

Preparing Nutrition Professionals for Population Level Action: Legal-Regulatory, Policy, Advocacy, and Systems level Competencies in Entry to practice Standards

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Abstract

Background.

Contemporary nutrition challenges are shaped by interacting social, commercial, environmental, political, and organisational determinants, requiring nutrition professionals to contribute beyond individual-level care. In Indonesia, recent national analyses have identified policy, regulatory, food-environment, and health-system gaps that require responses extending beyond individual behaviour and service delivery. This study examined how entry-to-practice standards represent competencies needed for population and systems level action, with Indonesia examined as an application case.

Methods.

A comparative qualitative document analysis was conducted across one global benchmark and nine international professional pathways. Competency statements were coded using four domains namely, legal-regulatory, policy, advocacy, and broader systems-level capability together with six systems subdomains. Cognitive demand was interpreted using the revised Bloom taxonomy, while expected performance was interpreted using Miller's pyramid where supported by statement wording or the explicit architecture of the source document. The object and systems orientation of professional action were examined separately. The resulting analytical lens was then applied to the Indonesian Nutritionist and Dietitian standards.

Results

. International entry to practice standards generally incorporated legal-regulatory and broader systems level capabilities, while policy and advocacy were less consistently represented and varied considerably in their intended action and target. Both Indonesian standards already contained substantial foundations across the four core domains and most systems subdomains. The main comparative differences concerned the concentration and orientation of policy functions, the specificity of advocacy targets, and the absence of explicit systems level competencies related to food systems, food environments, and sustainability.

Conclusions

. Entry to practice standards already provide substantial foundations for population-level nutrition action, but the presence of competency domains alone does not capture how professional action is expected to be performed or directed. For Indonesia, the findings support selective refinement rather than wholesale reconstruction, particularly clearer policy functions, more strategically specified advocacy, consideration of foundational legal-regulatory literacy for population health, and more explicit food-systems capability.

Background

Contemporary nutrition challenges are shaped by interacting biological, behavioural, social, commercial, environmental, and political determinants rather than individual dietary choices alone. The Global Syndemic framework links obesity, undernutrition, and climate change through common societal drivers and wider systems of food production and consumption, transport, urbanisation, governance, and commercial activity[1]. Evidence on the double burden of malnutrition similarly shows that undernutrition, overweight and obesity, and diet related non-communicable diseases (NCDs) are interconnected across the life course and influenced by societal and ecological conditions [2]. These interconnections have prompted calls for double duty actions that address shared drivers through programmes and policies rather than treating each form of malnutrition in isolation [3].

These perspectives indicate that nutrition outcomes are shaped by determinants operating across multiple and interacting levels, with individual behaviour embedded within wider social, commercial, institutional, and policy environments. Individual behaviour therefore remains relevant, but cannot be understood independently of food availability and affordability, commercial influences, institutional arrangements, public policy, and regulatory environments. UNICEF's Conceptual Framework on Maternal and Child Nutrition places diets and care within broader food, practice, service, resource, social-norm, and governance environments [4], while the commercial determinants of health literature shows how commercial actors and practices can influence environments and policy processes [5]. Individual level nutrition interventions can improve dietary behaviour and selected health outcomes [6], but interventions that depend primarily on individual behaviour change may have limited reach and population-wide impact when dietary choices are shaped by wider environmental and structural conditions [7]. Population level improvement therefore also requires interventions directed towards food environments and other upstream determinants, including programme, policy, regulatory, and structural measures [8]. This broader approach is reflected in WHO guidance on fiscal policies to promote healthier food environments [9].

This broader orientation has direct implications for the nutrition workforce. Individual assessment, counselling, and clinical care need to be complemented by capabilities for engaging with communities, organisations, decision-makers, regulatory environments, and sectors that influence food and health systems. Consistent with this, the WHO Global Competency and Outcomes Framework for Universal Health Coverage emphasises alignment between workforce preparation, population health needs, and health-system demands across individual health services, population health services, and management and organisational functions [10]. This raises a key question: to what extent are these broader capabilities already reflected in the minimum competencies expected of nutrition professionals at entry to practice? Entry to practice competency requirements are particularly relevant because they define the minimum knowledge, skills, behaviours, and professional capabilities expected at professional entry or eligibility for registration or recognition. International nutrition and dietetics standards similarly describe entry competencies as minimum competences expected at entry to the profession[11].

