically ill. Accessible populations were all neurosurgically ill patients who were treated in the Intensive Care Unit (ICU) at Department of Neurosurgery, Sanglah Hospital-

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Denpasar, between 1st Jan, 2004 and 31st Dec., 2008. Inclusion criteria was all patient who was diagnosed neurosurgically ill on head and neck, both including trauma and non trauma cases, who need to be treated in ICU. The demographics of the patients, sex, age, diagnosis, treatment, ventilated or not, length of stay in ICU, and outcome were recorded.

3. Results

During the study period (2004-2008), 1318 patients, 904 males and 414 females, were admitted with neurosurgical illness, 908 patients were diagnosed with trauma and 402 were diagnosed with nontrauma, 718 patients were younger than 40 and 600 patients were older than 40. Neurosurgical operative procedures were performed in 1109 patients and conservative treatment was given to 211 patients, 930 patients used a ventilator in ICU and 387 did not, 1011 patients were treated for less than 7 days in ICU and 307 patients were treated for more than 7 days.

The mean sum of male patients were 7.53±3.27 per month, meanwhile female patients were 3.45±2.3 per month. The mean of age less then 40 were 5.98±2.3 patients per month, age more then 40 were 5±2.66 patients per month. The mean of trauma cases were 7.57±3.47 patients per month, non trauma cases were 3.43 ± 3.17 patients per month. The mean of surgery treatment were 9.24±3.99 cases per month, conservative treatment were 1.76±1.59 cases per month. The mean of ventilator usage were 7.75±3.57 patients per month, non ventilator were 3.23±2 patients per month. The mean of ICU treatment less than 7 days was 8.43±3.15 patients per month, more than 7 days were 2.56±2.38 patients per month. Nine hundred and seventy five patients lived (73.98%) and were discharged from ICU and 343 (36.02%) patients died (Table 1).

Table 1 Distribution of the demographics data.

Variables	N	Mean ± SD pts /month
No.of cases	1318	-
Sex		
Male	904	7.53±3.27
Female	414	3.45±2.3
Age		
<40	718	5.98±2.89
≥40	600	5±2.66
Diagnostic		
Trauma	908	7.57±3.47
Non Trauma	412	3.43±3.17
Treatment		
Operative	1109	9.24±3.99
Conservative	211	1.76 ±1.59
Ventilated	930	7.75 ±3.57
Non Ventilated	387	3.23 ± 2
Length of Stay (ICU)		
<7 days	1011	8.43±3.15
≥ 7 days	307	2.56±2.38
Outcome		
Alive	975	8.13±3.76
Dead	343	2.86±2.49

* Values expressed as means (range) unless otherwise indicated
±Represent standard deviation

4. Discussion

Neurointensivists care has been associated with improved outcomes, including shorter length of ICU stay, improved resource utilization, and decreased in-hospital mortality. There is little data regarding the influence of an intensivist on the neurological and neurosurgical population, however. In patients with intracerebral hemorrhage (ICH), the introduction of a Neurosurgery Intensive Care Unit (NICU) team decreased mortality rates, shortened the hospital length of stay (LOS), lowered the total cost of care, and led to a better disposition at discharge. In another study with a similar population of patients with ICH, the presence of a full-time neurointensivist was associated with a lower mortality rate, but the LOS was longer in the NICU than in the general ICU [1-3].

Varelas et al. (2006) reported that the unadjusted mean mortality rate in the NICU decreased from 13.4 to 12.9% (relative mortality rate reduction 4%) and the mean NICU LOS increased from 3.1 to 3.6 days (relative NICU LOS increase 16%), both insignificant. A 51% reduction in the NICU-associated mortality rate ($p = 0.01$), a 12% shorter hospital LOS ($p = 0.026$), and 57% greater odds of being discharged home or to a rehabilitation center ($p = 0.009$) were found in the after

period in multivariate models after controlling for baseline differences between the two time periods. Better documentation of the Glasgow Coma Scale (GCS) score by the NICU team was also found in the after period (from 60.4 to 82%, p = 0.02). Most recently, investigators in two large studies reported that the presence of a neurocritical care team was an independent predictor of a decreased mortality rate in the NICU and was associated with decreased hospital and NICU LOS [3-6].

