Chapter 5
Team Medicine and Multidisciplinary Education

Abstract Nutrition has taken a leading role in team medicine. The concept of the Nutrition Support Team (NST) is a specific example and a pioneer in team medicine. There was a fundamental challenge in promoting Interprofessional Work. It was the lack of Interprofessional Education. Kanagawa University has four departments – Nursing, Nutrition, Social Welfare, and Rehabilitation – and has been training professionals based on education and research through multidisciplinary cooperation since its establishment. In today's complex and diverse health, medical and welfare systems, problems cannot be solved by one profession alone, and students are taught that it is necessary to demonstrate their comprehensive abilities through interprofessional cooperation.

Nutrition is always necessary for the foundation of life and health and has a strong relationship with other fields. Furthermore, it is impossible to maintain a comfortable QOL (quality of life) with nutrient supplementation alone, so it is necessary to work with a dentist to improve chewing and swallowing in order to eat well. In addition, cooperation with medical doctors, nurses, physiotherapists, occupational therapists, and public health nurses is also necessary to improve diet therapy and eating habits. The improvement of appetite and taste, which is the gateway to dietary therapy, involves various and complex factors such as medical condition, medications, environment, mental state, and nursing care.

Keywords Team medicine · Skill Mix · Study Group on the Promotion of Team Medicine · Nutrition Support Team (NST) · Interprofessional Work (IPW) · Interprofessional Education (IPE) · Human service

5.1 Birth and Development of Team Care

Since the latter half of the twentieth century, "team medicine" has been a topic of discussion whenever the nature of future medical care is discussed. I was invited to participate in a symposium many times at medical and medical-related conferences. However, the content of the discussion was usually the introduction of each profession that would form part of a team, the necessity of a team, and the division of work

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roles. At that time, the significance and inevitability of forming a team, and how to form a rational team were not discussed. The reason for this was that the work, systems, and training in each profession were not yet mature, and each profession was occupied with establishing its own specialties. Each training course was also fostered the belief that that its own profession was essential to healthcare and that its own development would improve healthcare in Japan. In other words, "dream team medicine" was repeated for many years, but only in discussions among symposiasts from different professions.

5.1.1 The Birth of Team Medicine and Interprofessional Work in Europe and America

In Europe and America, team medicine was implemented early on. The reason for this was not the "dream team medicine" discussed in Japan, but a methodology born out of necessity in terms of risk management. In the 1990s, the number of deaths due to medical errors in the U.S. ranged from 44,000 to 98,000 per year, and the cost reached $17 billion to $29 billion per year. A Presidential Advisory Committee was set up to deal with the problem. The cause of medical errors was not inadequate professional knowledge or skills on the part of each professional, but "lack of interprofessional communication". Teamwork had to be improved in order to prevent medical errors from occurring.

In the UK, in 1998, the Bristol Children's Hospital operating theater confessed to an unusually high number of child deaths in surgery. The government set up a secret commission of inquiry and submitted a report in 2001. The committee concluded that the reason for the high number of deaths was not inferior skill on the part of the doctors involved in the operations, but a lack of communication and teamwork among the staff, as well as an absence of leadership.

Thus, a philosophy was born that many medical professions should cooperate and collaborate in order to cope with highly advanced medical technology and diversified patient needs. Team medicine and team care are called interprofessional work (IPW), and in the 1990s, the need for and methods of IPW were discussed in OECD countries. In these discussions, the issue was approached not only as a way to prevent the aforementioned medical errors, but also as a way to solve the shortage of doctors. In other words, a review of tasks that can be performed by non-physicians within the scope of the Medical Practitioners Act and the promotion of the division of roles among physicians and other medical personnel were considered. This movement was called Skill Mix (multi-professional collaboration). Moreover, skill mix was not just a mere division of work roles, but also included consideration of the delegation of authority and responsibility within the medical team. The debate then evolved to include how staff with different qualifications and abilities should be mixed within the team, the delegation of authority and the creation of new job functions.

5.1.2 Promoting Team Medicine in Japan

In Japan, the Ministry of Health, Labour and Welfare (MHLW) launched the "Study Group on the Promotion of Team Medicine" in August 2009 (Heisei 21). All medical treatment had been performed "under the direction of a physician", but the committee discussed expanding the discretionary authority of other medical personnel to carry out such treatment, thereby reducing the workload of physicians and improving the quality of medical treatment. The report completed in March 2010 (Heisei 22). In the report, team medicine was defined as "a wide variety of medical staff engaged in medical care, based on their high level of expertise, sharing objectives and information, sharing tasks while collaborating and complementing each other, and providing medical care that precisely responds to patients' situations". There are three specific benefits of team medicine.

