

## Review

# The development of nutrition and dietetics education and accreditation system in Indonesia and various countries: A narrative review

A Fahmy Arif Tsani MSc, RD<sup>1, 2, 3</sup>, Susetyowati PhD<sup>4, 5</sup>, Tony Arjuna PhD, APD<sup>4, 5</sup>, Rachmadya Nur Hidayah PhD<sup>6</sup>, Fillah Fithra Dieny MSc<sup>1</sup>, Farah Amalia Andika Putri BSc<sup>1</sup>

<sup>1</sup>Department of Nutrition Science, Universitas Diponegoro, Semarang, Indonesia

<sup>2</sup>Doctoral Program, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

<sup>3</sup>Association of Nutrition Higher Education of Indonesia, Bogor, Indonesia

<sup>4</sup>Department of Health Nutrition, Faculty of Medicine, Public Health and Nursing, Universitas Gadjah Mada

<sup>5</sup>Indonesian Dietetic Association, Jakarta, Indonesia

<sup>6</sup>Department of Medical Education and Bioethics, Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia

The education and accreditation system of dietitian-nutritionists has gone through various changes throughout the years. These systems are important to produce competent nutrition professionals. Standardization attempts have been done internationally by the International Confederation of Dietetic Associations. Many countries have developed their own standards to educate and accredit nutrition professionals to ensure the quality of the nutrition and dietetic profession. Through internet and database searching, this paper aims to review and describe the education requirements and accreditation system of nutrition professionals in Indonesia and compare it to other countries including the United States, United Kingdom, Australia, Japan, South Korea, Malaysia, Philippines, Thailand, and Singapore. Most countries, including Indonesia, require a minimum of bachelor's degree to be a nutritionist and a dietitian, whereas the US requires a minimum of master's degree. In Indonesia, there is also an additional one-year training program after completing the undergraduate study that need to be taken if an individual wants to register as a dietitian or nutritionist, while other countries have included this similar program to their undergraduate or master course. A certification exam to be a dietitian or nutritionist is required by Indonesia, the US, Japan, South Korea, Philippines, and Thailand, while the remaining others do not. In conclusion, differences in dietetic education and accreditation system were found. Indonesia's nutrition and dietetic education system already meet the International Confederation of Dietetic Associations standard and on par with some countries reviewed here. However, further improvements are still needed.

**Key Words:** dietitian, nutritionist, education, registration, accreditation

## INTRODUCTION

The importance of diet in maintaining health and in the treatment of diseases has been acknowledged since the 8th century BC even though dietetics was not officially recognized as a profession. Dietetics as a profession rose in the 19th century and since then has been progressing rapidly. Contemporary medical nutrition service started in the United Kingdom and was brought to the United States.<sup>1</sup> Now, the United States through the Academy of Nutrition and Dietetics (AND) has a big influence on the world of modern nutrition and dietetics because of its various contributions including the development of the registered dietitian (RD) system.<sup>2</sup> In Asia, Japan was the first country to establish a nutrition institute followed by South Korea and the Philippines which introduced the discipline of Foods and Nutrition as a major of study.<sup>3</sup>

Indonesia started its journey of nutrition and dietetic education in 1950 through the establishment of the School of Food Specialist (Sekolah Ahli Makanan). Since then, the nutrition and dietetics education, accreditation, and registration system has undergone various changes and improvements to what is used today.<sup>4</sup> Nutrition and dietetics education, accreditation, and registration systems play an important role in producing competent nutrition

**Corresponding Author:** A Fahmy Arif Tsani, Department of Nutrition Science, Faculty of Medicine, Universitas Diponegoro, Prof. Mr. Sunario Street, Semarang 50275, Indonesia  
Tel: +6224-76402881

Email: fahmi.tsani@gmail.com

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professionals. Currently, an international standard for dietitians-nutritionists' education has been published by the International Confederation of Dietetic Associations (ICDA). However, even with the standardization attempts, differences in nutrition and dietetic services in different countries can still be found.<sup>5</sup> Through internet searching and reports, the authors aimed to introduce the nutrition and dietetics education and accreditation system in Indonesia. The authors also aimed to describe and compare the education requirements and registration system of dietitians and nutritionists in Indonesia to the international standards from the ICDA and various countries including the United States, United Kingdom, Australia, Japan, Korea, Malaysia, Philippines, Thailand, and Singapore. Official guidelines and policy documents were obtained from official websites of the International Confederation of Dietetic Associations (ICDA) and nutrition and dietetic associations or official bodies that regulate the profession in the reviewed countries.