Neurocritical care is the newest subspecialty of critical care. The development of neurocritical care units stemmed from the notion that neurological and neurosurgical critically ill patients were better served in ICUs staffed by healthcare personnel trained to recognize and treat intracranial processes as well as the systemic factors affecting them. The current management of intracranial process emphasizes control of Intra Cranial Pressure (ICP), in large part to maintain Cerebral Perfusion Pressure (CPP), which is defined as Mean Arterial Blood Pressure minus Intra Cranial Pressure (MABP-ICP). Cerebral perfusion pressure is a major variable that influences cerebral blood flow, which, when inadequate, can contribute to cerebral ischemia. This kind of management is better handled by a neurointensivist. Evidence from two recent studies supports the idea that the admission of patients to a neurocritical care unit staffed by a neurocritical care team is associated with reduced mortality rates and resource utilization [7-11].

Within the limitations of the study design, the authors conclude that in order to improve the outcome of the neurosurgically ill patients in Sanglah Hospital, Bali, it is necessary to have a neurointensivist in the neurocritical care unit, not only general intensivist. It is difficult to pinpoint a particular mechanism by which the introduction of neurointensivist improves outcomes. The author can speculate that such impact may be attributable to the fact that a neurointensivist can provide organized and standardized neurosurgical care.

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Effectiveness of the Standardised Nutritional Support of Senior Citizens in the Institutional Care

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Abstract: Introduction: Nutritional status of the elderly is known as major determiner of their quality of life and could influence ability to be independent in the old age. It is important to pay special attention to the elderly in nursing homes where the higher rate of malnourished status is presented. **Methods:** The longitudinal survey (for one year from January 2010 till January 2011) was made by the evaluation of 99 elderly persons (residents) living in the Nursing home. The basic data, weight, height, body mass index (BMI) of each were recorded. The relation among the level of self-care (ADL test), mental status (MMSE-Folstein test) and nutritional status (Mini Nutritional Assessment) score (first in January 2010, secondly in July 2010 and finally in January 2011) was evaluated. For statistical analyses we used Wilcoxon Signed Ranks Test, Mann Whitney U test, and Pearson correlation coefficient. **Results:** We have found statistically significant relation in the changes of the MNA score in the six and also twelve months period. The age of monitored persons was not statistically significant in relation to the nutritional status (in six and also twelve month's period). Gender was statistically influenced the score of MNA in the period of twelve months. Comorbidity was not statistically significant to the MNA score in both monitored periods. The changes of ability and self care (ADL) as well as mental status (MMSE) were statistically significant in relation of the MNA score. **Conclusion:** The quality of nutritional status, influence the quality of life in the elderly population. We believe that outcomes of our study could be the basis of the nutritional standards on the national level.

Key words: Aged, elderly, nutrition assessment, nutritional standard.

1. Introduction

Because of an increase in the number of elderly and the problems of nutrition associated with them, it is of interest to study the nutritional status of elderly persons [1]. Elderly become vulnerable to malnutrition owing to inappropriate dietary intake, poor economic status and social deprivation. Elderly are known to be easily subjected to inanition and avitaminosis resulting in multiple nutritional deficiencies [2]. While nutritional status surveys of the elderly have shown a relatively low prevalence of frank nutrient deficiencies, there is a marked increase in risk of malnutrition and evidence of subclinical deficiencies with the direct impact on function [3]. The risk of malnutrition is higher in relation to the hospitalisation or institutional life in Nursing homes not only in the Czech Republic [4, 5].

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2. Materials and Methods

We evaluated the association between nutritional statuses (MNA), cognitive functioning (MMSE) and self care ability (ADL) in 99 institutionalized men and women in Nursing home Nopova in Brno (Czech Republic). All of them were supported by the sipping according the nutritional standard in this Nursing home (the biggest one in the Czech Republic). We wanted to evaluate the effectiveness of the nutritional support in this group of elderly residents. The basic data, age, gender, length of stay in nursing home (in months), weight, height, body mass index (BMI) ADL score, MMSE, MNA score and co morbidity (diabetes, hypertensia, dementia, stroke and sclerosis multiplex) of each were recorded for one year in six months periods (January 2010, July 2010, January 2011). The data was statistically evaluated with SPPS version 18.0 (we used Wilcoxon Signed Ranks Test, Mann Whitney U test, Pearson correlation coefficient).

