Original Research Article

The Association between Oral Health Habits and Quality of Life for Residents of a Psychiatric Nursing Home in Southern Taiwan

Shu-Fen Yu[1], Jian-Jhou Chen[2], Chia- Chiun Liu[3], Chao-Hsien Lee[4], Chi Chang[5], Tsan Yang[4]
[1]Graduate Institute of Health Care, Meiho University, Pingtung, Taiwan
[2]Department of Medical Sociology and Social Work, Kaohsiung Medical University, Taiwan.
[3]Department of Shanghao Dentist Clinic Leader, Kaohsiung City, Taiwan
[4]Department of Health Business Administration, Meiho University, Pingtung, Taiwan
[5]Department of Nursing, Meiho University, Pingtung, Taiwan

*Corresponding author
Tsan Yang
Email: tsan.yang@msa.hinet.net

Abstract: The issue of daily care for patients with chronic mental disorders has recently been given more consideration. Many studies have revealed a strong association between oral diseases and chronic diseases. There is a lack of research on the relationship between oral health and quality of life of residents in psychiatric nursing homes. This study examined the oral health habits of the residents of a psychiatric nursing home and the predictive factors influencing their quality of life. The study adopted a cross-sectional study design and purposful sampling method to enroll 150 psychiatric nursing home's residents with their informed conscents. Data was collected using a structured questionnaire composed of the following sections: basic personal characteristics, oral hygiene habits, visit experience of the dentist, and Short-Form-**36** Health Survey (SF-36) quality of life scale. The results showed that among the eight quality of life dimensions, the psychiatric nursing home residents had the highest score in Mental Health (MH=64.97) and the lowest score in Role-Emotional (RE=55.83). Married residents had significantly different scores in Role-Physical (RP), Vitality (VT), Role-Emotional (RE), and Mental Component Summary (MCS). A significant correlation was observed between gender, oral self-care, and correct tooth brushing and quality of life. Age and years of education were found to be significantly and negatively correlated with physiologic function. Better oral health habits were associated with better overall quality of life. Overall quality of life was worse in female residents than in male residents. Older participants were found to have worse quality of life. Married people were found to have better overall quality of life. Participants who had had more years of education were found to have better overall quality of life. A better quality of life was observed in those who were able to perform oral self-care, correctly brushed their teeth, and had higher scores in oral health status.
Keywords: Psychiatric nursing home, dental hygiene, quality of life

INTRODUCTION

Patients with severe mental disorders are faced with barriers in mood, consciousness, thinking, and behavior. Patients' self-care, cognitive, and social functions gradually deteriorate and so do their interpersonal relationships; patients' learning declines and they cannot do productive work in society [1-3]. Patients lack self-esteem and cannot face social encounter [4-6]. Patients with mental illnesses have severe decrements in function and require life-long treatment, as well as social support and care. A currently popular model of mental care is the community-oriented model [7, 8].

As the population of people with mental illnesses grows, the government of Taiwan has given more consideration to the needs of certain social groups. However, there remain many deficiencies in meeting daily care and treatment needs of patients with mental illnesses. The results of the National Oral Health Survey of Disabled People in Taiwan conducted by the Health Promotion Administration in 2004 showed that oral health of people with mental disorders was worse than that of healthy people. Patients with mental disorders were found to suffer from persistent issues of dental caries and periodontitis, as well as lack of concentration, limited limb movement, oral muscle tension, and nervous reflex sensitivity, which hinder patients' ability to clean the oral cavity independently.

As a result, patients have difficulties with social adaptation and easily develop a social communication disorder, which causes limitations to their physical health and social communication [9, 10].