① improvement of medical care and quality of life, such as early detection of diseases, promotion of recovery, and prevention of serious diseases
② reduction of burden on medical personnel by improving efficiency of medical care
③ improvement of medical safety through standardization and organization of medical care.

In order to promote team medicine, it was decided that (a) improvement of the expertise of each medical staff member, (b) expansion of the role of each medical staff member], and (c) promotion of cooperation and complementarity among medical staff should be the basic principles.

In response to this study group, in April 2010, the Ministry of Health, Labour and Welfare (MHLW) issued a director-general's notice "On the promotion of team medicine through collaboration and cooperation of medical staff" to clarify the role of dietitians in the nutrition field (Table 5.1). According to this notice, the duties of dietitians "include determining or changing the content and form of general diets, proposing special treatment diets, judging the appropriate timing of nutritional guidance, and proposing the selection and change of enteral feeding agents, after receiving comprehensive guidance from doctors". The report states that dietitians should actively participate in team medicine.

Once again, team medicine is interprofessional work (IPW) in medical care, and in recent years, this philosophy has been expanded not only to medical care but also to the fields of health and welfare, and the significance and methods of IPW have come to be actively discussed. In 2008, the "Japan Association for Interprofessional Education" was established, led by Eimei Takahashi, former president of Niigata University of Health and Welfare, and discussions in a variety of fields were renewed.

In order to promote IPW, three perspectives are considered: ①communication, ② information sharing, and ③ team management. A number of conditions have been identified as being necessary for good IPW implementation. It is a question of creating a situation in which people are always encouraged to speak up within the

Table 5.1 Promotion of team medicine through collaboration and cooperation among medical staff

(3) Registered dietitian
In recent years, with the aging of patients and the increase in the prevalence of lifestyle-related diseases, the role that can be played by the registered dietitian in the medical field as a specialist in the evaluation and judgment of nutritional management and nutritional guidance for injured and sick patients has become significant from the perspective of improving and maintaining the nutritional status of patients, preventing a decline in immunity, and improving the effectiveness of treatment and QOL. The role of nutritional specialists in the medical field is significant. Since the following tasks can be carried out by dietitians under the current system, it is desirable to make active use of dietitians. ① The content and form of general meals (regular meals) shall be determined or changed under the comprehensive guidance of a physician ② Advice to the physician regarding the content and form of special treatment meals (This includes the proposal of changes to the content of meals, etc.) ③ Comprehensive guidance for physicians regarding nutritional guidance for patients (critical path) in determining the appropriate timing for implementation, and in implementing it ④ Proposal to the physician about the selection of change in the type of enteral feeding agent to be used when enteral feeding therapy is performed

Notification by the Director-General of the Medical Affairs Bureau, Ministry of Health, Labour and Welfare, dated April 30, 2010

Table 5.2 Conditions for good IPW

1	Different opinions are encouraged and individual interests and ideas can be openly expressed
2	The uniqueness of each profession is recognized
3	Members are aware of the limitations of their individual expertise and team
4	Members should always be willing to consider opinions from other professions and outside parties
5	Things should not be interpreted in a way that suits the individual or the team
6	Recognition and respect for the expertise of other professionals
7	The ethical and moral consequences of the team's decision are considered

team, and their interests and ideas are recognized, as well as the uniqueness of each professional. In addition, it is important to recognize one's own limitations, to take into account the opinions of other professionals and outsiders, and to recognize and respect other professionals (Table 5.2).

After the war, many medical professionals were trained, but cooperation with other professions was rarely discussed. In other words, we did not know what their philosophy was, how they were trained, or what sort of knowledge and skills they had. This ignorance of other professions led to an excessive "obsession" with one's own profession, which in turn led to a "stiffening" of the situation.

The marked differentiation of medical specialties has had the danger of losing sight of the wholeness of the patient and of interpreting things in a way that is convenient for one's own profession, "seeing the disease but not the sick person". However, as people's values and lifestyles diversify, the medical care that patients desire is becoming more and more sophisticated and diverse, and it is becoming

essential for medical staff with a high level of expertise to collaborate and complement each other appropriately.

