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## Original Article

## Family function and health behaviours of stroke survivors

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## ABSTRACT

**Purpose:** To investigate health behaviours and family function in stroke survivors, and evaluate the relationships among them.**Methods:** Patients who were diagnosed with stroke before and went back to neurology clinic between August 2011 and February 2012 in a tertiary hospital in Guangzhou, China were recruited for this study. Patients that were discharged and living at home for at least two months were asked to complete Family Assessment Device (FAD) and Health Promoting Lifestyle Profile, version II (HPLP-II) questionnaires. Individual items were scored between 1 and 4 points, and survey scores were compared and analysed using Pearson's correlations. **Results:** The mean overall FAD family function score was  $2.18 \pm 0.25$  points, with lower scores observed for problem solving and role function factors, and higher scores for communication, affection involvement, and behaviour control. The mean overall HPLP-II health behaviour score was  $2.27 \pm 0.36$  points, with the highest score for the nutrition factor, and the lowest score for the exercise factor. The total score of family function negatively correlated with health behaviours ( $r = -0.535, p < 0.01$ ).**Conclusions:** Family function and health behaviours in stroke survivors are related, and need further improvement. Healthcare workers should pay close attention to patients' family function and health behaviours and find the reasons which may be influence their level.

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## 1. Introduction

Stroke is a disease with a high morbidity, mortality, and recurrence rate, and has become a serious public health problem worldwide [1,2]. According to the National Health and Family Planning Commission, stroke is the third leading cause

of death in urban residents [3]. The recurrence of stroke is closely related to unhealthy behaviours [4,5], and results in deterioration of the disease [4,6] and a doubling of the associated mortality [7].

Strokes not only threaten a patients' physical and psychological status, but also the health pattern of the entire family. Furthermore, a disordered family system can

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negatively influence the patient's ability to cope with the disease and affect their rehabilitation [8]. Family function is an important factor of health behaviours, such that good family function can promote the formation of healthy behaviours [9–11]. Family function is the ability of a family to meet the various needs of its members, which is reflected in mutual love and support, emotional communication, and the ability to share life events and stress [12]. This study aimed to investigate the level of family function and healthy behaviours among patients with stroke, and also to explore the relationships among them. These interactions may be indicators for health behaviour interventions, and thus provide guidance for secondary prevention of stroke.

## 2. Design and methods

### 2.1. Subjects

Patients who were diagnosed with stroke before and went back to neurology clinic of a tertiary hospital in Guangzhou, China between August 2011 and February 2012 were recruited for this study. Patients were included in the study if they: 1) met the diagnostic standard of cerebrovascular disease (1995), [13] and were diagnosed with stroke by brain computed tomography or magnetic resonance imaging; 2) discharged and living at home for at least two months after the first stroke; 3) had an education level above primary school and the ability to communicate; 4) provided voluntary participation. Patients were excluded from the study if they had a subarachnoid haemorrhage, severe physical illness, presence of sensory aphasia, cognitive disabilities or were unconscious.

### 2.2. Surveys

#### 2.2.1. General information

Patients were asked to complete a questionnaire concerning demographic information, including age, gender, education level, marital status, occupation, family income, payment methods, and living style. Medical information was also requested, including body mass index, course of the disease, presence of hypertension, diabetes, coronary artery disease, hyperlipidaemia and other complications, family history, stroke type, presence of language barrier, limb movement disorder, dysphagia, hemianopia, and daily life assessment (Barthel Index).

#### 2.2.2. Family assessment device (FAD) survey

The FAD survey is a questionnaire designed by Epstein to measure the family function based on the McMaster family function model [14] and is used to identify possible problems in the family system. The survey has 60 items encompassing seven dimensions: problem solving, communication, role function, emotional reactions, emotional involvement, behaviour control, and overall function. Each item is scored from 1 to 4 points, with a lower score indicating better family function. Results of the questionnaire were excluded if 40% of the items were not answered. The FAD demonstrates good reliability and validity, [15,16] and testing of the Chinese version yielded a Cronbach's  $\alpha$  between 0.78 and 0.86 [17,18].

#### 2.2.3. Health promoting lifestyle profile, version II (HPLP-II) survey

The HPLP-II is a survey that was initially developed in 1987 by an American nursing scientist [19] and later improved in 1995, which is comprised of 52 items within six dimensions: self-realization, health responsibility, exercise, nutrition, relationships and stress management. Each item is scored from 1 to 4 points, with a higher score indicating better health behaviours. The HPLP-II demonstrates good reliability and validity, [20,21] and testing of the Chinese version by Zhang et al. revealed content validity of 0.85, and a Cronbach's  $\alpha$  of 0.86 [22].

