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Prospective Study of Case Management and Patient Compliance in Moderate to Severe Rheumatoid Arthritis

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Abstract

There is a big gap between best care and usual care in Rheumatoid Arthritis (RA). In particular, poor patient compliance of Rheumatoid Arthritis remains a significant problem in medicine; it is inadequately addressed and the cause of a care gap. About half of all patients with Rheumatoid Arthritis stop refilling prescriptions or make return visits after one year. Several effective interventions are available and adaptations of clinical trial practices offer promise for further improvement. Especially, the case management model is very effective. The aim of this study was to investigate the effects of patient compliance with moderate to severe rheumatoid arthritis. This study aims to explore the changes in patient compliance behavior following case management and related key factors. A total of 267 patients with Rheumatoid Arthritis from a medical center were enrolled and surveyed in this study. Data were collected via survey questionnaires filled out by patients after six months of case management related to patient compliance. The results of the study have shown that the adoption of the case management model had a significant effect on patient compliance ($P < 0.01$). This paper has reviewed the scope and causation of sub-optimal compliance, and evaluated improvement strategies and exploration of a best-practice benchmark. As a whole, the results of this study are expected to provide reference for clinical medical professionals.

Keywords: Rheumatoid Arthritis (RA), Case Management, Patient Compliance.

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1 Introduction

According to the World Health Organization (WHO) poor patient compliance to treatment of chronic diseases is a world-wide problem of striking magnitude. Patient compliance with the exigencies of long-term therapy for chronic illnesses in developed countries averages 50%. In developing countries, the rates are even lower. It is undeniable that many patients experience difficulty in following treatment recommendations (WHO, 2001). Poor compliance is a complex and significant cause of the gap between usual and best care and a driver of sub-optimal health outcomes. Interventions improve compliance, although achieving optimal levels remains elusive. Non-compliance is the main barrier for the effective delivery of the medical care. This will entail an economic burden on the country in terms of frequent hospitalization, use of expensive medicines in case of relapse due to non-compliance (Manmohan, et al., 2012). The causes of patient non-compliance are complex. Patient compliance is simultaneously influenced by several factors. The ability of patients to follow treatment plans in an optimal manner is frequently compromised by more than one barrier, usually related to different aspects of the problem. There is a large quantity of research concerning issues of patient compliance. These studies have shown that non-compliance exists on a large scale; different authors cite different reasons for this high level of non-compliance. These include: demographic characteristics, ethnicity, gender, age and socioeconomic status which are not very predictive (Haynes, 1979; Donovan and Blake, 1992; Wahl et al., 2005). More important factors are complexity of treatment, patient self-efficacy, social support, disease knowledge, treatment alternatives, costs and side effects (Gregoire, et al., 2002). The literature has identified the quality of the treatment relationship as an important determinant of patient compliance. Patient compliance is influenced by social and economic factors, the health care system, characteristics of the disease, disease therapies and patient-related factors. Solving the problems related to each of these factors is necessary if patient compliance to therapies is to be improved. Rheumatoid arthritis is a chronic illness, which in the worst case is a progressive disease, and can have a profound effect on the general physical and mental well-being of patients. The assessment of the severity of rheumatoid arthritis is very important in terms of monitoring the course of the disease and measuring the effectiveness of treatment.

The purpose of this study is to investigate whether the patient case management is influential in relation to the rheumatoid arthritis patient's compliance, and to establish a patient case management model to enhance the patient's compliance in the expectation that the treatment will prove effective. Studies consistently find significant cost-savings and increased effectiveness in the of health interventions that are attributable to low-cost interventions for improving patient compliance. Without a system that addresses the determinants of patient compliance, advances in biomedical technology will fail to realize their full potential to reduce the burden of chronic illness. Access to medications is necessary but insufficient in