### DEFINITION OF DIETITIAN AND NUTRITIONIST

The terms nutritionist and dietitian have been used since the 19th century. The word 'dietitian' was first defined in 1899 as "a person who specializes in the knowledge of food and can meet the demand of the medical profession for diet therapy" at the Lake Placid Conference on Home Economics. In 1920, however, some dietitians in the US were called 'nutrition workers' and that initiated the term 'nutritionist'. The first definition of nutritionist was conveyed in 1940 by the American Dietetic Association as "qualified, professionally trained person who directs or carries on a program of activities dealing with the application of scientific knowledge of nutrition to the prevention of disease and the promotion of positive health".<sup>6</sup> In 1967, dietetics as a profession was finally recognized by the International Labor Office, and the term 'dietitian' was used to address the professionals in that field as requested by the ICDA.<sup>2</sup> The ICDA defined a dietitian as "a professional who applies the science of food and nutrition to promote health, prevent and treat disease to optimize the health of individuals, groups, communities, and populations".<sup>7</sup>

Dietitians and nutritionists are commonly known as health professionals who use food and nutrition to promote health. In certain countries, the term "dietitian" is the officially recognized professional title while in others, both "nutritionist" and "dietitian" are recognized. In countries where both nutrition professions are recognized, nutritionists provide more general advice to promote healthy eating to the healthy population while dietitians perform medical nutrition therapy and give specialized dietetic interventions to patients.<sup>8-10</sup> Another nutrition professional is dietetic technicians, who work under the supervision of dietitians.<sup>11,12</sup> These three nutrition professionals are not always available simultaneously in every country. South Korea, Japan, and Thailand only recognize dietitians as their nutrition professionals. In the US, UK, and Australia, the title nutritionist is not protected by law and they can have limited qualifications while in others such as Malaysia, Indonesia, and Singapore both titles are recognized, and the professions are regulated by law. Die-

tetic technicians are recognized and regulated in Indonesia and the US. The terms used to address these nutrition professions are different in some countries. Differences in the available nutrition professionals and terms used to address each nutrition professional are shown in Table 1.

### INTERNATIONAL NUTRITION AND DIETETICS

The International Confederation of Dietetic Associations is an international organization of national associations of dietitians and nutritionists. Established in 1952, now ICDA comprises more than 50 National Dietetic Associations from countries around the world including the United States, Latin America, Europe, Asia, Australia, and Africa as members and represents over 180,000 professional dietitians and nutritionists.<sup>13</sup>

ICDA developed an international standard for the education of dietitian-nutritionists through consensus with member association representatives in 2004. The standard was then refreshed in 2014 which resulted in three basic requirements (Table 1) namely a bachelor's degree in nutrition and dietetics, a minimum of 500 hours of supervised professional practice, and meeting the international competency standards. The international standard for education and the international competency standard published by ICDA act as a basis and benchmark for every country and National Dietetic Associations in setting their own standards which will determine the scope of dietitian-nutritionists' work in each area.<sup>7</sup>

### NUTRITION AND DIETETICS IN DIFFERENT COUNTRIES

#### Indonesia

Indonesia has recognized and regulated nutritionists and dietitians as a professional that specializes in the nutrition and dietetic fields which is proved by a government regulation on health workers issued in 1996. In 2024, there are a total of 30,851 nutrition professionals working in the clinical and public health setting in Indonesia.<sup>14</sup> The newest professional standard which includes competency standards and code of ethics for nutritionists was issued in 2020 and 2022 for dietitians. Until 2023, competency and accreditation standards for nutritionists and dietitians are managed by the Indonesian Nutrition Association (Persatuan Ahli Gizi Indonesia/PERSAGI) as the national professional organization and the Association of Nutrition Higher Education of Indonesia (Asosiasi Institusi Pendidikan Tinggi Gizi Indonesia), which is responsible for the standardization and improvement of nutrition education institutions. However, a recently enacted statute in August 2023 resulted in changes of the bodies responsible for the competency and education of nutritionists and dietitians. Based on the newest statute number 17 of 2023, education and competency standards, including the issuing of the certificate of competency, are now done by the Nutrition Council (part of the Health Professional Council) with the assistance of the Indonesian College of Nutrition and Dietetics (Kolegium Gizi Indonesia).<sup>15</sup>

PERSAGI as the national nutrition professional organization presides over three affiliated organizations which are the Indonesian Dietetic Association, Indonesian Nutritionist Association, and Indonesia Sport Nutritionist Association.

**Table 1.** Education background and accreditation of nutrition professionals in various countries

Countries/ Organization	Profession	Authority	Accreditation requirements		
			Education	Supervised practice/ internship	Certification exam
ICDA	Dietitian-nutritionist	ICDA	Min. Bachelor's in nutrition & Dietetics	Min. 500 h	x
US	Registered Dietitian- Nutritionist	Academy of Nutrition and Dietetics	Master's in Nutrition or Dietetics	Min. 1000 h	✓
	Nutrition and Dietetics Technician, Registered		Associate degree & complete NDTR program	450 h	✓
UK	Registered Dietitian	Health and Care Professions Council	-BSc (Hons) in Dietetics -MSc/PgDip in Dietetics	>1000 h	x
	Registered Nutritionist	United Kingdom Voluntary Register of Nutri- tionist	BSc (Hons)/MSc in Nutritional Science	-	x
Australia	Accredited Practicing Dieti- tian	Dietitians Association of Australia	Dietetics degree	1000 h	x
Japan	Registered Dietitian	Ministry of Welfare and Labor	Min. Diploma degree in Dietetics	990 h	✓
	Dietitian	Prefecture Governor	Min. Diploma degree in Dietetics	990 h	x
South Korea	Dietitian	Ministry of Health and Welfare	A degree from Dietetics/Food and Nutrition/Food Science/Dietary Life Department	-	✓
Malaysia	Dietitian Nutritionist	Allied Health Professions Council	BSc in Dietetics/Nutrition and Dietetics	1200 h	x
			Bachelor's in Nutrition	1000 h	x
Philippines	Registered Nutritionist- Dietitian	Professional Regulation Commission	Bachelor's in Nutrition and Dietetics	1200 h	✓
Thailand	Dietitian	Ministry of Public Health	Vocational certificate in Food and Nutrition	-	✓
			Bachelor's/Master's in Nutrition and Dietet- ics/Nutrition/Dietetics/equivalent	900 h	✓
Singapore	Accredited Dietitians Accredited Nutritionists	Singapore Nutrition and Dietetics Association	Bachelor's in Nutrition and Dietetics	6 months	x
			Bachelor's/Master's in Nutrition	-	x
Indonesia	Registered Dietitian	Health Professional Council	Bachelor's in Nutrition Science	Min. 1500 h	✓
	Nutritionist	Health Professional Council	Bachelor's in Nutrition Science	-	x
	Technical Registered Dieti- tian	Health Professional Council	Associate in Nutrition Science	-	✓