2.1 Characteristics of the Target Population

There were 99 elderly persons evaluated in total in the beginning of the study (January 2010).

The criterion for the monitored persons:

- with the sign of malnutrition or in risk of malnutrition (according to MNA)
- living in the nursing home for one month at least
- with actual nutritional support (sipping) under the control of the nutritional therapist
- the gender and age were not excluding criterion (both men and woman were evaluated).

During one year period of the study eighteen elderly died (in the first period of six months it was twelve residents). Average age of the monitored population was 75.5 year (standard deviation 12.07). There were 16 men and 83 women in the study involved and monitored. The minimal length of stay in Nursing home was one month and maximal 60 months (five years). Average length of stay was 18.58 months (standard deviation 15.70). In relation to the co morbidities we found that most common chronic disease was dementia (93 respondents; 92.07%). Second common was hypertension (79 clients; 71.28%) and the third was ischemic heart disease (61 elderly; 60.39%). Just one chronic disease was found in 11 respondents. Most frequentwas three co morbidities presented (42 clients) and four diseases (22 elderly). Nutritional support was arranged/secured by sipping (enriched drink). The most of the residents drank the enriched drinks two times per day (n = 34) or three times per day (n = 24). Most used enriched drink was Nutridink compact (30 clients), Nutridrink Multi Fiber (n = 23) and Nutridrink Youghrt (n = 21). There were also nine residents who used Cubitan. All of them had chronic wound (mostly pressure sores or leg ulcers).

2.2 Objective Testing of the Target Population – Preliminary Results

As we noted already outside the demographic data we recorded also the physical status and cognitive functions of the evaluated elderly for the objectification of their general status. We used MMSE, ADL, MNA and BMI score. The average ratings of the evaluated score were increased and improved in all monitored parameters. The input average score of MMSE was 8.46 points, after first six months increased to 10 points and final evaluation was 11.65 points. ADL score was also changed in six months period (from 26.57 points in the beginning to 31.95 points) and after the one year it was 37.59 points. Indigenous average nutritional status score according to MNA was 5.61 points. After six months it was 7.05 points and at the end of study 8.10 points.

3. Main Results and Discussion

We have found statistically significant relation in the changes of the MNA score in the six and also twelvemonths period (with Mann Whitney U test) as the results of the nutritional support. The input average MNA score increased from 5.61 to 7.05 in six months ($p - 0.000$) period and to 8.10 points ($p - 0.000$) in one year. The age of the clients was not statistically significant in relation to the MNA in six months period ($p - 0.251$) and also in the twelve months period ($p - 0.330$). Different results were found according to client's gender. In six months period there was no difference between the changes in MNA of man and woman $p - 0.321$ (the input average score in men population was 5.00 point after six months 7.06; in woman's group it was 5.72 in the beginning and 7.04 points after six months). During one year period was found statistically different changes in MNA score between man and woman group ($p - 0.036$). The man had 8.79 points of the MNA after twelve months and woman 7.96. We could say that man had more positive changes in MNA score during one year monitoring period. It is also very interesting that in our evaluated group we did not find the statistically significant relationship between co morbidities and MNA score changes ($p - 0.930$ in six months, $p - 0.560$ in one year period). It could be also influenced by good level of

health and nursing care and correct illness compensation in the Nursing home residential population. When we evaluate the relation between the ADL and MNA score (through Pearson correlation coefficient) we found that in our investigated group exists statistically significant relation (in six months period and in one year was p – 0.000). The nutritional status influences the rate of physiologic and functional declines with age [3, 4, 7, 8]. It means that monitored people with better nutritional status were more self-sufficient according the ADL test. Of course it is not so easy to claim that the trigger is the change in the physical condition or in nutritional status. The last part of our study was focused on the assessment of the relation between the mental status (MMSE) and MNA score. In both evaluated periods we found high significant relation (p – 0,000). This corresponds to findings in others scientific sources [7-9]. It is known that nutritional supplementation may improve neuropsychological performance in frail elderly persons [7, 9-11].