itself for the successful treatment of disease. Case management in social work refers to a process in which a social worker is assisted by a group or a case. The current case management has long been practiced under different areas of expertise. In the medical social model, the case management model can be applied to acute care systems and home health agencies. The drug side effects of rheumatoid arthritis drug types are complex; for patients with complications, their disease is often poorly controlled due to their poor compliance, It is hoped that case management will enhance patient compliance with rheumatoid arthritis, achieve complete disease control and improve the quality of care for patients. This study finds that what is needed for each such patient is a case manager who is a nurse who has been trained in patient case management and is responsible for communicating with physicians and medical teams and patients, setting a patient education plan and case management plan, and ensuring care and comfort for the patient. According to the research, nurses have shown more significant results than the physicians in patient education, behavioral change, and stress and adaptation (Gutman, 1999). Rheumatoid arthritis program might involve sessions with a nurse practitioner focusing on drugs, physical exercise and joint protection, pain control and general coping strategies (Hill et al 2001).

In this study, a cross-sectional field study was used to design a narrative correlation study, which was designed for the period from March to September in 2017; patients with rheumatoid arthritis were enrolled to complete a structured self-reported questionnaire, and 267 valid samples were collected. The descriptive data were analyzed by SPSS 20.0. The basic attributes of the subjects were described by mean and standard deviation and the inference was described by t-test.

2 Literature Review

2.1 Rheumatoid arthritis

Rheumatoid arthritis is an autoimmune and inflammatory disease, which means that your immune system attacks healthy cells in your body by mistake, causing inflammation in the affected parts of the body. It causes generalized fatigue, joint stiffness in the morning and at the end of the day, and pain and stiffness caused by osteoarthritis (Hoboken, 2015). Rheumatoid arthritis is the most common autoimmune inflammatory arthritis in adults. Rheumatoid arthritis is an autoimmune disease that can cause joint pain, swelling and inflammation, and finally joint deformation. Rheumatoid arthritis early in the disease worsens bone joints fast, up to two years of onset in patients (Lindavist, et al., 2003). Rheumatoid arthritis has a significant negative impact on the ability to perform daily activities, including work and household tasks, reduces health-related quality of life, and it increases the mortality rate (Solomon, et al., 2003; Salaffi, et al., 2009). The American College of Rheumatology has defined disease duration of

less than six months as early rheumatoid arthritis. Moderate rheumatoid arthritis patients with more moderate disease will likely exhibit some loss of bone density and perhaps evidence of early bone erosions due to the destructive influence of inflammation. These patients may suffer a couple of hours of morning stiffness. It is difficult to picture the condition of severe rheumatoid arthritis patients. These patients have hours and hours of morning stiffness, profound fatigue, difficulty getting out of bed in the morning, significant anemia, joint pain and swelling involving most of the joints; they show significant joint destruction on x-rays. Moderate-to-severe rheumatoid arthritis refers to the disease development greater than 3 years; the disease activity is high (Majithia, 2007). According to the statistics of rheumatoid arthritis ethnic groups have shorter life expectancy than those without rheumatoid arthritis. According to U.S. statistics, the average life expectancy of patients with rheumatoid arthritis is only 66.8 years. About 80% of the disease occurs in the prime of 30-50 years old and within 10 years after onset, 30% of patients will lose their ability to work. For individuals, families and society caused a huge financial burden. In the United States, the social costs of rheumatoid arthritis patients including medical costs and productivity losses are as much as 128 billion annually. (Helmick, et al., 2008). Rheumatoid arthritis can begin at any age, but the likelihood increases with age. The onset of rheumatoid arthritis is highest among adults in their sixties, but can occur at any age.New cases of rheumatoid arthritis are typically two-to-three times higher in women than men. Etiology includes genes, the environment (infection, smoking), and other unknown factors (Efthimiou, 2010). Taiwan's prevalence rate of reported rheumatoid arthritis is about 0.4%~0.5%, less than 1% of the general population, or about 100,000 people (TRA, 2017).