With regard to oral issues, people with mental disorders cannot provide themselves with proper and balanced nutrition due to the lack of medical rehabilitation and knowledge about preventive health care [11]. This leads to the inability for proper control and improvement of oral disease symptoms and, consequently, the development of systemic diseases [12, 13]. Oral health issues in nursing home residents with mental disorders include infrequent teeth cleaning, dental plaque, and dental calculi leading to poor dental hygiene and lack of medical rehabilitation and preventive health care. Physically and mentally disabled people tend to suffer from oral health issues [14], insufficient medical care, and inability to receive good oral health care [15, 16]. These issues are serious and require attention. Traditional oral health care includes cavity filling, dental implants, and periodontal scaling and mainly focuses on physiology and functioning, while ignoring psychological and social aspects [17]. Thus, this study aimed to investigate the influence of oral health in residents of a psychiatric nursing home on their quality of life in order to propose improvement strategies, increase the efficiency of oral cavity diagnosis and enhance patients' quality of life by improving their care.

METHODS
Study design
This study used a cross-sectional study design and a structured questionnaire to collect data.

Definition of terms
1. Patients with mental disorders: Psychiatric specialists followed the Diagnostic and Statistical Manual of Mental Disorders, 4th Edition (DSM-IV) to diagnose patients with schizophrenia. Ambulatory treatment, home care, and community rehabilitation continue to be used in the current psychiatric treatment system.

2. Resident medical history:
Age of onset: The age at which a patient first experienced mental disorder.

Number of admissions: Number of hospital admissions due to mental disorder.

Duration of disease: The total time (in years) from the first experience of a mental disorder symptom to October 31, 2014.

3. Oral hygiene habits:

Ability to clean the mouth, daily tooth brushing frequency and method, bleeding when brushing the teeth, frequency of changing toothbrushes, dental cleaning products used assistance in cleaning the oral cavity.

4. Visit experience of the dentist:
The reason for the visits, adaptability during the visits, regularity of oral cavity examination

Study population
The participants in this study were residents of a psychiatric nursing home in southern Taiwan. Demographic data was collected using a structured questionnaire. Data was collected using a questionnaire regarding oral health and tooth cleaning habits and the Short-Form-36 Health Survey (SF-36) quality of life scale. The inclusion criteria for participants were as follows:
1. Age between 18 and 65 years old; not diagnosed with intellectual inadequacy; patients with organic psychosis and alcohol and drug addiction.

2. Ability to communicate in Mandarin Chinese or Taiwanese.

The recruitment period was from December 2014 to February 2015. A total 150 patients participated in the study.

Instruments
1. Basic demographical information
  Gender, age, educational degree, marital status

2. Resident medical history:
Age of onset, number of admissions, duration of disease

3. Survey on oral health and tooth cleaning habits of psychiatric nursing home residents.

A patient's ability to clean the oral cavity; a patient's method to brush teeth; number of tooth brushings per day; duration of using one toothbrush; frequency of visiting a dentist for oral cavity examination.

In order to reduce the number of factors while maintaining the information provided by the original data, factor analysis was applied to reduce the variable dimensions. A factor analysis was conducted for three factors: (1) number of tooth brushings per day, (2) frequency of changing toothbrushes, and (3) frequency of oral cavity examinations. All results supported the same concept. The principal component was extracted based on the results. Sampling adequacy was measured using Kaiser-Meyer-Olkin (KMO) (0.588) and Barlett Test of Sphericity (0.001). The results showed that

variables could be combined into one factor "oral hygiene status."

4. SF-36 quality of life scale:

SF-36 survey contains 36 questions and focuses on measuring eight sub-scales: Physical Functioning (PF), Role-Physical (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role-Emotional (RE), and Mental Health (MH). The eight health sub-scales include physical component summary (PCS) and mental component summary (MCS) scores. Upon conversion of scores in eight sub-scales, the total score ranged from 0 to 100, where 0 indicated poor health status and 100 indicated optimal health status. Tseng et al (2003) examined reliability of the scale and reported that Cronbach's α of eight health survey dimensions was between 0.8 and 0.9, while both discriminant validity and internal consistency reached 100% (18).