Existing comparative work has mainly described differences in nutrition and dietetics education and accreditation systems, including qualifications, supervised practice, accreditation, and certification arrangements [12]. Less attention has been directed to how entry to practice requirements represent legal-regulatory, policy, advocacy, and broader systems level capabilities, or to how professional action is articulated within these areas. Presence alone is insufficient: understanding a law or policy differs from applying, analysing, evaluating, developing, or influencing it, and higher cognitive demand does not necessarily indicate that a competency is expected to be performed in practice or directed towards systems change. Comparative analysis therefore needs to consider domain representation alongside cognitive demand, performance expectations, and the explicit object or systems orientation of professional action.

These questions are relevant to Indonesia, where multiple forms of malnutrition coexist and recent national analyses identify response needs extending beyond individual behaviour and service delivery. UNICEF's Landscape Analysis of Overweight and Obesity in Indonesia indicates that effective prevention requires action beyond individual behaviour change, including policy, regulatory, and food-environment measures addressing broader structural determinants [13], while the Indonesia 2018–2024 National Nutrition Programme Review identifies bottlenecks in policy coherence, service delivery, financing, coordination, and data systems [14]. These national analyses make it relevant to examine whether minimum professional competencies equip nutrition professionals to engage with population-, policy-, regulatory-, and systems level action. International entry-to-practice requirements provide a comparative reference for this examination, without assuming that international standards can be transferred directly to Indonesia.

Accordingly, this study asks: (1) How are legal-regulatory, policy, advocacy, and broader systems level competencies represented across selected international professional pathways? (2) How is professional action within these competencies articulated in terms of cognitive demand, performance expectations, and explicit object or systems orientation? (3) When the resulting international analytical lens is applied to the Indonesian Nutritionist and Dietitian standards, how are these capabilities configured, and what bounded implications emerge for future competency refinement?

Methods

Study design

This study used comparative qualitative document analysis to examine how authoritative entry to practice requirements represent legal-regulatory, policy, advocacy, and broader systems level competencies. The study was situated within an interpretivist orientation, recognising competency standards as institutional texts whose meaning requires systematic interpretation in relation to their wording, hierarchy, normative function, and professional context. Directed qualitative content analysis [15] was used to code and interpret competency statements, while cross-pathway comparison was organised through matrices informed by the Framework Method [16]. The primary analysis focused on

the international corpus, from which the analytical lens was developed and subsequently applied to the Indonesian competency standards.

Document identification and selection

Documents were purposively identified from selected international professional systems to capture variation in professional titles, regulatory arrangements, and routes linking education, accreditation, credentialing, and entry to practice. Searches focused on official websites of relevant regulatory, accreditation, credentialing, and professional bodies. A professional pathway was defined as the analysed entry to practice or registration route within a jurisdiction; more than one pathway could be represented when distinct categories or routes existed.

Documents were included when they were issued or formally adopted by an authoritative professional, regulatory, accreditation, or credentialing body; defined minimum knowledge, skills, behaviours, capabilities, or performance expectations relevant to entry to practice; were formally linked to professional education, programme accreditation, completion of training, credential eligibility, registration, or professional recognition; and applied to the pathway under analysis. Documents limited to continuing competence, advanced or specialist practice, professional progression, or scope of practice without minimum entry to practice competencies were excluded. The most recent authoritative version that could be independently retrieved from an official source at the time of final verification was used. Document authority, pathway, normative function, education or registration linkage, version status, relationships with other frameworks, and source-specific version issues were recorded in a master register. The ICDA framework [11] was treated as a global benchmark rather than an additional jurisdictional pathway and was therefore excluded from pathway-level counts.

Data extraction and analysis

All core documents were read in full to establish their purpose, terminology, structure, competency hierarchy, and linkage to professional entry. The unit of analysis was the most specific normative statement within each competency hierarchy that retained an interpretable competency meaning. Depending on the framework, this could include a competency, enabling competency, performance criterion or indicator, learning outcome, or equivalent statement. Explicit parent–child hierarchy was retained when necessary for interpretation, but broader contextual meaning was not inferred without an explicit hierarchical link.