2.2 Patient compliance

Patient compliance is an important modifier of health system effectiveness. Health outcomes cannot be accurately assessed if they are measured predominantly by resource utilization indicators and efficacy of interventions. The health outcomes predicted by treatment efficacy data cannot be achieved unless patient compliance rates are used to inform planning and project evaluation. Increasing the effectiveness of patient compliance interventions may have a far greater impact on the health of the population than any improvement in specific medical treatments. Although most research has focused on patient compliance in regard to medication, patient compliance also encompasses numerous health-related behaviors that extend beyond taking prescribed pharmaceuticals. Sackett (1976), Haynes (1976) and Becker et al. (1977) first defined compliance as a person's behavior from a medical point of view, including changes in medication, diet, or lifestyle, and compliance with medical and health care recommendations. Edel's (1985) new definition of patient compliance is bsed on the treatment plan set by mutual consultation between the patient and the health care provider. WHO's definition of patient compliance as the extent to which the patient follows medical instructions was a helpful starting point. However, the term medical was felt to be insufficient

in describing the range of interventions used to treat chronic diseases. Furthermore, the term instructions implies that the patient is a passive, acquiescent recipient of expert advice, as opposed to an active collaborator in the treatment process (WHO, 2001). For Haynes (1979) and Rand (1993) compliance refers to the extent to which a person's behavior, such as taking medication, following a diet, or executing lifestyle changes, corresponds with the agreed recommendations from a health care provider (Ngoh, 2009). Patient compliance with rheumatoid arthritis sufferers is a problem, especially in the use of therapeutic drugs because the patient often self-medicates or reduces the dosage of drugs (Elizabeth and Susan, 2011). The use of case management in patients with rheumatoid arthritis can produce beneficial disease-related outcomes such as treatment outcomes and patient quality of life (Van den Bemt, et al., 2012). For economic reasons and patient health, we have to develop effective interventions for improving patient compliance with the medication regimens required for short-term illness and for optimizing health outcomes. The concept of patient compliance is broadly viewed as related to instructions concerning medicine intake, use of medical devices, diet, exercise, lifestyle changes, rest and return for scheduled appointments (Aronson, 2007; Bell, et al., 2007).The patient compliance is important that in chronic disease,overdose which causes serious health hazards,to control diseases of public health and replacement therapy(Jin, et al., 2008).This study views patient compliance as being in accordance with the doctor's advice on the use of drugs, self-diet control based on doctors' instructions, regular exercise compliance and patients being on time to visit their doctors and complete structural questionnaires.

2.3 Case management

Weingarten et al. (2002) evaluated the efficacy of interventions used to improve patient management, including patient compliance, in chronic diseases like asthma, coronary disease, depression, diabetes, and hypertension. The Case Management Society of America (CMSA) defined case management as a process of cooperation that includes assessing, planning, implementing, coordinating, monitoring and evaluating whether the services provided meet the individual's health needs, and uses communication and effective resources to enhance care quality and cost-effectiveness. Case management, through communication and the utilization of existing resources, promotes quality and cost-effectiveness and meet the health needs of individuals and families. For Austin (1983), patient case management is a health care system that includes assessment, planning, service, coordination and monitoring to meet multiple care needs. The practice of case management is a process that manages client wellness and autonomy through advocacy, communication, education, and the identification and facilitation of services. According to Austin (1988), patient case management achieves three goals to reduce costs, improve care quality, and meet three goals of health supervisors; case management is a health care system that includes assessment, planning, service, coordination and monitoring to comply with multiple care needs. Case management is a prescription that can effectively save costs and reasonably

improve the resource allocation mechanism because it can solve the problem of institutional integration and waste of resources, and face the least resistance to reform without major reforms (Austin, 1990). Case management is a participatory process to identify and facilitate the provision of services to meet individual health needs, while reducing fragmented and repetitive care, improving care quality and cost-effective results (Huber, 2000). Cohen and Cesta (2001) argue that case management is a multi-disciplinary clinical care system that employs nursing staff at the master's level to provide continuous and coordinated care for specific cases. Case management required for long-term care cases includes: (1) Assessing the case requirements to facilitate access to appropriate care services; (2) improving the physical function of the case and its health status; (3) preventing accidents and comorbidities; (4) the use of institutional care in chronic patients; (5) reducing the number of cases of improper use of emergency or outpatient frequency to control the cost of medical care; (6) enhancing the quality of life of the patients (Kemper, 1990; Davidson, 1991). Patient case management has become popular; it can save on medical costs with long-term care patients.