Ethical Consideration

This study collected data using a structured questionnaire after obtaining approval from the Institutional Review Board. Prior to interviews, participant consent was obtained and the research objective, process, and participants' rights and interests were explained in detail.

Statistical Analyses

After collecting questionnaire responses, they were examined; coded, recorded, and analyzed using SPSS for Windows release 18.0. To achieve the research objective, the independent t-test, ANOVA analysis, Scheffé's post hoc tests were performed, and Pearson's correlation analyses were performed. Main predictive factors influencing quality of life were examined using a linear regression analysis.

RESULTS

As shown in Table 1, male psychiatric nursing home residents had significantly higher PF, SF, RE, and PCS scores than female residents (p<.05). With regard to marital status, married residents were found to have significantly higher RP, VT, RE, and MCS scores than non-married residents. Residents who brushed their teeth correctly had significantly higher RP, GH, VT, SF, RE, MH, and MCS scores (p<.05). Residents who could clean their oral cavity themselves had significantly higher PF, VT, SF, MH, and PCS scores than those who could not.

Table 2 showed that, age was negatively correlated with PF (r=-0.206) and PCS (r=-0.182), meaning that

older participants had lower scores. Years of education were significantly correlated with PF (r=0.206), RP (r=0.231), and PCS (r=0.183), meaning that participants who had studied longer had higher scores. No significant correlation was observed between age of onset and any of eight quality of life sub-scales. Number of admissions was negatively correlated with BP (r=-0.175), meaning that participants with more hospital admissions had lower scores. Duration of disease was negatively correlated with PF (r=-0.174), RP (r=-0.171), and PCS (r=-0.169), meaning that participants who had longer suffered from the disease had lower scores. A significant correlation was observed between oral hygiene status and each of the eight quality of life sub-scales in both dimensions of scores, meaning that participants with a higher oral hygiene score were more satisfied with their quality of life.

Table 3 shows the results of the linear regression analysis regarding main predictive factors that influence quality of life in psychiatric nursing home residents. With regard to PF, male participants who could clean their oral cavity themselves and had a good oral hygiene status had a better physical functioning. With regard to RP, male participants who were married, had more years of education and had a better oral hygiene status were not limited in their role due to physical health. With regard to BP, young and married participants with a small number of hospital admissions and better oral hygiene status had less pain. Participants with a better oral hygiene status were found to have higher GH scores. With regard to VT, married participants with a better oral hygiene status had more vitality and energy. With regard to SF, male and married participants with a better oral hygiene status had less social communication difficulties caused by physiological and emotional issues. Male and married participants who correctly brushed their teeth had higher RE scores; that is, they did not encounter emotional-related issues in work or daily life. With regard to MH, participants with a small number of hospital admissions who correctly brushed their teeth and had a better oral hygiene status had a better psychological health. With regard to PCS, male and married participants who were able to clean their oral cavity themselves had better quality of life in terms of physical health. With regard to MCS, married participants who brushed their teeth correctly and had a better oral hygiene status had better quality of life in terms of mental health.

Table 1: Patients' basic characteristics and analysis of differences in quality of life (N=150)