Statements were eligible when they addressed legal-regulatory requirements, policy, advocacy, systems thinking or governance, population or community assessment or action, food systems or food environments, organisational or programme change, intersectoral or stakeholder engagement beyond routine individual care, or evidence translation into programme-, policy-, regulatory-, or systems level

decisions. Communication, research, leadership, and management statements were included only when their wording extended beyond routine individual-level service delivery.

Eligible statements were extracted verbatim into structured Microsoft Excel matrices and retained with source, page or section, hierarchical position, competency identifier, statement level, and familiarisation notes. Following familiarisation with the international corpus, initial sensitising concepts were refined into four core domains: legal-regulatory (LR), policy (POL), advocacy (ADV), and broader systems level capability (SYS). Because SYS encompassed heterogeneous forms of professional action, it was further differentiated into six recurrent subdomains: systems and structural determinants, equity, and power (SYS-DET); food systems, food environments, and sustainability (SYS-FS); population or community assessment, surveillance, and priority-setting (SYS-POP); population or community programme and intervention action (SYS-PROG); stakeholder, partnership, and intersectoral engagement (SYS-STK); and organisational or service governance, leadership, and change (SYS-ORG). These subdomains distinguished different forms of systems level capability rather than constituting an exhaustive taxonomy. Evidence-to-action translation was treated as a cross-cutting modifier.

A generative artificial intelligence tool was used only to support the preliminary identification of potentially relevant competency statements and to suggest provisional analytical codes. All candidate statements were verified against the original source documents, and all final inclusion and exclusion decisions, coding, comparative analysis, interpretation, and manuscript development were undertaken by the authors.

Coding was anchored to the explicit wording of each statement and, where applicable, its explicitly linked hierarchical context. Cognitive demand was interpreted using the revised Bloom taxonomy [17], while performance expectations were interpreted using Miller's pyramid [18] where supported by statement wording or explicit source-document architecture. These dimensions were supporting descriptors and were neither scored nor combined into a single hierarchy. The action, object, target, and orientation of each statement were also examined to distinguish individual-, programme-, organisational-, population-, policy-, regulatory-, food-system-, and broader systems level action, particularly for policy and advocacy. Illustrative competency statements supporting domain classification and analytical interpretation are provided in Additional file 2.

Verified statements were organised by professional pathway in a comparative matrix. A core domain or SYS subdomain was classified as explicitly represented when at least one verified statement met the relevant coding definition. Pathway level counts were descriptive only and were not interpreted as measures of competency strength. Cross-pathway synthesis focused on recurring similarities and differences in content, action, object, and orientation. After completion of the international analysis, the resulting analytical lens was applied to the Indonesian Nutritionist and Dietitian standards. Representation was classified as explicit, implicit only when supported by an explicit hierarchical relationship, or not explicit. Indonesia was treated as an application case and was not included in professional-pathway ranking.

Trustworthiness

An audit trail was maintained through verbatim extraction, source identifiers, hierarchy checks, and analytical memos. Before finalising the comparative matrix, source documents were re-screened for potentially missed eligible statements, which were assessed against the locked codebook without post-hoc changes to coding boundaries. Extraction, coding, comparative synthesis, interpretation, and development of conclusions were undertaken by the authors using predefined eligibility criteria, coding definitions, hierarchical rules, and decision procedures for each analytical stage. Analytical uncertainties were reviewed against source wording and hierarchy, with decisions documented throughout the process. This approach promoted transparency and consistency rather than duplicate independent coding or inter-rater reliability assessment.

The authors brought complementary backgrounds in nutrition, public health nutrition, law, and field practice. These perspectives sharpened analysis and contextual interpretation of entry level capability, population and systems level nutrition action, legal and regulatory enabling conditions, and the relevance of negotiation, advocacy, systems thinking, and problem-solving for policy and programme action. They also informed interpretation and manuscript development. Reporting was informed by the Standards for Reporting Qualitative Research (SRQR) [19]. A completed SRQR checklist is provided in Additional file 3.