2.4 Case manager

In this study, patient case management is carried out by the care manager; physicians' limited contact time in Taiwan with outpatients precludes in-depth and long-term communication. As a result, patient health education requires the case managers, who need to assist physicians in providing patient services to enhance the quality of life of patients and increase the chances of successfully treating diseases. Case managers can provide patient education information, including general health care, disease knowledge and patient medication guidance, while reminding patients to regularly visit; in brief, they can enhance the ability of patients to coexist with the disease. The Commission for Case Manager Certification (CCMC) states that the case manager has many functions: conducting a comprehensive assessment of the client's health and psychosocial needs, planning, facilitating communication and coordination, education, and enhancing the patient's problem-solving ability. The case managers play an important role throughout the continuum of care in advancing evidence-based practice, working in teams to improve patient outcomes, and helping patients achieve health and wellness goals. Care requires greater emphasis on continuity and collaboration through regulatory compliance, an increased focus on health outcomes, cost-effectiveness and value, and more evidenced-based and client–centered care. This study requires a full-time case manager to provide patients with professional health education services, a wealth of knowledge and skills, and to achieve the rapid implementation of patient self-disposal, decision-making, diet and exercise according to the guidelines. The case manager have five major components were: (1) Individual health education and coordination of care; (2) individualized and comprehensive patient education of four weeks enhanced; (3) telephone follow-up and surveillance medications, and medication doses based on consensus guidelines; (4) obtaining needed consultations from dietary services and

physical therapy; (5) arrangements were made for additional patient education during two patients club visits involving the patient and family in developing the plan of care and providing informational and emotional support to the patient and family. At present, there are some full-time hospital health care personnel who have hepatitis B case managers, diabetes case managers, respiratory care case managers, kidney case managers, cancer case managers, etc.; these full-time case managers for patients with medical practices have positive influences.

Patient education is the most widely used disease management intervention and includes one-on-one sessions, mailings and telephone calls (Piette, et al., 2001). Weinberger (1998) believes that telephone contact measures can provide patient counseling services to promote patient education and monitoring, especially for outpatients, who can overcome the time constraints in outpatient visits and improve care quality by regular telephone contact with the patients, and mailing disease-related education. Telephone calls confirm the date of the visit; if the patient's condition appears to change, they can be used to help arrange outpatient or emergency treatment, health care and care services, and also show concern about the daily life of patients. Riegel (2002) stated that the reduction in hospitalization, costs, and other resource use achieved by using standardized telephonic case management in the early months after a heart failure admission is greater than that usually achieved with pharmaceutical therapy, and is comparable to other disease management approaches. Telephone visits reduce the use of medical resources in patients, the number of emergencies, outpatient visits and hospitalization rates, and increase patient satisfaction. Patient education is most common intervention that programs use to increase patient compliance under the category of disease management, and the focused application of resources to achieve improved care and outcomes (Montague, et al., 2003). Laramee et al. (2003) used health education and telephone access interventions to improve patient outcomes. Patients involved in the case management will set up two meetings at the patient club to enhance disease education. Similarly, previous reviews have indicated that combination interventions are more effective than single interventions (Roter, et al., 1998; Wu, Roberts, 2008).

3 Method

3.1 Study design and framework

Poor patient compliance is a complex and significant cause of the gap between usual and best care, and a cause of sub-optimal health outcomes. Interventions improve patient compliance, although achieving optimal levels remains elusive. As shown in Figure 3-1, the intervention was performed by one case manager (CM), who holds a master's degree and has 3 years of experience in rheumatology.