5.2 IPW and Nutrition

5.2.1 NST and Total Parenteral Nutrition

IPW has been actively discussed in nutrition, and nutrition has taken a leading role in team medicine. The concept of the Nutrition Support Team (NST) is a specific example.

In 1968, Dr. Stanley Dudrick, of Harvard Medical School, developed a catheter-based method of total parenteral nutrition and established NST, a multidisciplinary team dedicated to the implementation and dissemination of this method of feeding. At the time, such an innovative method of nutritional support could not be implemented by doctors alone, but required the participation of relevant registered dietitians, nurses and pharmacists. In 1973, the first NST was officially established at Boston City Hospital in the United States. Around this time, Dr. George Blackburn's nutritional assessment was systematized, and in 1975, the American Society for Parenteral and Enteral Nutrition (ASPEN) was established with physicians, registered dietitians, nurses, pharmacists, and others as members. In other words, it can be said that the field of nutrition was a pioneer in team medicine for the practice and operation of innovative technologies for nutritional supplementation.

In the U.S., around 1990, NSTs were established in acute care hospitals to provide nutritional assessment, determination of nutritional support, and management by a team. For example, when NSTs were created, requests for total parenteral nutrition would come to them, but actually only half of them were implemented. This was because detailed nutritional assessment had reduced the excessive use of central venous nutrition. In addition, the use of inappropriate nutritional materials, catheter sepsis, and abnormalities in blood glucose and electrolytes were significantly reduced (Table 5.3).

5.2.2 Launch of JSPEN

In Japan, the Society for Complete Venous Nutrition was established in 1970 (Showa 45), the Japan Society for Venous and Enteral Nutrition in 1985 (Showa 60), and the Japanese Society for Parenteral and Enteral Nutrition (JSPEN)* in 1998 (Heisei 10), the latter led by former Vice President Shohei Kogoshi of Kochi University. In Japan, the establishment of an academic society to serve as a governing body for NST, as is the case in Europe and the United States, was delayed for more than 25 years. One of the reasons for this is that Japanese medical care as a whole had little interest in nutrition, and the reform in the training of dietitians who

Table 5.3 Qualitative changes in nutrition management with the creation of NST

Items	1990		After NST 1992~1993	
	n	%	*n*	%
Request for a TPN from a doctor in charge			208	
Patients who have been treated with TPN	77		122	59.0
Inappropriate nutritional supplements	19	24.7	1	0.5*
Catheter sepsis	8	10.0	7	5.7
Hyper -/hypoglycemia	19	24.7	6	4.9*
Hyper -/hypokalemia	3	3.9	0	0
Hyper -/hyponatremia	15	19.5	0	0*
Hyper -/hypophosphatemia	9	11.7	0	0*
Hyper -/hypomagnesaemia	5	6.5	0	0*

Data: Flsher and Opper (1996)
*<0.001

must play a central role had been delayed. In other words, it took a long time for dietitians to be freed from food service work.

*The Japanese Society for Parenteral and Enteral Nutrition changed its name to the Japanese Society for Clinical Nutrition and Metabolism in January 2020.

5.3 Interprofessional Education and the Challenge of Kanagawa University of Human Services

5.3.1 The Importance of Interprofessional Education

There was a fundamental challenge in promoting IPW in our country, which was the lack of Interprofessional Education (IPE) for this purpose. In 2010, WHO published a "Framework for action on interprofessional education and collaborative practice" and recommended interprofessional education to the world-wide (Fig. 5.1). According to this framework, it is necessary to improve the general ability of professionals and the ability of professionals to cooperate one another, as well as to improve the ability of each professional as before.

Especially in Japan, where the aging of society is advancing, inter-professional cooperation has become an essential issue as problems such as caring for elderly people who need nursing care, transition to community and home care, and controlling medical and nursing care costs arise, but education and research for this purpose are remarkably lagging behind the need . In recent years, discussions of IPE have become more active, and several competency models have been presented, but they generally consist of four domains (Fig. 5.2).