4. Conclusion

The health of elderly people is often affected by inadequate nutritional intake. Psychosocial determinants and the higher prevalence of acute and chronic illnesses are risk factors for nutritional deficiencies in the elderly. Nutritional assessment (NA) or nutritional risk screening must be an important element in care programmes for elderly people in the community and should be part of all geriatric assessment programmes. In our study we recognised that appropriate nutritional care influence nutritional status of the clients in the biggest Nursing home in Czech Republic (Nopova Brno) in all monitored parameters – MNA, BMI, MMSE and ADL (Table 1).

Table 1 Changes in evaluated tests (Wilcoxon Signed Ranks Test).

period	MMSE change	p	ADL change	p	MNA change	p	BMI change	p
6 months follow up	-2.5	0.012	-3.41	0.001	-5.0	0.000	-4.09	0.000
1year Follow up	-4.73	0.000	-5.12	0.000	-6.38	0.000	-5.49	0.000

The calendar age is not significantly influencing the nutritional status. The man group had better outcomes in MNA in relation to the nutritional support in one year period. And self-sufficiency and mental condition are in close relation to the nutritional status of elderly. The quality of nutritional status, influence the quality of life in the elderly population. We also identify that in the institutions where the standardised nutritional care is provided are positive results on the quality of life of elderly registered. We suggest arranging more standardise nutritional programmes in the Nursing homes and other institution caring for elderly in the Czech Republic. We still do not have general recommendation for nutritional assessment and support for elderly in social-health institutions. We believe that outcomes of our study could be the reason for the encouraging of these activities on the national level.

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Impact of Decision – Operation Interval on Pregnancy Outcomes among Mothers Who Undergo Emergency Caesarean Section at Mulago Hospital

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Abstract: Background: A maternal mortality ratio (MMR) of 600 deaths/100,000 live births at Mulago National Referral Hospital in Kampala is higher than the national ratio of 435/100,000 live births. Uganda's neonatal mortality ratio (NMR) also stands at 29/1000 live births. Pregnancy outcomes are at times related to the decision-operation interval (DOI) yet from hospital records and literature the DOI and its determinant factors were not well described. **Objective:** To determine the mean DOI, the maternal and foetal outcomes relative to the DOI and to determine the factors that determine the DOI among mothers who undergo emergency caesarean section (EmCS) at Mulago hospital. **Methods:** This was a prospective cohort study of women who had EmCS in Mulago hospital from October to November 2008. Consecutive sampling was used to enrol participants who were followed from the time of the decision of operation to the 3rd postoperative day. **Results:** All 351 mothers who had EmCS had their results analysed. Only 1.1% participants had DOI within 30 minutes, 36.8% were operated after 8 hours of the decision. The overall DOI averaged 465 minutes with a median of 320 minutes. On average bad outcomes were noted in 41.3% participants but they were higher (51.8%) among the teenage gravidae than in older gravidae. They included obstructed labour (5.7%), low 5-minute Apgar score (12.5%), need for neonatal intensive care unit (NICU) admission (12.0%) and perinatal death (10.9%). Survival analysis showed bad outcomes to increase 2½ hours from the decision to operate. Among the determinants of DOI, lack of theatre space and personnel factors were the commonest. **Conclusions:** The average DOI for EmCS in Mulago is about 7½ hours with bad outcomes like obstructed labour and perinatal deaths noted in many cases that increased with DOI over 2½ hours. Delays were mostly due to lack of theatre space and personnel factors. **Recommendations:** More personnel sensitisation and training on better time management and theatre space allocation need to be ensured to reduce the waiting time for EmCS. A larger study to follow-up participants for at least 6 weeks is needed to assess outcomes.

Key words: Decision-operation interval, bad pregnancy outcomes, obstructed labour.