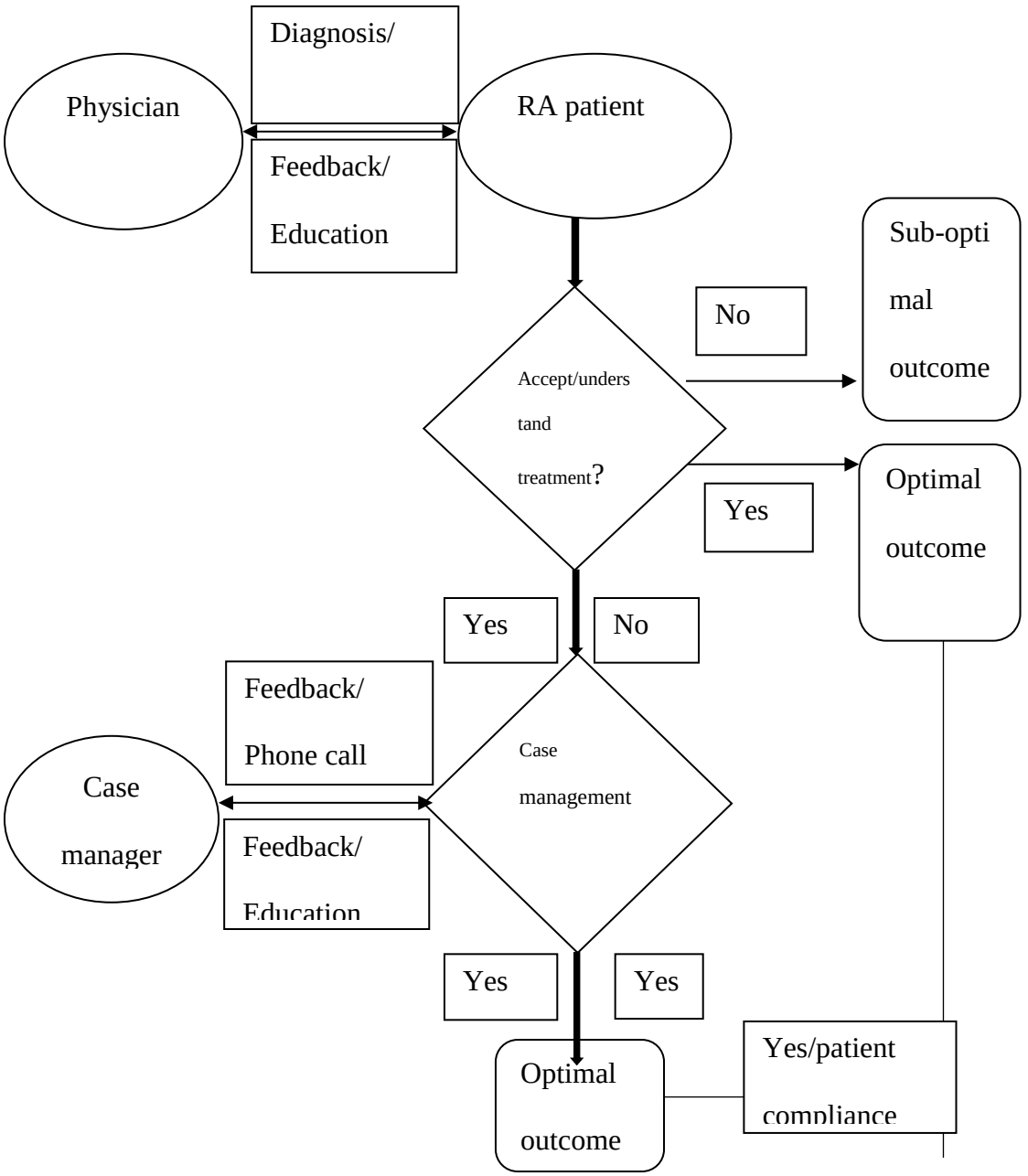

Figure 1: The patient compliance processes depicted in a patient's therapeutic journey

3.2 Intervention

The case-based care approach adopted in this study considers patients as individual cases and provides a personalized case management model. And case manger to full-time responsible for case management tasks. Regular monthly telephone contact the patient, tracking the patient's use of drugs and referral of the situation. Every three months to hold a meeting of patients club. The table 3-1 is the intervention group and control group comparison of two groups. Patient education both groups have implemented. Phone call every month, develop a plan of care, educate on disease process, organized patient club activity, provide patient education consultant, assist with medication management, accompany the client to doctor’s appointment, liaison between family members, physicians and others, support caregiving family members,monitoring of the patient's treatment only intervention group implemented.