ICDA, International Confederation of Dietetic Associations.

### History of nutrition-dietetics education

The journey of nutrition and dietetics education in Indonesia started in 1950 when the first nutrition school called the School of Food Specialist (Sekolah Ahli Makanan) was established. After the establishment of the School of Food Specialist, other nutrition and dietetics schools were found to create competent nutrition specialists for the public and clinical settings. In 1959, one of the established dietetic schools produced graduates with a Bachelor of Science degree. This dietetic school was then known as the first nutrition academy in Indonesia. In 1985, the Academy of Nutrition changed its curriculum from an academy to vocational studies and produced graduates as nutrition associates. This started the vocational studies of nutrition in Indonesia.<sup>4</sup>

In the academic setting, nutrition as a topic of study was first included in the University of Indonesia's Department of Public Health curriculum in 1957. Starting from the 1970s, nutrition has been added as a course of study in various departments including agriculture and public health. Finally, in 2003, the first Department of Nutrition was established with graduates receiving the Bachelor of Nutrition Science degree at four universities (Universitas Gadjah Mada, Universitas Diponegoro, Universitas Brawijaya, and Universitas Esa Unggul). Individuals who graduated from the program will be recognized as nutritionists. Four years later, in 2007, the dietetic internship program that must be taken to be a dietitian was executed. Universitas Gadjah Mada and Universitas Brawijaya are the first universities to offer a dietetic internship program.<sup>4</sup>

### Current nutrition-dietetics education

Nutrition and dietetics education in Indonesia are divided into vocational, academic, and professional (dietetic internship) programs. The vocational program is a three-year study program and graduates will be granted the Associate of Nutrition degree. The academic program consists of a bachelor, master, and doctoral level. The bachelor program is usually done in four years, while the duration for the master program is 1.5-2 years and the doctoral program is 2.5-4 years. The degree received for individuals graduating from the bachelor, master, and doctoral program is Bachelor of Nutrition, Master of Nutrition, and Doctor of Nutrition respectively. To date, there are a total of 127 bachelor programs, eight master programs, and two doctoral programs in Nutrition Science in Indonesia.<sup>16</sup> The professional (internship) program available in Indonesia at present is dietetic internship. However, an internship program for nutritionists is currently under development. Dietetic internships can be taken after individuals complete their bachelor's degree in nutrition. The program requires a minimum of one year of study, including at least 1500 practice hours through internships in three rotations: clinical, public health, and food service. The clinical rotation comprises 15-19 credits, which is equivalent to 690-862 hours, while both the public health and food service are worth 8-12 credits each, corresponding to 363-544 hours. The internships are done in various settings including hospitals, private clinics, public health centers, district health offices, sports and fitness centers, as well as restaurants and catering services.

The dietetic internship program, including curriculum, competency, and education system in Indonesia refers to The International Confederation of Dietetic Associations, the Academy of Nutrition and Dietetics, and others. Currently, nine institutions have provided a dietetic internship program in Indonesia. An addition of three more institutions will also open and start operating the dietetic internship program in 2025. Students who have completed the dietetic internship program will be granted the title of dietitian.<sup>4</sup>

### Current nutrition-dietetics profession accreditation and competence

Based on the Regulation of the Minister of Health of the Republic of Indonesia number 26 of 2013, nutritionists and dietitians can be categorized into technical registered dietitian, nutritionist, and registered dietitian according to their level of education.<sup>12</sup> In addition to that, a new Government Regulation number 28 of 2024, which was derived from the Regulation of the Minister of Health of the Republic of Indonesia number 26 of 2013, stated that nutrition graduates must undergo a professional internship before registering as a nutritionist or dietitian.<sup>17</sup> A technical registered dietitian is an individual who has completed vocational study. To be a registered health professional, individuals must meet the requirements which have been set. Technical registered dietitians and registered dietitians must complete their study program, pass the national competency examination, and obtain a license issued by the Ministry of Health. After becoming a licensed nutrition professional, technical registered dietitians and registered dietitians can work in various settings including the hospital and public health facilities. However, there is a slight difference in competencies. A technical registered dietitian works under the supervision of an RD and can only give counseling, education, and dietetic services to healthy subjects and patients without complication. Registered dietitians have more competencies in providing dietetic services such as handling patients with complications, accepting clients/patients directly or receiving diet prescriptions from doctors, consulting physicians regarding diet prescriptions, and referring complex/critically ill patients to a specialist physician. Registered dietitians are also able to work in a private practice while technical registered dietitians must work under an institution.<sup>12,18</sup> Until 2023, graduates of the Bachelor of Nutrition can also be licensed by Health Professions Council under the Ministry of Health and work in the clinical setting. However, with the enactment of statute number 17 of 2023 as the latest regulation, the licensing of nutrition professionals can only be given to graduates of vocational (technical registered dietitian) and professional (registered dietitian) study.<sup>15</sup> Bachelor of Nutrition graduates who have graduated from the academic program must continue their studies and take the dietetic internship program to be a licensed health professional as a registered dietitian or work in other areas besides the clinical field, such as in food industries, public and community settings, research and development, and other related fields.