Results

Characteristics and functions of competency-bearing documents

The international corpus comprised one global entry to practice benchmark and nine professional pathways representing different mechanisms for defining minimum professional capability. These included professional or entry to practice competency standards in Australia and Canada; regulatory threshold standards for Dietitians and registration competency requirements for Associate Nutritionists in the United Kingdom; professional standards and entry level competencies in New Zealand; practice competency standards in Hong Kong; programme-level benchmark learning outcomes for Dietetics and Nutrition in Malaysia; and accreditation-linked Core Knowledge and Competencies for the Registered Dietitian Nutritionist route in the United States. The ICDA framework was retained as a global benchmark and was not counted as a professional pathway.

The documents differed in their relationship with professional education and entry. Most directly defined professional, registration, or accreditation-linked competency expectations, whereas the Malaysian documents comprised programme level benchmark learning outcomes. The United States framework also distinguished Core Knowledge from competency requirements. These differences in source function and architecture were retained when interpreting competency representation and performance expectations (Table 1).

Table 1
Characteristics and functions of included competency-bearing documents

Professional pathway / benchmark	Source type	Formal linkage represented in study	Analytical role / caveat
ICDA global benchmark	International entry to practice competency benchmark	Used as a global comparator for entry to practice capability.	Not counted as a professional pathway.
Australia – Dietitian	Professional entry to practice competency standard	Defines professional entry to practice competency expectations.	Performance criteria treated as competency bearing normative statements.
Canada – Dietitian	Entry to practice competency framework	Defines pre-registration expectations derived from Practice Competencies.	Source explicitly maps performance indicators across academic, practicum, and registration examination contexts.
United Kingdom – Dietitian	Regulatory threshold standards of proficiency	Defines threshold proficiency for professional registration.	Regulatory standards rather than a curriculum document.
United Kingdom – ANutr	Entry/early career registration competency requirements	Linked to Associate Nutritionist registration requirements.	Distinct nutritionist professional pathway.
New Zealand – Dietitian	Professional standards and entry level competencies	Defines entry level professional capability expectations.	Professional standards and entry-level competencies analysed together.
Hong Kong – Dietitian	Practice competency standards	Linked to the accredited Dietitian professional pathway.	Selected appendix indicators analysed only where parent links were explicit.
Malaysia – Dietetics	Programme standards, benchmark learning outcomes	Formally linked to educational programme standards.	Programme level benchmark outcomes rather than a professional competency standard.
Malaysia – Nutrition	Programme standards, benchmark learning outcomes	Formally linked to educational programme standards.	Programme level benchmark outcomes rather than a professional competency standard.
<i>Note. ANutr = Associate Nutritionist; ICDA = International Confederation of Dietetic Associations; RDN = Registered Dietitian Nutritionist. A professional pathway refers to the analysed entry to practice or registration route within a jurisdiction; more than one pathway may be represented within one jurisdiction.</i>			

Professional pathway / benchmark	Source type	Formal linkage represented in study	Analytical role / caveat
United States – RDN	Accreditation standards, Core Knowledge and Competencies	Linked to accreditation requirements for the analysed RDN preparation route.	Core knowledge and competency requirements interpreted according to source architecture.
Indonesia – Nutritionist	Ministerial professional standard / minimum competency standard	Linked to professional authority, education providers, and curriculum development.	Covers heterogeneous nutrition qualification levels rather than one homogeneous entry pathway.
Indonesia – Dietitian	Ministerial professional standard / minimum competency standard	Linked to Dietitian education, curriculum, teaching/assessment, and practice authority.	Clearer professional education endpoint than the Nutritionist standard.
<i>Note. ANutr = Associate Nutritionist; ICDA = International Confederation of Dietetic Associations; RDN = Registered Dietitian Nutritionist. A professional pathway refers to the analysed entry to practice or registration route within a jurisdiction; more than one pathway may be represented within one jurisdiction.</i>			

For the Indonesian application case, the 2020 Professional Standard of Nutritionist and the 2022 Professional Standard of Dietitian were analysed. Both define minimum professional competencies and have formal links to education and professional practice, although the Nutritionist standard encompasses a more heterogeneous range of nutrition qualifications than the Dietitian standard.