### 2.3. Data collection and statistical analysis

Data were collected when the patients completed the outpatient follow-up. After informed consent was obtained, the patients were asked to complete a three-part questionnaire that included general information and questions from the FAD and HPLP-II. For patients unable to fill out the survey, questions and possible answers were read to them, and their oral answers were recorded. Questionnaires were carefully checked by the researcher to avoid omissions or errors. Results were compiled in Excel (Microsoft Inc., Redmond, WA, USA), and descriptive analyses, Pearson correlations and multiple regression analyses were performed on SPSS 16.0 software (SPSS Inc., Chicago, IL, USA). Data are presented as mean  $\pm$  the standard deviation or percentage, and a  $p < 0.05$  was considered as statistically significant.

## 3. Results

### 3.1. General information

A total of 100 questionnaires were distributed, and 88 valid questionnaires were returned. Of the 88 patients with stroke, 55 were male (62.5%) and 33 were female (37.5%), aged between 33 and 85 years ( $65.19 \pm 10.56$  y). Responses concerning marital status indicated that 88.6% (78/88) of patients were married, and the remaining 11.4% (10/88) were divorced or widowed. Regarding educational level, 22.7% (20/88) of patients were educated only to the primary school level, 26.1% (23/88) to the middle school level, 21.6% (19/88) were at a high school level, and 29.5% (26/88) of patients had obtained a college degree or above. The majority of patients (83/88; 94.3%) were diagnosed with ischemic stroke, whereas the remainder (5/88; 5.7%) had suffered a haemorrhagic stroke, and the median duration of disease was 13 months (range: 2–189 mo). Results of questions concerning family history revealed that 28.4% (25/88) of patients had a family history of stroke. Of the 88 patients, 69 (78.4%) had hypertension, 43 (48.9%) had hyperlipidemia, 29 (33.0%) had diabetes, and 9 (10.2%) had coronary heart disease. Body mass index scores ranged from 18.73 to 30.82, with an average of  $24.16 \pm 3.07$ . Barthel indices ranged from 75 to 95, and 14 patients had a mild activity disorder, and only two patients suffered from moderate or severe impairment of daily living activities.

**Table 1 – Family assessment device (FAD) score among stroke patients (n = 88).**

Dimension	Items (n)	Total possible score	Minimum score	Maximum score	Overall total score	Average item score	Order
FAD score	60	240	82	173	130.60 ± 15.17	2.18 ± 0.25	
Emotional response	6	24	9	21	14.47 ± 2.63	2.41 ± 0.44	1
Behaviour control	9	36	13	27	21.23 ± 2.16	2.36 ± 0.24	2
Communication	9	36	12	28	20.37 ± 3.71	2.26 ± 0.41	3
Emotional involvement	7	28	10	23	15.52 ± 2.13	2.22 ± 0.30	4
Problem solving	6	24	6	19	12.83 ± 2.43	2.14 ± 0.41	5
Role function	11	44	15	34	22.84 ± 3.54	2.08 ± 0.32	6
Overall function	12	48	12	36	23.34 ± 4.62	2.00 ± 0.38	7

### 3.2. Family function

The overall average item score from the FAD was  $2.18 \pm 0.25$  (Table 1), indicating a moderate level of family function. The highest average item scores were observed in the emotional response dimension, followed by behaviour control, communication, emotional involvement, problem solving, role function, and finally, overall function dimensions.

### 3.3. Health behaviour level

The overall average item score from the HPLP-II was  $2.27 \pm 0.36$  (Table 2), indicating that the frequency of health behaviours ranged from “sometimes” to “often”. The highest average item scores were observed in the nutritional dimension, followed by relationships, stress management, health responsibility, self-realization and lastly, exercise dimensions.

### 3.4. Association between family function and health behaviour

Correlational analyses showed that the total score of family function among stroke patients was negatively correlated with health behaviour, such that high score of family function means worse family function, so high family function corresponded to better health behaviour. With the exception of emotional involvement, the score of all dimensions of family function negatively correlated with health behaviours, among which communication ( $r = -0.439$ ) and behaviour control ( $r = -0.391$ ) showed the strongest correlations (Table 3). Moreover, all dimensions of health behaviour negatively

correlated with overall score of family function assessment, with relationships ( $r = -0.408$ ) and self-realization ( $r = -0.502$ ) dimensions demonstrating the strongest correlations.

## 4. Discussion

### 4.1. Family function for stroke survivors

The results indicate that stroke survivors currently have a moderate level of family function. Although the patients in this study scored higher on the FAD questionnaire than a previous report, [23] the results are consistent with research conducted in other Chinese hospitals [4,24]. Furthermore, the highest average scores were observed for measures of emotional response, behaviour control and communication, which indicates that the patients are weak in these three aspects of family function. Possible explanations for this include that traditional Chinese culture tends to suppress personal expression among family members, or the fact that the majority of patients were elder family members whose behaviours are more likely to be tolerated by other members of the family. Because of the patients' family status and illness situation, their behaviours would be exempt from regulation or restriction. Another important aspect to consider is that the illness causes a great financial burden and psychological stress to the family, which can strongly influence the interactions among family members.