1. Introduction

Globally, every year about 8,000,000 women get pregnancy-related complications and of these about 585,000 die with about 25% deaths found in East and Southern Africa. Furthermore, millions of women who survive childbirth suffer from pregnancy-related injuries, infections, diseases and disabilities, often with lifelong consequences [1].

Uganda's maternal mortality ratio (MMR) reduced to 435/100,000 live births [2]. For over 10 years the MMR and neonatal mortality ratio (NMR) had remained high. Over 6,000 women and about 11,000 newborns died each year from complications before, during or after delivery [2, 3]. A study done in 2005 estimates the MMR at 645 deaths per 100,000 live births at Mulago National Referral Hospital [4]. The risk of death is

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highest during the first day after birth, when it is estimated that 25-45% neonatal deaths occur [1].

Implementing a few interventions including emergency obstetric care can reduce the large numbers of maternal and child deaths [5].

There are three major delays that perpetuate the high maternal and neonatal morbidity and mortality ratios in Uganda. The first is delay to decide to seek care; the second is a delay to reach the health facility with definitive care, and the third is delay in receiving definitive care at the health facility.

In order to successfully manage the high maternal morbidity and mortality the hospital delay has to be reduced to a minimum level through making a policy or guiding protocol on decision - operation interval for obstetric emergencies at Mulago hospital. But before this is possible a baseline safe decision – operation interval had to be determined for this setting.

2. Specific Objectives

(1) To determine the decision - operation interval, DOI, for EmCS at Mulago hospital.

(2) To assess the pregnancy outcomes relative to the DOI among mothers who undergo EmCS at Mulago hospital.

(3) To determine the factors that determine the DOI for mothers who undergo EmCS at Mulago hospital.

3. Methods

This was a prospective cohort study from October to November 2008 that took place in Mulago National Referral and Teaching hospital. The hospital conducts about 30,000 deliveries per year of which about 24% are by emergency caesarean section. The demand for EmCS averages 30 mothers per day but only about 13 can be operated in 24 hours. Data was collected from 366 pregnant women in the general labour suite of Mulago hospital scheduled for EmCS during study period who provided informed consent. Fifteen mothers were excluded because they did not have an EmCS.

3.1 Sampling Procedure

Consecutive sampling method was used. Once admitted to the labour suite a pregnant mother would be monitored and if a decision for delivery by EmCS was made she would be informed about the study, recruited and later enrolled if she got the operation.

3.2 Outcome Variables

(1) The difference between the time of deciding to operate and time baby delivery at operation.

(2) Development of new complications during the decision to operation interval.

(3) A need for additional treatment to the standard care given after caesarean section.

(4) Findings at surgery–state of urinary bladder, uterus and the parametria.

(5) Apgar score at 5 minutes.

(6) Reason (s) for delay to operate the mother.

(7) The indication for EmCS.

3.3 Data Collection

Data was collected by the principal investigator and 7 midwives as research assistants on a daily basis using a data collection form.

Following the clinical team's review of a mother, the team was asked about the plan of delivery. In case she was planned for EmCS she would be asked into a treatment room and told about the study before being asked to participate and provide verbal consent if she accepted.

Before EmCS the date and time of decision to operate, indication for EmCS, maternal and foetal conditions were recorded.

After recruitment the participant and her clinical team/notes were assessed after 30 minutes then every 2 to 4 hours until she was operated or delivered.

After EmCS good pain control was ensured before mothers were enrolled into the study. She would then be taken to a side room of the post operative ward and the discussion of the study repeated before she was asked to provide written consent.

Following enrolment, the participant and/or her baby were followed up for 72 hours. They were reviewed by the research team at least once in 24 hours for the next 72 hours. The neonate was reviewed together with the mother.

3.4 Ethical Considerations

(1) Informed consent process was ensured.

(2) Confidentiality was ensured by conducting interviews privately and using participant codes instead of names.

(3) During the preoperative period, identified causes of delay to operate the mother were communicated to her.

(4) Permission to carry out the study was sought and obtained from relevant institutional review boards, IRBs.