Representation of core competencies across international pathways

Broader systems level capability was explicit in all nine international pathways, legal-regulatory capability in eight, and policy and advocacy in six each. Five pathways including Australia Dietitian, Canada Dietitian, United Kingdom Dietitian, New Zealand Dietitian, and the United States RDN route represented all four core domains (Table 2).

Table 2
Cross-pathway patterns in core and systems level competencies

Analytical area	Cross-pathway representation	Professional pathways with explicit representation	Comparative pattern
Legal-regulatory	Explicit in 8 pathways	Australia; Canada; UK Dietitian; UK ANutr; New Zealand; Hong Kong; Malaysia Dietetics; USA RDN	Nearly universal and predominantly practice facing, including legal awareness, application of legislation, compliance, and professional regulatory responsibility.
Policy	Explicit in 6 pathways	Australia; Canada; UK Dietitian; UK ANutr; New Zealand; USA RDN	Ranged from policy knowledge and application to review or evaluation, impact assessment, and contribution to policy development.
Advocacy	Explicit in 6 pathways	Australia; Canada; UK Dietitian; New Zealand; Hong Kong; USA RDN	Varied in target, including professional value, structural or equity-oriented change, generic advocacy, and legislative, regulatory, or policy issues.
Broader systems level capability	Explicit across all 9 pathways	All professional pathways	The common denominator across pathways, although its internal configuration differed.
SYS-DET	Explicit in 8 pathways	Australia; Canada; UK Dietitian; UK ANutr; New Zealand; Hong Kong; Malaysia Dietetics; Malaysia Nutrition	Represented systems and structural determinants, equity, power, or related contextual dimensions; not explicit in the USA RDN pathway.
SYS-STK	Explicit across all 9 pathways	All professional pathways	The only universal subdomain; positioned professionals to engage with stakeholders, partners, or sectors beyond routine individual care.
SYS-PROG	Explicit in 8 pathways	Canada; UK Dietitian; UK ANutr; New Zealand; Hong Kong; Malaysia Dietetics; Malaysia Nutrition; USA RDN	Commonly represented organised population or community programme and intervention action.

Note. Counts represent the number of professional pathways in which at least one competency statement was classified as belonging to the specified domain. Each pathway was counted only once per domain, irrespective of the number of eligible competency statements. SYS-DET = systems and structural determinants, equity, and power; SYS-FS = food systems, food environments, and sustainability; SYS-ORG = organisational or service governance, leadership, and change; SYS-POP = population or community assessment, surveillance, and priority-setting; SYS-PROG = population or community programme and intervention action; SYS-STK = stakeholder, partnership, and intersectoral engagement. The ICDA global benchmark is excluded from professional-pathway distribution summaries.

Analytical area	Cross-pathway representation	Professional pathways with explicit representation	Comparative pattern
SYS-POP	Explicit in 7 pathways	Canada; UK Dietitian; UK ANutr; New Zealand; Hong Kong; Malaysia Dietetics; Malaysia Nutrition	Focused on population or community assessment, surveillance, nutrition intelligence, or priority-setting. Hong Kong 2.1.1 was mixed and population-capable.
SYS-ORG	Explicit in 7 pathways	Australia; Canada; UK Dietitian; New Zealand; Hong Kong; Malaysia Nutrition; USA RDN	Included organisational or service governance, leadership, strategic planning, quality management, or change beyond routine operational management.
SYS-FS	Explicit in 5 pathways	Australia; Canada; UK ANutr; New Zealand; Hong Kong	Selectively represented through food systems, food environments, food security, sustainability, supply chains, or related system-level concepts.
Note. Counts represent the number of professional pathways in which at least one competency statement was classified as belonging to the specified domain. Each pathway was counted only once per domain, irrespective of the number of eligible competency statements. SYS-DET = systems and structural determinants, equity, and power; SYS-FS = food systems, food environments, and sustainability; SYS-ORG = organisational or service governance, leadership, and change; SYS-POP = population or community assessment, surveillance, and priority-setting; SYS-PROG = population or community programme and intervention action; SYS-STK = stakeholder, partnership, and intersectoral engagement. The ICDA global benchmark is excluded from professional-pathway distribution summaries.			