Table 3-1: Case management execution item

Case management	Intervention group	Control group
Patient education	+	+
Phone call every month	+	-
Develop a plan of care	+	-
Educate on Disease Process	+	-
Patient club activity	+	-
Provide patient education consultant	+	-
Assist with medication management	+	-
Accompany the client to doctor’s appointment	+	-
Liaison between family members, physicians and others	+	-
Support caregiving family members	+	-
monitoring of the patient's treatment	+	-

"+" Has an execution item; "-" Has no execution item

3.3 Samples

We planned to enlist 300 rheumatoid arthritis patients. The case management group and the control group each totaled 150 patients. The case management group is a case management intervention. The rheumatoid arthritis patients took part at a medicial center and reginal hospital in Central Taiwan. The study period was from March through September 2017. The selection criteria for the research cases were as follows: (1) At least 18 years old; (2) moderate to severe rheumatoid arthritis for long-term medical treatment; (3) consciousness and no mental disorders; (4) literacy and communicators; (5) willing to participate in this research.

3.4 Data collection

The questionnaire was implemented during six months. The tool for this study is a structured questionnaire based on the relevant literature; the scoring method used Likert five scales and also True (YES) or false (NO). The first part of the content includes basic information on gender, age and educational level. The second part of patient compliance was related to diet, exercise, return, and taking medicine. Data were collected at enrollment by the case manager through patient interview.

4 Main Results

During the experiment, 11 patients in the case management group were unable to complete the study because of going abroad, changing hospitals or for other reasons. There were 13 patients in the control group without case management because of the above reasons. In this study, a total of 276 questionnaires were issued. Deducted regular answer case management group 5 case and control group 4 case. This study is based on a questionnaire filled out by rheumatoid arthritis patients from a medical center and three regional hospitals in Central Taiwan. Of 267 patients with rheumatoid arthritis 134 (50.1%) explored the influences between case management and patient compliance.

4.1 Patient characteristics

First, according to gender, age and educational level of the research objects, descriptive analysis was carried out; their distribution is described as follows (Table 1). Among the study patients, the gender distribution of this study population had more females: in the intervention group of rheumatoid arthritis patients 65% were female (N=87); in the control group of rheumatoid arthritis patients 72% were female (N=95). The ratio of males to females is about 3:1, consistent with the epidemiology. Rheumatoid arthritis patients are of all ages, with most over 40 years old. The chi-square-test was used to compare the differences of the demographic data categories variables: gender, age and

education level; there was no significant difference between the two groups. The result of non-reaction bias test p-value> 0.05 was not significant, indicating no differences between the two groups.
These are the main results of the paper.
Sections and subsections should be numbered as 1, 2, etc. and 1.1, 1.2, 2.1, 2.2 respectively.
Capital letters should be used for the initial letter of each noun and adjective in the section titles, the section should be formatted as left, bold, times new roman, and 15pt font size. For subsection (left, bold, times new roman, and 14pt), the initial letter of first word should be capitalized. And also similarly for other sub-subsections (left, bold, times new roman, and 12pt).

Table 4-1: Demographic Characteristics

Characteristic		No. (%)		P Value
		Intervention (n = 134)	Control (n = 133)	
Gender	Female	47(35)	38(28)	0.352
	male	87(65)	95(72)	
Age	18- 29 year old	15(11)	9(7)	0.825
	30- 39 year old	17(13)	15(11)	
	40- 49 year old	29(22)	27(20)	
	50- 59 year old	34(25)	35(25)	
	60- 69 year old	24(18)	27(20)	
	70- 79 year old or above	15(11)	20(17)	
Education graduate	high school or Within	77(57)	84(63)	0.50524
	University or above	57(43)	49(37)	

4.2 Data analysis
As can be seen from Table 4-2, the average of all factors is above 3.0, so that patient compliance in taking medication exhibited the best performance, followed by self-diet control; the worst performance was regular exercise. In regard to

regular exercise, the average of the control group was the lowest, with an average of 2.81. In the itervention group, the average was also low, 3.24; the main reason is that while exercise is healthful, but it is not easy to start and work keeps people busy, so mintaining the habit of continuous exercise is not easy.