3.5 Study Limitations

(1) The study was not able to assess pre-decision factors that could impact on pregnancy outcomes, such as delay to diagnose complication necessitating EmCS and congenital foetal anomalies.

(2) The study was not able to consider outcomes like puerperal sepsis, burst abdomen, obstetric fistulae or maternal and neonatal mortality that could have occurred after the 3rd postoperative day that would be related to the DOI.

4. Results

In the two months of the study, 366 women were identified as needing CS. Fifteen mothers who delivered vaginally whilst awaiting CS were excluded leaving 351 participants in the final analysis.

The participants' ages ranged from 15 to 42 with a mean of 23.6 years. 22.5% were below 20 years while 3.4% were 35 or more years old. The majority of participants were primiparae (64.4%), but 4.0% were grand multiparae with 11 as the highest parity.

The most common indications for EmCS were obstructed labour (24.5%), an abnormal foetal heart rate on auscultation (14.0%), previous caesarean section related indications (25.9%) and cephalopelvic disproportion (12.8%).

4.1 The Decision – Operation Interval (Table 1)

Table 1 Participants within the Decision-Operation Intervals.

DOI (Minutes)	Frequency (n = 351)	Percent
≤ 30	4	1.1
31 – 60	27	7.7
61 – 120	47	13.4
121 – 180	30	8.5
181 – 240	30	8.5
241 – 300	32	9.1
301 – 360	21	6.0
361 – 420	12	3.4
421 – 480	19	5.4
> 480	129	36.8

Mean = 465 min, Median = 320 min, SD = 424 min

4.2 Pregnancy Outcomes

Of the 351 participants, 41.3% had at least one bad pregnancy outcome.

During the decision to operation interval new complications that developed included; maternal exhaustion (1.4%), haemorrhage (0.6%), clinical infection (2.6%), obstructed labour (5.7%), abnormal foetal heart (4.6%), loss of fetal heart (2.0%), arm and cord prolapse (0.3%), trapped after-coming head (0.3%) and uterine scar tenderness (0.6%).

At surgery, abnormal findings included urinary bladder oedema (12.7%) or rupture (0.3%), uterine oedema (8.4%) or rupture (5.5%) and the haematomas in the parametria (2.4%), low five-minute Apgar score (8.8%) and stillbirths (9.1%).

Additional treatment to the standard care given after caesarean section included continuous bladder drainage beyond 48 hours after surgery (19.9%) and NICU admission (7.8%).

The early neonatal death rate within 3 days of birth was 3.7%.

4.3 Factors Determining the DOI

Several factors were identified as determinants of the DOI. Personnel factors like shift change-over delays and absenteeism/late coming were the 2nd common causes of delay (Figs. 1-2 and Table 2).

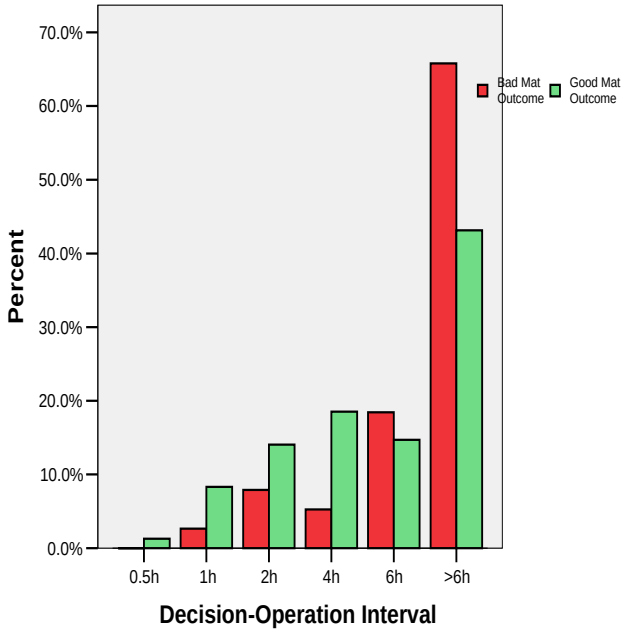

Fig. 1 Bar graph of maternal outcome against DOI.