Variables		Gender		Marital Status			Tooth Brushing Method		Cleaning the oral cavity	
		Male	Female	Non-married	Married	Other	Correct	Not correct	Self-care	Others
Physical Functioning (PF)	Mean	52.81	44.42	50.27	52.11	45.27	51.34	48.17	50.98	38.77
	Standard Deviation	7.07	12.43	9.83	8.81	11.86	10.61	9.37	9.01	13.08
	P	<0.001***		.135			.072		.016*	
Role-Physical(RP)	Mean	51.14	47.74	49.11	55.38	49.74	51.60	47.82	50.48	44.51
	Standard Deviation	9.79	10.14	10.57	4.41	8.97	8.99	10.95	9.65	12.61
	P	.060		.048*(married> non-married)			.033*		.154	
Bodily Pain(BP)	Mean	51.27	47.78	49.37	54.53	48.93	51.26	48.29	50.98	38.77
	Standard Deviation	8.96	11.63	10.32	5.51	11.00	9.67	10.27	9.82	10.95
	P	.056		.118			.086		.061	
General Health(GH)	Mean	50.55	48.92	49.09	53.92	51.79	51.48	47.99	50.44	44.99
	Standard Deviation	9.51	10.94	9.96	7.73	11.97	10.58	8.86	9.97	9.34
	P	.371		.129			.043*		.083	
Vitality (VT)	Mean	50.75	48.50	49.00	55.55	49.76	51.84	47.49	50.52	44.09
	Standard Deviation	8.63	12.24	9.90	8.04	11.32	10.94	7.97	9.89	9.82
	P	.270		.039*(married> non-married)			.008**		.041*	
Social Functioning(SF)	Mean	82.14	72.55	49.31	54.45	49.44	51.57	41.87	50.51	44.20
	Standard Deviation	17.94	28.46	10.17	7.86	10.30	10.16	9.45	13.33	9.57
	P	.041*		.129			.032*		.044*	
Role-Emotional(RE)	Mean	51.35	47.33	49.21	55.83	48.39	52.20	47.00	50.31	46.36
	Standard Deviation	9.55	10.44	10.61	0.00	9.55	8.42	11.21	9.68	13.15
	P	.026*		.025*(married> non-married)			.004**		.350	
Mental Heh(MH)	Mean	51.10	47.82	49.45	54.99	47.71	52.41	46.72	50.53	43.97
	Standard Deviation	8.09	12.81	9.53	8.40	13.59	10.41	8.45	11.63	9.72
	P	.117		.062			.001**		.037*	
Physical Component Summary (PCS)	Mean	51.64	46.75	49.62	53.10	48.82	50.99	48.66	50.68	42.25
	Standard Deviation	7.05	10.29	8.81	5.03	9.84	7.85	9.35	8.15	9.72
	P	.005**		.244			.127		.002**	
Mental Component Summary(MCS)	Mean	50.76	48.49	49.11	55.80	49.18	52.33	46.82	50.31	46.40
	Standard Deviation	7.98	11.37	9.11	6.89	11.01	9.83	7.43	9.03	11.69
	P	.229		.016*(married> non-married)			<0.001***		.187	

Note 1: Independent t-test, ANOVA, and Scheffe's post hoc analysis were used.
Note 2: *p<0.05 ** p<0.01 *** p<0.001
Note 3: Insufficient sample number was considered as missing values.

Table 2: Pearson's correlation analysis of patients' basic characteristics, oral hygiene status, and quality of life

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Age	-.206*	-.114	-.117	-.076	-.038	-.095	-.062	-.073	-.182*	-.024
Years of education	.206*	.231**	.047	.086	.049	.027	.121	.118	.183*	.050
Age of onset	.012	.089	.041	.057	.100	.045	.107	.045	.042	.092
Number of admissions	-.080	-.077	-.175*	-.137	-.113	-.091	-.133	-.133	-.115	-.136
Disease duration	-.174*	-.171*	-.068	-.091	-.073	-.064	-.109	-.062	-.169*	-.046
Oral hygiene status	.291**	.229**	.318**	.403**	.417**	.418**	.205*	.464**	.278**	.319*

** Significant if the significance level is 0.01 (two-tailed).
* Significant if the significance level is 0.05 (two-tailed).

Table 3: Regressions analysis of patients' basic characteristics, disease characteristics, Oral health habits, oral hygiene status, and quality of life