Table 4-2: Patient compliance results

Variable	Intervention (n=134) mean ± SD	Control (n=133) mean ± SD
self-diet control	4.07±0.61	3.61 ±0.75
regular exercise	3.24±0.87	2.81±0.81
return visit on time	4.11±0.61	3.4±0.65
Take medications	4.41±0.62	3.73±0.68

As can be seen from Table 4-3, patient compliance of self-diet control under management intervention reached 80.5%. The control group only reached 66.1% compliance with diet control. The questionnaire asked patients for six months whether they engaged in smoking and drinking; these scores showed the highest performance since some patients had no smoking and drinking habits. Patient compliance with regular exercise under case management intervention reached up to 61.9% compliance. The control group only showed 51.8% compliance with regular exercise. The intervention group performed better than the control group. The averages indicated that the intervention group scored higher than the control group; it can be seen that case management intervention influenced patient compliance. The regular exercise score is the lowest of all factors, showing that it is not easy to constantly exercise for reasons stated above. Management intervention regarding patient compliance with return visit on time reached up to 83.6%. The control group only had 69.9% compliance with on time visits. The average number of observation intervention scores is high. The intervention group did better on time to visit. The taking medications survey includes dose correctness, medication knowledge, and repeated medication ratio. The control group did not increase or decrease their drug dose, with their score remaining 73.4%. The patients with case management intervention reached 88.8%. The

questionnaire asked whether patients had taken their medicine to treat the disease; the highest score shows that taking traditional Chinese medicine and folklore therapy is not common. Perhaps most patients use little traditional Chinese medicine; the average number in the intervention group was higher than in the control group. There was case management intervention to improve patient compliance with medication.

Table 4-3: Patient compliance results

Variable	Intervention (n=134) Yes %(N)	Control (n=133) Yes %(N)
self-diet control	80.5(N=108)	66.1(N=88)
regular exercise	61.9(N=83)	51.8(N=69)
return visit on time	83.6(N=112)	69.9(N=93)
Take medications	88.8(N=119)	73.4(N=98)

The second T-test analysis found that rheumatoid arthritis patients under case management performed better on compliance behavior than patients who did not join case management; they were statistically significantly different ($p < 0.001$) (Table 2). Patients with rheumatoid arthritis were interviewed regarding implementation of the case management intervention model. The results joined the case management aspects such as doctor's advice; the t-test analysis found that rheumatoid arthritis patients were assayed for statistical significance regarding diet compliance ($p < 0.001$). The results showed that the implementation of case management intervention achieved remarkable results: patients had significantly better dietary behavior than the patients that had not joined case management. Patients in the diet control group had significantly superior results. This means that interventional case management in patients with rheumatoid arthritis can improve the patient's dietary knowledge and hence dietary behaviors through individualized dietary guidelines and defined dietary goals.

Patients' compliance with regular exercise behavior reached a statistically significant level ($p < 0.001$). This shows that the implementation of case management achieved remarkable results, and patients have significantly better performance in regular exercise behavior than those who did not join case

management. This means that case management in patients with rheumatoid arthritis can significantly improve patient compliance.

There was statistical significance ($p<0.001$) for patient compliance in on time visit. Examining this research program, intervention strategies related to referral behavior included helping to schedule a referral time, exchanging regular pedophonic exhortations, and improving patient compliance with patient referrals. The findings support the finding that rheumatoid arthritis case management can significantly improve patients' referral behavior.

Patient compliance with medication was statistically significant ($p <0.001$), showing that the implementation of case management has achieved remarkable results, in that tyhese patients have better medication administration than patients without case management. Examining this research program, intervention strategies related to drug taking include the introduction of medical education topics, regular telephone calls, interpretation of disease problems, and community health education. These interventions improve patients' medication behavior. The findings support the conclusion that the management model increases patient compliance to medication guidelines. And so self-diet control is better outcome, regular exercise is better outcome, patient referral is better outcome, take medications is better outcome. It is has a positive and significant difference.