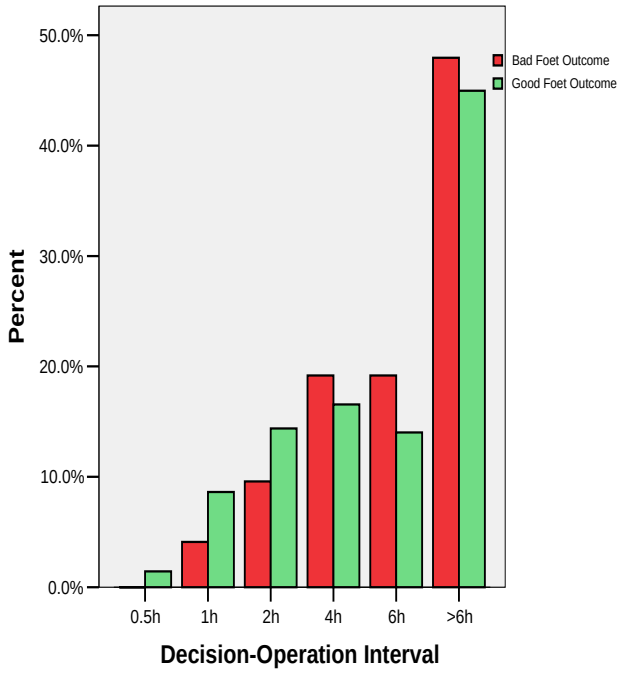

Fig. 2 Bar graph of neonatal outcome against DOI.

Table 2 Common factors determining the DOI.

	Factor	Mean time lost (minutes)	% Mothers affected, n=351
1	No theatre space	366.5	94.0
2	Personnel factors	80.1	85.4
3	Lack of theatre sundries or instruments	21.4	36.8
4	Patient issues	3.7	3.5

5. Discussion

From this research, the average decision-operation interval, DOI, for EmCS at Mulago hospital is 465 minutes which fuels the MMR and slows the realisation of MDGs 4 and 5. However, it is comparable to some other resource-limited settings with DOIs of 453 minutes [6]. With 1.1% operations within 30 minutes of the decision, these statistics are very poor compared to the rates in developed settings where 67% EmCS are within 30 minutes [7, 8].

Overall, outcomes were bad in 41.3% of the operations. Uterine rupture and perinatal deaths were higher than the 2.3% and 3.7% from similar settings in Nigeria [9].

Over 75% cases with DOI less than 30 minutes had good outcomes, and bad outcomes were mostly in cases where the DOI exceeded 150 minutes. This rhymes with findings in Britain where DDI over 75 minutes are associated with poor pregnancy outcomes [10].

Bad outcomes were more among the under 20 year-old gravidae over half (51.9%) of whom had atleast one bad pregnancy outcome. This could be explained by the fact that ominous indications for EmCS like antepartum bleeding or uterine tenderness are not common among this age group hence the older gravidae (more at risk of uterine rupture) getting priority before them. Unfortunately these young gravidae get more stillbirths and neonatal deaths than the over 20 year-olds resulting pregnancies soon after puerperium (if they survive obstetric fistulae) and return to labour rooms with a previous uterine scar and some degree of cephalopelvic disproportion or another

complication that increases chances of EmCS with priority over other under primigravidae and the cycle continues.

Determinants of the DOI were multifactorial with lack of theatre space followed by personnel factors being the commonest causes of delay. The former is a recognised cause of delay to operate in RLS [9, 11].

This study had some limitations. It was not able to assess pre-decision factors that could impact on pregnancy outcomes, such as delay to diagnose complication necessitating EmCS and congenital foetal anomalies. Furthermore, it was not able to consider outcomes like puerperal sepsis, burst abdomen, obstetric fistulae or maternal and neonatal mortality that could have occurred after the 3rd postoperative day that would be related to the DOI.

In conclusion, this study has shown that the mean decision-operation interval for emergency caesarean section in Mulago hospital is about 7½ hours, and that pregnancy outcomes are bad in 41.3% cases.

Lack of theatre space and personnel factors were identified as the major determinants of the long decision-operation interval.

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