Legal-regulatory capability was predominantly practice-facing. Statements commonly required professionals to understand or apply relevant legislation, comply with statutory or regulatory requirements, recognise legal responsibilities, or practise within professional and legal frameworks. Although legislation and regulation were incorporated into broader professional activities in several pathways, no coded international statement explicitly required entry level professionals to draft legislation or independently undertake regulatory reform.

Policy capability showed greater variation in both action and target. Some statements positioned policy primarily as knowledge of government policy or policy frameworks, whereas others required application, review, impact assessment, evaluation, or contribution to policy development. The clearest explicit system directed policy development function occurred in the New Zealand Dietitian standard, which required dietitians to “critique and contribute to the development of New Zealand policies influencing food, nutrition and health systems” (Competency 4.3.2).

Advocacy was also heterogeneous. Across pathways, advocacy was directed towards professional contribution, structural or environmental change, health equity and social justice, or legislative, regulatory, and policy issues, while some statements remained more generic. The Canadian framework

further differentiated advocacy-related capability into recognising opportunities, identifying effective strategies, and engaging in advocacy. Thus, the presence of advocacy did not indicate a uniform type or target of professional action.

Cross-pathway patterns in broader systems level capability

Broader systems level capability was universal, but its internal configuration varied across pathways. Stakeholder, partnership, and intersectoral engagement (SYS-STK) was the only subdomain represented in all nine pathways. Systems and structural determinants, equity, and power (SYS-DET) and population or community programme action (SYS-PROG) were each represented in eight pathways. Population or community assessment, surveillance, and priority-setting (SYS-POP) and organisational or service governance, leadership, and change (SYS-ORG) were represented in seven.

The form of systems level capability also differed within the same subdomain. In Hong Kong, SYS-POP was represented through a competency spanning individuals, groups, communities, and populations, indicating a mixed but population capable orientation rather than an exclusively population level focus. The United States RDN pathway showed a systems profile centred on programme action, stakeholder engagement, and organisational or service governance, while systems determinants, population assessment, and food systems capability were not explicitly represented.

Food systems, food environments, and sustainability (SYS-FS) showed the most selective distribution. It was explicitly represented in five pathways Australia Dietitian, Canada Dietitian, United Kingdom ANutr, New Zealand Dietitian, and Hong Kong Dietitian. Relevant statements referred to concepts including food systems, food environments, food security, sustainable food systems, supply chains, and the application of food-system knowledge in professional practice (Table 2).

Cognitive demand and performance expectations did not necessarily vary in parallel and were therefore retained as separate supporting analytical dimensions. For example, some cognitively demanding policy requirements were positioned primarily as knowledge expectations, whereas some competencies expected to be performed in practice did not support assignment of a distinct Bloom category. The United States CRDN framework and the explicitly differentiated academic, practicum, and registration examination architecture in Canada further illustrated why cognitive demand, performance expectations, and systems orientation could not be reduced to a single hierarchy.

Application of the analytical lens to Indonesian competency standards

Application of the internationally derived analytical lens showed that legal-regulatory, policy, advocacy, and broader systems level capabilities were explicitly represented in both Indonesian standards. The principal differences therefore concerned how these capabilities were articulated and how the broader systems domain was configured, rather than categorical absence of the four core domains (Table 3).

Table 3
Application of the international analytical lens to Indonesian competency standards