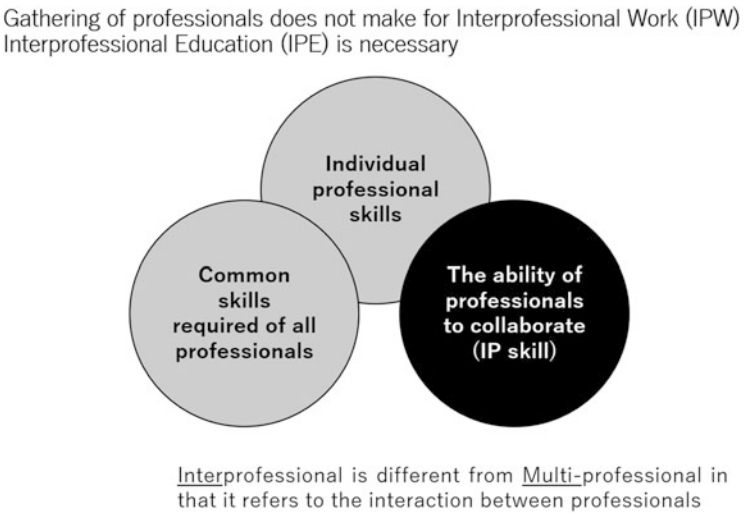

Fig. 5.1 Encouraging interprofessional education

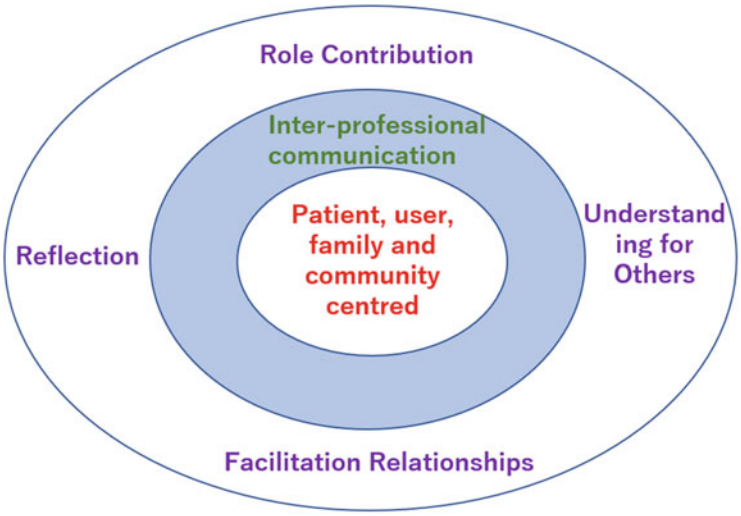

Fig. 5.2 Inter-professional competency model as a collaborative skill

Its contents can be explained as follows.

1. Fulfilling the role of the job: Role Contribution
   Each profession understands one another's role and can fulfill their role as a profession while utilizing one another's knowledge and skills.
2. Working on the relationship: Relationship Facilitation

Able to support and coordinate the development, maintenance and growth of relationships with multiple professions. Each profession is also able to respond appropriately to inter-professional conflicts that sometimes arise.

3. Reflection on one's own occupation: Reflection
   Able to Reflect on the thoughts, actions, feelings, and values of one's own profession, and gain a deeper understanding of the experience of collaborative work with multiple professions, and apply this understanding to collaborative work.
4. Understanding of Others
   Able to Understand the thoughts, actions, feelings, and values of other professions and apply them to collaborative work.

5.3.2 Education of Kanagawa University of Human Services

Kanagawa University has four departments – Nursing, Nutrition, Social Welfare, and Rehabilitation – and has been training professionals based on education and research through multidisciplinary cooperation since its establishment. In today's complex and diverse health, medical and welfare systems, problems cannot be solved by one profession alone, and students are taught that it is necessary to demonstrate their comprehensive abilities through inter-professional cooperation. The significance and methods of collaboration are taught in lectures, exercises, and practical training, and special research funds are allocated for research on multidisciplinary collaboration, in an attempt to change from the specialization seen in traditional universities. The curriculum is designed to provide education in each of the professions, and in the first year there is a symbolic subject of "Human Services", which includes a classroom lecture on the philosophy and necessity of human services from each department. In addition, the theory of health and medical welfare is taught in the first and second year, the theory of regional health and medical welfare is taken in the third year, and human service II is taken in the fourth year. (Table 5.4).