	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)	β (s.e.)
Constant	53.455* (6.845)	49.385* (7.501)	58.981* (7.440)	54.535* (7.417)	51.113* (7.293)	56.332* (7.215)	49.934* (7.579)	51.608* (6.965)	54.875* (6.319)	51.052* (6.635)
Gender										
Female	-7.519* (1.691)	-3.769* (1.853)	-2.756 (1.838)	-0.905 (1.832)	-1.402 (1.802)	-4.053* (1.783)	-4.362* (1.873)	-1.935 (1.721)	-4.358* (1.517)	-1.776 (1.693)
Marital status										
Married	2.873 (2.379)	7.303* (2.607)	5.589* (2.586)	4.835 (2.578)	5.675* (2.535)	5.398* (2.508)	6.176* (2.635)	4.714 (2.421)	4.661* (2.134)	5.576* (2.306)
Other	-0.706 (2.587)	4.096 (2.835)	2.653 (2.812)	4.852 (2.803)	2.641 (2.757)	3.372 (2.727)	2.291 (2.865)	0.859 (2.632)	2.614 (2.320)	2.262 (2.508)
Age	-0.072 (0.215)	-0.089 (0.235)	-0.510* (0.233)	-0.232 (0.232)	-0.237 (0.229)	-0.314 (0.226)	-0.205 (0.238)	-0.206 (0.218)	-0.202 (0.192)	-0.257 (0.208)
Years of education	0.080 (0.199)	0.501* (0.218)	-0.21 (0.216)	0.133 (0.216)	0.020 (0.212)	-0.106 (0.210)	.0250 (0.220)	0.143 (0.203)	0.158 (0.179)	0.74 (0.193)
Age of onset	-0.43 (0.217)	0.050 (0.238)	0.327 (0.236)	0.100 (0.236)	0.218 (0.232)	0.178 (0.229)	0.205 (0.241)	0.107 (0.221)	0.070 (0.195)	0.210 (0.211)
Number of admissions	-0.132 (0.223)	-0.104 (0.244)	-0.511* (0.242)	-0.437 (0.241)	-0.349 (0.237)	-0.210 (0.295)	-0.265 (0.247)	-0.459* (0.227)	-0.220 (0.200)	-0.377 (0.216)
Disease duration	-0.183 (0.206)	-0.087 (0.226)	0.304 (0.224)	0.76 (0.223)	0.148 (0.220)	0.314 (0.217)	0.083 (0.228)	0.098 (0.210)	-0.027 (0.185)	0.177 (0.200)
Tooth brushing method										
Correct	2.359 (1.559)	2.375 (1.709)	1.465 (1.695)	1.427 (1.689)	1.943 (1.661)	1.912 (1.643)	4.246* (1.726)	3.236* (1.586)	1.167 (1.398)	3.386* (1.511)
Oral cavity cleaning										
Self-care	8.743* (2.780)	2.159 (3.046)	4.319 (3.021)	3.458 (3.012)	4.624 (2.962)	4.125 (2.930)	1.275 (3.078)	3.950 (2.828)	5.685* (2.493)	1.917 (2.694)
Oral hygiene status	2.161* (0.751)	1.814* (0.823)	2.720* (0.816)	3.725* (0.814)	3.655* (0.800)	3.713* (0.792)	1.361 (0.832)	3.955* (0.764)	2.289* (0.674)	3.327* (0.728)

Note:

1* p<0.05, β coefficient, standard error (s.e.)

2. (Physical Functioning, PF), Role-Physical, RP),（Bodily Pain, BP),（General Health, GH), (Vitality, VT), (Social Functioning, SF), (Role-Emotional, RE), (Mental health, MH), (Physical Component Summary, PCS),（Mental Component Summary, MCS）

3. Gender (male), marital status (non-married), tooth brushing method (not correct), cleaning the oral cavity (others' assistance). ( ) indicated a reference group

DISCUSSION

Some studies indicated that patients with mental disorders are more likely to suffer from periodontitis due to the inability for self-care and difficulty following dentists' instructions; the longer patients have periodontitis, the worse quality of life they have [13, 19, 20].