Nurses should help patients and their caregivers to recognize the importance of appropriate emotional responses, and encourage both parties to express themselves more openly. As communication with a family is a crucial factor, nurses should

**Table 2 – Health behaviour level (n = 88).**

Dimension	Items (n)	Minimum score	Maximum score	Overall total score	Average item score	Order
HPLP-II	52	83	192	118.02 ± 18.85	2.27 ± 0.36	
Nutrition	9	15	33	24.70 ± 3.28	2.74 ± 0.36	1
Relationships	9	13	35	21.34 ± 3.63	2.36 ± 0.40	2
Stress management	8	9	31	18.86 ± 3.56	2.36 ± 0.44	3
Health responsibility	9	11	55	19.16 ± 5.54	2.12 ± 0.62	4
Self-realization	9	12	35	18.92 ± 4.41	2.10 ± 0.49	5
Exercise	8	8	29	15.02 ± 5.07	1.88 ± 0.63	6

Abbreviations: HPLP-II, health promoting lifestyle profile, version II.

**Table 3 – Correlation between family function and health behaviour**

	FAD	Problem solving	Communication	Role function	Emotional response	Emotional involvement	Behaviour control	Overall function
HPLP-II	-0.535**	-0.313**	-0.439**	-0.352**	-0.384**	-0.168	-0.391**	-0.491**
Health responsibility	-0.382**	-0.119	-0.274**	-0.299**	-0.244	-0.241*	-0.323**	-0.342**
Nutrition	-0.249*	-0.221*	-0.132	-0.241*	-0.118	0.062	-0.167	-0.295**
Stress management	-0.419**	-0.214*	-0.336**	-0.264*	-0.328**	-0.242*	-0.276**	-0.364**
Exercise	-0.388**	-0.251*	-0.348**	-0.215*	-0.289**	-0.015	-0.256*	-0.406**
Relationships	-0.408**	-0.347**	-0.353**	-0.274**	-0.261*	-0.046	-0.280**	-0.364**
Self-realization	-0.502**	-0.281**	-0.476**	-0.261*	-0.437**	-0.208	-0.392**	-0.390**

Abbreviations: FAD, family assessment device; HPLP-II, health promoting lifestyle profile, version II; \* $p < 0.05$ , \*\* $p < 0.01$ .

support the use of proper communication skills by caregivers (e.g. attentive listening, expression of sympathy, use of encouraging words) to improve their exchange of affections and information.

#### 4.2. Health behaviours of stroke survivors

Stroke patients reported that they “sometimes” or “often” engaged in healthy behaviours, corresponding to a moderate level in overall health behaviour. In the HPLP-II, exercise, self-actualization and health responsibility factors received lower scores than other factors, consistent with other reports [25,26]. Therefore, patients need further instruction to appreciate the importance and necessity of exercise, including knowledge of what to do and when to do it, so as to improve upon the effects of exercise. Examples of such instruction involve informing the patient about the meaning of taking their pulse and how to take it, and the way to calculate expected heart rate and how to recognize it. In addition to functional rehabilitation, healthcare workers should pay attention to the patients' psychological rehabilitation, as well as encourage them to maintain a positive attitude and motivation to address new challenges. Moreover, patients should be directed to learn methods of active self care and accept greater responsibility for their own health, such as undergoing regular health check-ups and communicating with healthcare workers in a timely manner when feeling unwell.

#### 4.3. Family function promotes health behaviours

Analyses in this study revealed that health behaviours were most strongly correlated with communication and behaviour control, indicating their mutual influential effects. Problem solving within families is based on communication, which involves family members talking to each other and voicing opinions in order to exchange information and maintain relationships [27]. With good communication, negative emotions are removed and a problem can be effectively dealt with. As increased communication promotes better health behaviours, nurses should impart great importance to effective communication during health education and interventions. To achieve this, nurses can teach various communication skills and encourage a greater amount of communication.

Behaviour control refers to the restrictions and permissions within a family that are imposed in response to

various environmental pressures. To some extent, a stroke and its sequela will affect the patient's psychology, social communication and other health behaviours. A lack of sufficient behaviour control will prevent the patient from developing healthy habits, such as regular diet, exercise, social communication and proper pressure management. To achieve this, family members can focus on therapies and restrict bad behaviours by encouraging and monitoring the patient's exercise, assisting with doctor's appointments and medication, as well as encouraging participation and accompanying the patient in social activities.

Family function is defined by the McMaster model as the function of a family as a whole, aspects of which are influenced by health behaviours. Thus, in order to effectively improve a patient's health behaviours or prevent unhealthy behaviours, all aspects of family function should be addressed. Dimensions of family function should be clinically assessed and a good family support system constructed. Meanwhile, healthcare workers should cooperate with caregivers to establish a health plan and motivate the patients to change their behaviours.

## 5. Conclusions

Stroke survivors demonstrate only moderate engagement in health behaviours. Consequently, strong relevant measures should be taken to improve these behaviours in patients, particularly in the exercise aspect. This study shows that family functions influence patients' health behaviours. In clinical work or community care, nurses should consider head family members when devising a care plan and help to systematically build a favourable family environment and function. These measures will help patients adjust to their health condition and form good health behaviour habits as soon as possible.

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