Table 4-4: Satisfaction Survey*

Variable	Intervention (n=134) mean ± SD	Control (n=133) mean ± SD	T value	*p* value
self-diet control	13.54 ± 1.20	12.34 ± 1.54	-7.1	<0.01
regular exercise	10.11 ± 2.58	8.43 ± 2.15	-5.77	<0.01
return visit on time	8.12 ± 1.09	6.93 ± 1.05	-9.05	<0.01
Take medications	12.96 ± 1.41	11.40 ± 2.07	-7.19	<0.01

5 Discussion and Conclusion

Rheumatoid arthritis is a stubborn disease that requires regular referral treatment. The type of medication taken is complex; therefore, in order to effectively control the progress of rheumatoid arthritis, besides using drug control, patients also need case managers to provide patient education, medication guidance, telephone interviews, professional advice and recommendations. As a result of this study, interventional case management in patients with moderate-to-severe rheumatoid arthritis does increase patient diet compliance, medication compliance, exercise compliance, and referral compliance. After receiving care from case managers, patients' awareness of taking medication on time, knowledge of medication safety and medication behaviors all showed good improvement. A questionnaire interview found that patients do not always seek a doctor for illness, but rather buy drugs or listen to the underground radio medication advertising, incurring drug safety risks and delays in treatment. Patients with rheumatoid arthritis take many kinds of drugs every day; teaching the patients about safe and proper medication is not easy. Taiwan's health insurance for the payment of pharmacists to provide medication guidance entails little cost. Therefore, if the case manager can assist with the patient's medication guidance, there is also a positive effect on the cognitive improvement of the patient's medication behavior. Reducing drug interaction and repeated use of drugs improves patient compliance. Each month, the case manager contacts the patients involved in case management by telephone interview, reminds patients to return and gives patients feelings of warmth, trust and support. The study reaults match Laramee et al. (2003) and the research in this study used health education and follow-up by telephone interview to improve patient outcomes and patient education is the most widely used disease management intervention and includes one-on-one sessions, mailings and telephone calls (Piette et al 2001) Therefore, we can see that group health education and regular telephone interviews are effective ways to enhance patient compliance with taking medication. If the patient is uncomfortable or has medication questions, s/he can also contact the case manager for help in two-way communication. We see that the patients' referral rates in the two groups are good. In Taiwan, most patients receive four weeks of medication. After four weeks, they need to go back to see the report and receive the drug again. After seeing the doctor, the nurse will help patients make an appointment for the referral time. If the doctor missed the appointment, he would not be able to schedule a doctor again. The patients will not miss the referral time.

Patient compliance was evaluated in outpatients by questionnaire after six months of case management, including four variables of patient compliance with doctor's orders for patients with rheumatoid arthritis. This research program’s intervention strategies related to referral include helping to schedule a return visit, and regular telephoned exhortations. Due to the intervention of case management, patient compliance with medical practice is improved. In regard to the results of

this research program, the intervention strategies related to medication behaviors include the introduction of the topic of health education, explaining disease-related doubts and community health education to improve the patients' medication behavior. This shows that case management has a positive and significant impact on patient compliance. Clinicians can administer case management to patients with rheumatoid arthritis to improve patient compliance and achieve the goals of disease control, as well as to reduce the financial burden on patient family, community and country. And so the study result, the patient case management can improve patient behaviors and care quality, but observation the patients and case manager interactivity finding the points that the most important thing is patient-centered, care patients, trust patients, maintain good friendships with patients, sometime like instructor or director and emotional support to the patient and family. Case management equal to care management equal to patient advocacy.

The following are two limitations: (1) the case management tracking time used in this study is only six months, which may affect the findings and effectiveness of the study. In the future, a longer time may be taken to track and evaluate. (2) In this study, only one medical center and three regional hospital patients with rheumatoid arthritis were studied in Central Taiwan, so the inferences of the research results are limited. Future research can increase the number of samples using the relevant variables to to enhance the generalizability of the study.

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