This study recruited residents of a psychiatric nursing home. Female participants were found to have poorer performance in terms of PF, RP, SF, RE, and PCS than male participants, matching the findings from the previous study [6]. Our results showed a significant correlation between age and PF and PCS, between years of education and PF, RP, and PCS, and between disease duration and PF, RP, and PCS, which corresponded to the results of the survey conducted by the Ministry of Health and Welfare in 2008. Marital status was most

strongly correlated with RE (married > non-married), followed by VT (married > non-married) and RP (married > non-married). Marital status was found to be significantly correlated with MCS, while not significantly correlated with PCS, which being identical to the findings of previous studies [16, 21]. The reason for such results was that patients received support from their partners and, thus, had an active and positive outlook. Good interaction with and accompany of family helped patients adapt to social life, thus, improving their quality of life. Participants who were able to clean their oral cavity themselves had significantly better quality of life performance in terms of PF, VT, SF, MH, and PCS than those who did not, which are similar to the results of previous studies [16, 21]. The participants who correctly brushed their teeth had significantly better quality of life in terms of FP, GH, VT, SF, RE, MH, and MCS than those who did

not, which corresponds to findings a previous study [22]. Knowledge about prevention of periodontal diseases, regular oral cavity health examinations, maintenance of periodontal health, and improvement of overall health can enhance patients' daily functioning and activity and quality of life.

Linear regression analysis conducted in this study showed that main predictive factors influencing quality of life were gender, age, marital status, years of education, disease duration, ability to clean the oral cavity, correct tooth brushing, and oral hygiene status. With regard to gender, significant negative correlation results were observed in PF, RP, SF, RE, and PCS, in which female participants had worse performance than male participants. These results resemble those studies earlier [8, 23]. Married participants had significantly higher RP, VT, SF, RE, PCS, and MCS scores than non-married participants, which being the same as the findings in former studies [19, 23]. A possible reason for such results is that partners can support each other and maintain good personal relationships, thus, improving quality of life. A significant negative correlation was observed between age and BP, which are similar to the results of previous studies [8, 24, 25]. Participants who had studied longer had higher RP scores, which being corresponding to the findings in former studies [6]. However, Hwang (2007) reported that there was no negative correlation between educational level and quality of life [8]. Such a difference in results can be explained by the difference in participants. A significant positive correlation was observed between age and RP, which matches the results in previous studies [5, 22]. In other words, patients who have a disease for a shorter period of time do not encounter issues in work and daily life caused by their physiological health. A significant positive correlation was observed between number of hospital admissions and BP and MH; those who believed that their health had become worse over years often suffered from severe pain. These results correspond to those reported by Wu and Lin (2012) [23]. Participants who correctly brushed their teeth believed that their health had improved over years, did not suffer from RE-related issues in daily life and had good MH and quality of life, which was similar to previous findings [11, 26]. Patients who could clean their oral cavity themselves were not limited in terms of PF as much as those who needed the help of others and had a better quality of life in terms of physical health, which corresponds to findings by previous findings [26, 27]. Related studies also indicated that patients with higher oral cavity cleaning scores had a better quality of life in terms of PCS and MCS as they were not limited in RE in daily life [11, 27, 28].

Limitations

The participants in this study were residents of a psychiatric nursing home in southern Taiwan. Due to non-random sampling, inferences can be made only based on the currently available data, meaning limited statistical inference. This study investigated the oral health of psychiatric nursing home residents and the factors influencing their quality of life. This study used a cross-sectional study design which led to limited judgments regarding causal relationships and inability to make long-term inferences with regard to changes in quality of life. It is suggested that a longitudinal study is performed in the future to examine residents' quality of life at different stages, as well as factors influencing it. This can help medical personnel provide more effective treatments and care plans.

CONCLUSION

Overall quality of life was worse in female residents than in male residents. Overall quality of life declined with age. Married patients had a better overall quality of life. Participants who had studied longer had better overall quality of life. Overall quality of life was better in participants who could clean their oral cavity themselves, correctly brushed their teeth and had better oral hygiene. Residents of psychiatric nursing homes require special attention and training in their daily life. With insufficient training or assistance, it is difficult for patients to maintain oral health and their quality of life cannot be improved.

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