In "Health and Medical Welfare", students learn about the basic concepts and activities of each profession regarding the systems and activities that support health and medical welfare, and learn about the significance and necessity of collaboration, especially with the user at the center. In addition, students learn about the concepts, history, subjects, and fields of nursing, nutrition, social welfare, and rehabilitation studies, understand the current status and issues of each profession, and learn about the nature of cooperation. Students will then visit hospitals and social welfare facilities to learn about the actual practice of healthcare and welfare and about their users. In "Human Services II", students conduct mock case conferences using examples in the second semester of their fourth and final year, based on the expertise they have learned so far at the university. In other words, the objective is to acquire the ability to provide inter-personal support and assistance from the perspective of

Table 5.4 Kanagawa University of Human Services curriculum on IPE

First year	Second year	Third year	Fourth year
Symbolic subject			
Human service I			Human service II
General human education courses			
Relationships and communication human rights, gender and more			
Collaborative practical education courses			
Health and medical welfare Theory I	Health and medical welfare Theory II Counselling theory	Regional health and medical welfare Theory Welfare Collaboration Theory	Human service Comprehensive exercises
Specialized creative education courses			
Various specialist subjects Graduation research			

"Human Service" in practice after graduation. Specifically, the following methods are used.

① Cases and examples are presented for each of the mixed groups of students from the four departments.
② In each group, students evaluate the subject from their own professional standpoint and make a comprehensive assessment.
③ For each group, students work together to develop an individual support plan.

Steps ① ~ ③ are performed in an exercise format.

In addition, when the need for preparation or review arises, instructions will be given on study contents and methods as needed.

④ General comments from department chairs, faculty, and deans

As mentioned above, our university has been experimenting with collaborative education throughout the university. The results are unclear at present, but on the occasion of the 10th anniversary of our university, we conducted a questionnaire survey of our graduates. As a result, "Awareness of inter-professional collaboration" topped the list of "The things that students learned at university", and "Ability to be aware of inter-professional collaboration" was selected as a "Useful ability" (Table 5.5).

In recent years, many medical and welfare professionals, as well as educators, have presented the form of team medicine and care. There is no problem if such medical treatment and care become reality, but I have heard graduates of our university say, "In the field, it is not yet a team medical treatment" or "There is a gap between the ideal of education and the field". Recently, I have been thinking that the key word for the success of IPW and IPE is to have a "margin" as a "potential" to

Table 5.5 Results of a survey of Kanagawa University of Human Services graduates (Sixth Graduating Class: 2011)

1. The things that students learned at university		
1.	Awareness of inter-professional collaboration	72.7%
2.	Academic specialization	63.6
3.	Communication skills	43.2
4.	Human Services Philosophy	34.1
5.	The ability to contribute to teamwork	29.5
6.	Problem finding and solving skills	27.3
2. Useful abilities		
1.	Ability to be aware of inter-professional collaboration	61.9%
2.	Professional knowledge and skills	59.5
3.	The ability to contribute to teamwork	40.5
4.	Communication skills	35.7
5.	Problem finding and solving skills	23.8
6.	The ability to implement human services	21.4

work together with other fields. If you don't have a "margin", there is a risk that the overlapping area will be interpreted as an intrusion or invasion and the work in the boundary area will develop into a dispute. Rather than reaching out to other areas and expanding our own areas, we should aim to create margins where we can work together and improve the quality of our respective areas. To this end, we believe that the most important thing for the success of collaborative work is to respect and honor other professions, rather than ignoring or disrespecting other domains. Therefore, interprofessional work is meaningless unless the new results produced by the team are appreciated, and at the same time, the expertise of each team member advances. This means that it is not possible for dietitians alone to improve nutritional status.

Nutrition is always necessary for the foundation of life and health, and has a strong relationship with other fields. For example, it is necessary to cooperate with doctors, nurses, and pharmacists for various nutritional supplements. Furthermore, it is impossible to maintain a comfortable QOL (quality of life) with nutrient supplementation alone, so it is necessary to work with a dentist to improve chewing and swallowing in order to eat well. In addition, cooperation with physiotherapists, occupational therapists, and public health nurses is also necessary to improve diet therapy and eating habits. The improvement of appetite and taste, which is the gateway to dietary therapy, involves various and complex factors such as medical condition, medications, environment, mental state, and nursing care.

In the twentieth century, each profession developed by improving their professional education. However, in the twenty-first century, as health care, medical care, and nursing care rapidly become more sophisticated, problems are emerging that cannot be solved no matter how much effort is made by each profession. Under these circumstances, if we receive support from other professions and collaborate with other professions, we will be able to overcome the insurmountable barriers.

As is apparent, professional education for each of these professions is in a period of great change. In 2012, the Japanese Association of Nutritional Science Education was founded by Dr. Heizo Tanaka, former director of the National Institute of Nutrition, and the present author is currently the president of the society. It is my sincere hope that many people will join this society and study the future of nutrition and dietitian education.

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