### United States

Dietetics in the United States started with the emergence of cooking schools in the 19th century which produced graduates called 'dietists'. The term 'dietists' then changed into 'dietitians' and in 1917 the American Dietetic Association, now known as the Academy of Nutrition and Dietetics, was founded.<sup>6</sup> In the last century, AND has grown its influence in education, research, and system development which largely impact the growth of nutrition and dietetics all over the world and make them the leading organization of nutrition and dietetics worldwide.<sup>1</sup> There are six organizational units affiliated with AND, and among them are the Accreditation Council for Education in Nutrition and Dietetics (ACEND) and the Commission on Dietetic Registration (CDR).

ACEND is the accrediting agency while CDR is the credentialing agency for AND. ACEND ensures the quality of nutrition and dietetics education programs by establishing accreditation standards and assisting in the improvement of each program. Currently, there are more than 600 programs accredited by ACEND which include Coordinated Programs, Didactic Programs, Internship Programs, Technician Programs, and Foreign Programs.<sup>19</sup> CDR creates and implements standards appropriate for the profession, occupation, role, or specialty area to grant credentials to those wishing to register as dietitians. CDR has the liberty to control matters related to all necessary certifications, including recertification, setting certification fees, running credentialing programs, and managing associated professional assessment and development activities.<sup>20</sup>

In the US, the officially recognized professionals related to nutrition and dietetics are registered dietitian nutritionists (RDN) and nutrition and dietetics technicians, registered (NDTR). Starting in 2024, the minimum education requirement to be an RDN is a master's degree from a US regionally accredited university or college or its equivalent abroad. Transitioning the qualification of RDN from a bachelor's to a master's degree was a necessary step for the evolution of the profession. In the US, the education requirements of other healthcare professions were already beyond the undergraduate level. Thus, increasing the minimum education requirements to a graduate level aligned with the knowledge, skills, and research ability needed in the nutrition and dietetics field.<sup>21,22</sup> Another requirement is completing a minimum of 1000 hours of supervised practice and passing the national exam for RDNs held by CDR.<sup>23</sup>

Individuals who pass the examination will be accepted as an RDN. Some RDNs also have certification in specialized areas granted by CDR including renal nutrition, sports dietetics, gerontological nutrition, oncology nutrition, obesity and weight management, pediatric nutrition, specialist in pediatric critical care nutrition, and advanced practice in clinical nutrition. Other certificates of specialization can also be achieved through various national credentialing agencies in the US.<sup>24</sup>

NDTR, similar to technical RD in Indonesia, operates under the supervision of an RDN when providing direct patient/client nutrition care. However, they can also work independently in various settings such as consulting with food service businesses and industries, providing general

nutrition education to healthy populations, conducting nutrient analysis, collecting data, and conducting research. Requirements needed to be an NDTR are as follows: (1) completed at least an associate's degree and an ACEND-accredited NDTR program which includes 450 hours of practice under supervision in community programs, health care, and food service facilities and (2) passed the national exam for NDTRs held by CDR. Similar to RDNs, NDTRs can also be certified in a specific area through various credentialing agencies. However, the choice of specializations is more limited as NDTRs are not qualified to do medical nutrition therapy (MNT) compared to RDNs.<sup>11</sup> Both RDNs and NDTRs need to maintain registration every five years by fulfilling two requirements which consist of paying the yearly registration maintenance fee and completing the required continuing professional education units (CPEUs) as much as 75 CPEUs for RDNs and 50 CPEUs for NDTRs.<sup>25</sup>

### United Kingdom

Dietetics in the UK started in the 19th century. In 1936, the need for a professional association was more apparent which resulted in the establishment of the British Dietetic Association (BDA). The BDA is the only organization in the UK that represents the entire dietetics workforce and is also in charge of designing curriculum for the profession.

The officially regulated profession related to nutrition and dietetics in the UK is dietitians. Registration of the profession was done by the Health and Care Professions Council (HCPC). The requirement needed for dietitian registration is the completion of a university program approved by the HCPC and accredited by the BDA. Two different kinds of dietetics programs can be taken. The first is a full-time undergraduate program which will end with a final degree of BSc (Hons) in dietetics and the second is a full-time postgraduate program that leads to a Masters (MSc) or Postgraduate Diploma (PgDip) in dietetics. The available courses are structured and already include a period of supervised practical placement of more than 1000 hours.<sup>26</sup> After successful completion of the course program, individuals are eligible to be registered as dietitians by the HCPC. Registered dietitians must renew their registration every two years by paying a renewal fee and submitting a professional declaration attesting to their continued practice of the profession since the last registration.<sup>27</sup> In the UK, dietitians can work in a specialized area and join one or more specialist groups. Currently, there are 22 specialist groups including cystic fibrosis, food allergy, food services, freelance dietitians, human immunodeficiency virus care, industry, maternal and fertility, mental health, neurosciences, sustainable diet, and other specialist groups. Each group offers access to online discussion networks, expert professional knowledge, and other activities.

Another profession related to nutrition in the UK is nutritionist. However, nutritionist as a profession is not regulated by the law. Nutritionists are not allowed to perform MNT, but they can give information regarding food and healthy eating. In accordance with that, nutritionists can also work in other various roles including in the local and national government, public health, health policy, health

improvement, non-governmental organizations, the private sector, and education and research. The regulation of nutritionists is handled by the Association for Nutrition. A Registered Nutritionist typically has a BSc (Hons) or MSc in Nutritional Science and at least three years of professional practice. Individuals can directly apply for the United Kingdom Voluntary Register of Nutritionists registration to become a Registered Nutritionist. However, the registration of nutritionists to the United Kingdom Voluntary Register of Nutritionists is not mandatory. Non-registered nutritionists may not have met or be able to meet the acknowledged standards and competencies in foundational knowledge and professional skills set by the Association for Nutrition.<sup>8,28</sup>

The steps to be a dietitian and nutritionist in the UK and Indonesia differ. In the UK, not all nutrition courses can prepare students to be a dietitian. Individuals who aim to be a dietitian need to have a dietetic degree from an accredited dietetic program, while those who graduated from a nutrition science program can be called as nutritionists. Furthermore, there is no additional training or internship needed to register as a dietitian upon graduating. In contrast, individuals who graduated from any nutrition science program can be a dietitian in Indonesia as long as they take an additional year of dietetic internship.

### **Australia**

A registered dietitian in Australia is called an accredited practicing dietitian (APD). The registration is handled by the Dietitians Australia which was established in 1976 and is formerly known as the Australian Association of Dietetics. This association consists of two separate and independent councils which are the Dietitian and Nutritionist Regulatory Council and the Australian Dietetics Council (ADC). Dietitian and Nutritionist Regulatory Council is responsible for the profession's regulatory functions including regulating professional conduct and credentialing standards and overseeing accreditation standards, accreditation of training programs, and qualification for entry into the profession. ADC is the governance structure for accreditation and recognition services. ADC gives expert, independent, and strategic advice on those matters.<sup>29</sup>

In Australia, APDs are divided into four levels, namely Provisional APD, Full APD, Advanced APD, and Fellow of Dietitian Australia.<sup>30</sup> The provisional status will be given as dietitians enter the APD program. APD program is the national program for recognition of qualification, ongoing training, and practice standards for dietitians. The eligibility criteria to join the program is to have obtained an accredited dietetics degree from Australia or a mutually recognized degree from New Zealand, or successfully passed the association's Dietetic Skills Recognition Process within the last three years. Currently, there are 21 accredited nutrition and dietetics education programs in Australia including bachelor's and master's degrees. Eligible individuals will be granted entry to join the Provisional APD program. Once granted entry to the program, provisional APDs must commit to (1) complete a minimum of 52 weeks of active mentoring partnership with a Full APD which must be done within two years from joining the program, (2) take 30 hours of continuing

professional development (CPD) annually, (3) follow the professional standards, (4) declare and uphold 1000 hours of dietetic practice during the five years prior, and (5) be subject to audit and complaint process. Successful completion of the APD program will change one's status from provisional to full. Full APDs must maintain their credential by completing a minimum of 30 hours of CPD annually, completing the APD declaration, declare they have undertaken 1000 hours of dietetic practice in the previous five years, and maintain the association's membership.<sup>31</sup> After working for five years, Full APDs can apply for the Advanced APD credentials. APDs can be awarded the Fellow of Dietitians Australia credentials if they show proof of leadership and commit to ongoing personal and professional development.<sup>30</sup> The APD program that has been implemented in Australia is quite similar to the dietetic internship program in Indonesia, where dietetic interns in Indonesia also need to take an additional one year training/internship.

### **Japan**

Japan was the first country in Asia to establish a nutrition institute in 1914. Ten years later, the first dietetic school was opened with one year of study duration. In 1962, the dietetic education system was revised, and the duration of study was changed to a four-year program. The Japanese Dietetic Association (JDA) was established in 1945, in conjunction with the enactment of the "Dietitian Regulations" which was changed into the "Dietitians Act" in 1947.<sup>32</sup> One of the roles that JDA focuses on is providing professional development for dietitians. JDA oversees the professional dietetic education system including issuing specific certifications for dietitians. The certification system is based on credits gained and skill achievements. Currently, there are five specific certifications for registered dietitians and dietitians namely specialized health guidance, parenteral and enteral nutrition, home-visiting services, sports, and food allergy. JDA also provides specialized certifications which include specialization in cancer, dysphagia rehabilitation, home care nutrition, kidney disease, and diabetes.<sup>33</sup>

The officially recognized title of dietetics and nutrition professionals in Japan are registered dietitian and dietitian. RD is defined as an expert in human nutrition who received a license issued by the Ministry of Health, Labor, and Welfare whereas dietitian received their license from the governor of a prefecture.<sup>33</sup> This is in contrast with Indonesia, where all dietitians are registered by the Ministry of Health.

Currently, Japan has the second most dietitians ratio per 100,000 population after Portugal compared to other countries.<sup>34</sup> The prerequisites needed to be a dietitian/registered dietitian include having a degree from a dietitian/registered dietitian course in university, junior college, or vocational school. Throughout the educational period, students will complete around 990 hours of practice inside and outside the university or school. Individuals who have graduated from the training facility and obtained a certificate issued by the prefectural office will be able to use the title dietitian. To be a registered dietitian, individuals who have graduated must take and pass the national exam organized by the Ministry of Health,

Labor, and Welfare. Dietitians can also become RDs by using their work experience in addition to passing the national exam. The required work experience will differ depending on the duration of study previously taken.<sup>35</sup> Currently, RDs in Japan do not need to renew their qualifications.<sup>5</sup>

### **South Korea**

Dietetic education in Korea started at the Home Economics departments of women's colleges. The first established nutrition major was at Ewha Women's Professional School in 1929. Almost 25 years later, in 1950, the title "dietitian" was first used after graduates obtained a Bachelor of Science degree. However, the first licensing of dietitians in Korea was issued in 1964, a year after the regulations for dietitians were established. To this day, the only officially recognized nutrition and dietetics professional in Korea is dietitian.<sup>36</sup>

Requirements needed to be a dietitian in Korea are as follows: (1) Graduated from the Department of Dietetics, Food and Nutrition, Food Science, or Dietary Life that was authorized by the Higher Education Act, (2) Passed the National Exam for Dietitian's License organized by the Ministry of Health and Welfare, (3) Submit related documents to the National Health Personnel Licensing Examination Board. Individuals who have completed all three steps will be given the dietitian's license from the Ministry of Health and Welfare.<sup>37</sup> Licensed dietitians in Korea can take a specific certified specialist system run by the Korean Dietetic Association. The certified dietetic specialist systems are divided into three fields namely clinical, food service management, and occupational health. Each field of specialization requires a dietitian to obtain a license and have a minimum of one year of work experience (inclusive of internship). The certified dietetic specialist system also requires dietitians to take a one-year course program related to the specific fields.<sup>38</sup>

### **Malaysia**

Malaysia recognizes nutritionists and dietitians as health professionals and both are part of the Allied Health Professions (AHP). Nutritionists provide services to healthy individuals/community groups or individuals at risk of nutritional diseases/disorders while dietitians focus on providing MNT to patients. Registration of nutritionists and dietitians is handled by The Malaysian Allied Health Professions Councils. The council also has the authority to issue certificates, decide the appropriate and necessary qualifications and requirements of AHP, control the practice of AHP, and oversee things like professional development, competency, and training.<sup>9</sup> Dietitians must hold a Bachelor of Science in Dietetics or Bachelor of Science in Nutrition and Dietetics degree with proof of taking a dietetic internship of 1200 hours. The dietetic internship consists of three placements, namely a clinical placement with 20 credits (800 hours), a community dietetics placement, and a food service placement. Each of the community dietetics and food service placements comprises four credits (160 hours). Nutritionists in Malaysia must complete an undergraduate program in nutrition, which includes a 720-hour industrial placement and 280-hour community placement.<sup>39</sup> Additionally, individuals must

graduate from universities that are recognized for registration and practice under the AHP Act and are not registered for other professions under the AHP Act. Eligible individuals must register within six months after graduation. After applying for registration, registration and practicing certificates will be given and are valid for two years. Dietitians and nutritionists who want to renew their certificates must complete 20 CPD points.<sup>40,41</sup>

### **Philippines**

In the Philippines, the officially recognized title is Registered Nutritionist-Dietitians. The national dietetic association in the Philippines is the Nutritionist-Dietitians' Association of the Philippines (NDAP). In addition to NDAP, there are also Philippines Stakeholders for Nutrition and Dietetics and The Philippines Association of Nutrition as national nutrition associations. Individuals who aim to be nutritionist-dietitians must fulfill the following requirements: (1) Complete a bachelor program in Nutrition and Dietetics, which already includes 1200-hour practical training as specified by the Commission on Higher Education. The practical training is done in the fourth year and is divided into a 600-hour clinical dietetics rotation, a 300-hour public health nutrition rotation, and a 300-hour food service rotation; and (2) Pass the nutritionist-dietitians licensure examination conducted by the Board of Nutrition and Dietetics under the supervision of the Professional Regulations Commission. Registered Nutritionist-Dietitians who wish to renew their qualification must complete 45 CPD units every three years.<sup>5,42</sup>

### **Thailand**

Individuals who aim to be a registered dietitian in Thailand must be a member of the Thai Dietetic Association (TDA). The TDA developed standards of education and practice of dietitians.<sup>43</sup> Requirements needed to be a dietitian are graduating from one of the following options: (1) Vocational Certificate in Food and Nutrition with a minimum of six years of experience working in nutrition and dietetics in a hospital, (2) Bachelor's degree in Nutrition and Dietetics, Nutrition, Dietetics, or Home Economics with internship experience in a hospital for at least 900 hours, 250 hours of internship with a minimum of one year of experience working in nutrition and dietetics in a hospital, or at least two years of work experience in nutrition and dietetics in the hospital if internship is not completed. Individuals who graduated from other fields related to food and nutrition must have a minimum of three years of experience working in nutrition and dietetics/nutrition therapy in the hospital while those who graduated from fields not related to food and nutrition must have at least four years of experience. (3) Master's degree in Nutrition and Dietetics, Nutrition, Dietetics, or equivalent with similar experience requirements as Bachelor graduates. Eligible individuals must take and pass the certification exam held by the TDA and obtain a medical license in the field of dietetics issued by the Ministry of Public Health.<sup>44</sup>

### **Singapore**

Currently, there are no laws protecting the titles and regulating the practice of dietitians and nutritionists in

Singapore. Therefore, dietitians do not need to register or obtain a license to practice dietetics in Singapore. However, to preserve a high standard of professional practice, the Singapore Nutrition and Dietetics Association (SNDA) has created an accreditation system for dietitians and nutritionists who are members of the association. Based on the SNDA, nutrition health professionals can be divided into Accredited Dietitians and Accredited Nutritionists. Accredited Dietitians applies the science and art of food and human nutrition based on proven studies to maintain and promote the health of individuals, groups, and the community, in both health and disease while Accredited Nutritionists integrates and applies scientific knowledge to improve the health and well-being of individuals, communities, and populations.<sup>10</sup>

Requirements needed to be a dietitian in Singapore are: (1) Obtained a Bachelor's degree in Nutrition and Dietetics (three to four years duration of study), a Bachelor's degree in Nutrition (three years duration of study) + Post-Graduate Diploma in Dietetics, or a Bachelor's degree in Science, majoring in Physiology and Biochemistry + a Master Degree in Dietetics (two years duration of study), (2) completed six months of clinical internship. Until 2019, no universities offered nutrition and dietetics programs in Singapore. Degree courses could only be taken overseas, usually in the USA, UK, Australia, Canada, or New Zealand. Singapore Institute of Technology is the first university to offer a Bachelor of Science program with Honors in Dietetics and Nutrition. Individuals must enroll in undergraduate or graduate nutrition courses to be recognized by the SNDA as nutrition professionals.<sup>45</sup>

## COMPARISON AMONG COUNTRIES

### *Minimum education requirements*

The minimum education required to be a nutrition professional in each country varies. For dietetic technicians, such as NDTR in the US and technical RD in Indonesia, the minimum education required is an associate's degree.<sup>4,11</sup> However, for dietitians, there are differences in the entry-level education needed as shown in Table 1. Based on the ICDA, the international standard to be a dietitian-nutritionist is a minimum of a bachelor's degree in nutrition and dietetics.<sup>7</sup> However, Japan and Thailand allow individuals with an associate's degree to register as a dietitian.<sup>35,44</sup> The United States is the only country reviewed in this article that requires a master's degree to be a dietitian, while other countries require a minimum of a bachelor's degree in nutrition or dietetics.<sup>24</sup>

Transitioning the education requirement of registered dietitians to a graduate level has various benefits, but it may not be feasible to be mandated in all countries. In Singapore, where the nutrition and dietetic profession is relatively new compared to the US, changing the education requirement from a bachelor's to a master's degree may not be applicable because currently there is only one university offering the nutrition and dietetic course. Changing the education requirement from a bachelor's to a master's degree is also not feasible in Indonesia because it is not the priority now. Indonesia currently only has a ratio of 0.11 nutrition professionals/1000 population.<sup>14</sup> Thus, increasing the quantity of dietitians and nutritionists is more urgent than increasing the required qualifica-

tion. Another challenge in Indonesia is the shortage of institutions that offer graduate-level education in nutrition and dietetics. There are only eight master programs in nutrition and dietetics in Indonesia. That amount will be inadequate to accommodate graduates from 127 bachelor programs to continue their education if the minimum education needed to be a dietitian is a master's degree.<sup>16</sup> Even though transitioning the minimum entry level of education from a bachelor's to a master's degree will not be applicable in some Asian countries, it should be taken into consideration for future development of nutrition and dietetics education in Western countries such as the UK and Australia, where the dietetic system is more mature.

### *Hours of supervised practice*

Another standard that must be met to be a dietitian-nutritionist according to ICDA is the completion of a minimum of 500 hours of supervised practice.<sup>7</sup> The duration of supervised practice or internship hours in each country varies and is shown in Table 1. However, the authors have not found any data regarding the supervised practice or internship hours in South Korea. All remaining countries reviewed in this article have met the ICDA standard for supervised practice hours for dietitian-nutritionists. The diverse hours of supervised practice range from 900 hours in Thailand to more than 1500 hours in Indonesia. The Asian countries seem to require less time on supervised practice compared to the Western countries like the US, UK, and Australia. The number of practice hours need to be taken into consideration because the skills acquired from those practices are proportional to the amount of practice taken. Supervised practice greatly contributed to dietetic interns' professional development and preparedness in entering the workforce because it is essential for developing the competence to work as a dietitian across multiple settings.<sup>46,47</sup>












### *Certification exam*

Based on the findings, not all countries implement a national certification exam for dietitian and nutritionist candidates. The passing of the certification exam serves as an additional strategy to ensure that dietitian-nutritionists are competent to provide services, improve patient or client safety, and enhance the nutrition and dietetics program quality. Only Indonesia, the US, Japan, South Korea, Philippines, and Thailand require the passing of the certification exam, while the UK, Australia, Malaysia, and Singapore do not. In Australia, while a certification exam is not required, dietitians who have just graduated and want to be registered as an APD must join the APD program and undergo 52 weeks of active mentoring partnership with an accredited practicing dietitian. The mentoring process may offer enhanced confidence and competence, and the chance for reflective practice.<sup>48</sup>

## NUTRITION AND DIETETICS IN THE FUTURE

The advancement of dietetics education and accreditation system between the western countries and East Asian countries (the US, UK, Japan, South Korea) differs with the Southeast Asian Countries (Malaysia, Philippines, Thailand, Singapore, Indonesia). In the US, UK, Japan, and South Korea, there is a specialist system for



Countries/ Organization	Profession	Accreditation Requirements		
		Education	Internship	Certification Exam
	Dietitian-nutritionist	Min. Bachelor's in Nutrition & Dietetics	Min. 500 h	x
	RDN	Master's in Nutrition or Dietetics	Min. 1000 h	✓
	NDTR	Associate degree & complete NDTR program	450 h	✓
	RD	• BSc (Hons) Dietetics • MSc/Pdip in Dietetics	>1000 h	x
	RN	BSc (Hons)/MSc in Nutritional Science	-	x
	APD	Dietetics degree	1000 h	x
	RD	Min. Diploma degree in Dietetics	990 h	✓
	Dietitian		990 h	x
	Dietitian	A degree from Dietetics/equivalent	-	✓
	Dietitian	BSc in Dietetics/Nutrition and Dietetics	1200 h	x
	Nutritionist	Bachelor's in Nutrition	1000 h	x
	RND	Bachelor's in Nutrition and Dietetics	1200 h	✓
	Dietitian	Vocational certificate in Food and Nutrition	-	✓
		Min. Bachelor's in Nutrition and Dietetics/equivalent	900 h	✓
	ADS	Bachelor's in Nutrition and Dietetics	6 months	x
	ANS	Bachelor's/Master's in Nutrition	-	x
	RD	Bachelor's in Nutrition Science	Min.1500 h	✓
	Nutritionist	Bachelor's in Nutrition Science	-	x
	Technical RD	Associate in Nutrition Science	-	✓

**Graphical Abstract.** A review of dietetic education and accreditation systems according to International Confederation of Dietetic Association and various countries showed differences in the terms used to address nutrition professionals. Education and internship hours required also varied. Some countries conduct a certification exam in addition to their accreditation requirements. ADS, Accredited dietitian; ANS, Accredited nutritionist.

dietitians, while in the Southeast Asian Countries, dietitians tend to be more general in their field.

Indonesian nutrition and dietetics education and profession are currently in an intersection and will soon require the concerted efforts of all related stakeholders to define, determine and develop the scope of work for nutritionists and dietitians. Experts and related stakeholders of nutrition and dietetics in Indonesia are planning to develop a professional study (internship) program for nutritionists, which is expected to improve the competencies of nutritionists. It is expected that the nutritionist professional study program will be comparable to the dietetic internship program but is intended to train graduates to be nutritionists, specifically.

Specialization of dietitians is also under discussion. Currently, there is no specialization system for dietitians in Indonesia. However, the plan for specialization of dietitians has been proposed by the nutrition collegium, professional organization, and universities. Based on the proposed plan, RDs will be categorized into three categories namely a generalist, specialist, and advanced practitioner. A generalist can demonstrate the basic competency and practice of a dietitian. A generalist is responsible for various fields such as clinical, public health, research, education, food service, and others. A specialist focuses on one nutrition and dietetics field such as pediatric nutrition, renal nutrition, sports dietetics, oncology nutrition, and others. An advanced practitioner can be an RD or an individual who has a master's in nutrition degree. An advanced practitioner is responsible for instructing, developing, and consulting the most recommended dietary therapy for patients.<sup>4</sup>

Further studies are needed to investigate the effectiveness of the current education and accreditation systems in producing competent nutrition professionals. The possibility of enacting the ICDA competency standards to align the quality of nutrition and dietetics professionals across the globe is very intriguing, even though it would be an enormous undertaking considering the current state of nutrition and dietetics education and accreditation systems. At the very least, regional countries, such as those in Southeast Asia, may start considering the recognition and ratification of each other's education and accreditation systems. This would enable graduates of nutrition and dietetics programs from other countries to work across borders while simultaneously improving the quality of nutrition and dietetics education and the workforce in the region.

## CONCLUSION

The nutrition and dietetics field and workforce are constantly evolving. A thoroughly developed dietetic education and accreditation or registration system are important to produce competent nutrition professionals. Countries reviewed in this article have developed and implemented their own standards to educate and accredit dietitian-nutritionists. Differences in education and accreditation systems and officially recognized profession titles were found in the reviewed countries. Indonesia's nutrition and dietetic education system already meet the ICDA standard and on par with some of the reviewed countries. However, further improvements are still needed for the continuous advancement of the nutrition and dietetic profession. These data can be used as a reference to develop and determine better nutrition and dietetic education and

accreditation systems by the relevant stakeholders. The data can also be used as a guide for future nutrition professionals wishing to work in the reviewed countries.

# CONFLICT OF INTEREST AND FUNDING DISCLOSURE

All authors have no conflict of interest to declare.

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