Analytical area	Nutritionist	Dietitian	Comparative interpretation
Legal-regulatory	Explicitly represented and mainly framed around legal problem identification, professional responsibility, and compliance with applicable legislation.	A closely parallel practice-facing legal pattern is explicitly represented.	Both Indonesian standards broadly converge with the dominant international practice-facing legal-regulatory pattern.
Policy	Explicitly represented through multidimensional analysis of policy choices affecting public-health programmes.	Explicitly represented through advocacy and evidence-informed policy recommendations for health-service institutions and communities.	Policy is present in both pathways, but its explicit orientation remains mainly programme-, institution-, or community-based. Selected international frameworks articulate broader policy functions and, in some cases, direct policy action towards food, nutrition, or health systems.
Advocacy	Explicitly framed as advocacy with multiple parties to address community nutrition problems.	Explicitly represented in generic and community contexts, with one statement linking advocacy to evidence-informed policy recommendations.	Compared with several international frameworks that specify advocacy strategies or structural, equity, food-system, legislative, or regulatory targets, Indonesian advocacy is generally more broadly framed and less explicitly system-targeted.
Broader systems level capability	Broadly represented through structural/contextual determinants, population assessment and surveillance, programme action, stakeholder/intersectoral engagement, and organisational/service governance.	The same broad systems level areas are explicitly represented.	Indonesia therefore shows substantial convergence with international systems level patterns and should not be characterised as generally lacking systems capability.
Food systems, food environments,	Not explicitly represented as a systems level competency.	Not explicitly represented as a	This is the clearest selectively unrepresented area in

Note. The comparative interpretation is qualitative and based on the explicit wording of the analysed standards. 'Not explicitly represented' refers to documentary representation and does not imply absence of competence in education or practice. No numerical ranking or strength score is intended.

Analytical area	Nutritionist	Dietitian	Comparative interpretation
and sustainability		systems level competency.	the Indonesian standards. Several international frameworks explicitly address food systems, food environments, food security, sustainability, or related system-level concepts, whereas Indonesian food and food-service competencies are not framed in these terms.
<i>Note. The comparative interpretation is qualitative and based on the explicit wording of the analysed standards. 'Not explicitly represented' refers to documentary representation and does not imply absence of competence in education or practice. No numerical ranking or strength score is intended.</i>			

Legal-regulatory capability showed a closely parallel pattern in the Nutritionist and Dietitian standards. Both addressed legal problems, professional legal responsibility, compliance with applicable legislation, and legal dimensions of professional practice. Their orientation was predominantly towards lawful professional practice and broadly resembled the practice facing legal-regulatory pattern observed internationally.

Policy capability was explicit in both standards but concentrated in relatively few statements. The Nutritionist standard required analysis of the effects of policy choices on public-health programmes from fiscal, administrative, legal, ethical, social, and political perspectives. The Dietitian standard included advocacy and formulation of evidence informed policy recommendations for health service institutions and communities. These statements involved substantial cognitive demand, but their explicit policy objects remained primarily programme-, institution-, or community oriented. This contrasted with selected international pathways in which a broader range of policy functions or more explicit systems level policy targets was articulated.

Advocacy was likewise explicit in both Indonesian pathways. The Nutritionist standard positioned advocacy as engagement with multiple parties to address community nutrition problems, while the Dietitian standard included generic and community oriented advocacy and linked advocacy with evidence informed policy recommendations. Compared with international statements that specified advocacy strategies or structural, equity, legislative, regulatory, or food system targets, Indonesian advocacy was generally less explicit about the intended system level target of change.

Both Indonesian standards nevertheless demonstrated a broad systems level foundation. SYS-DET, SYS-POP, SYS-PROG, SYS-STK, and SYS-ORG were explicitly represented in both pathways. The clearest selectively unrepresented area was SYS-FS: neither standard explicitly framed food systems, food environments, or sustainability as a systems level competency. Although both contained substantial

competencies related to food and food-service management, these were not articulated in terms of food-system relationships, food environments, sustainability, or equivalent systems level constructs.

Discussion

Principal findings

This comparative qualitative document analysis showed that entry to practice competency requirements for nutrition professionals extend beyond individual-level practice, although their representation and articulation vary across professional pathways. The included documents were linked to professional entry through different mechanisms including professional competency standards, regulatory registration thresholds, accreditation requirements, and programme-level standards and should therefore not be treated as structurally equivalent. Within this heterogeneous corpus, broader systems level capability was explicitly represented across all nine international pathways, legal-regulatory capability was nearly universal, and policy and advocacy were less consistently represented. Five pathways represented all four core domains. When the same analytical framework was applied to Indonesia, both the Nutritionist and Dietitian standards explicitly represented all four core domains and contained a relatively broad configuration of systems level capabilities. The principal comparative issue was therefore not the categorical absence of population- or systems-relevant capability in Indonesia, but how particular capabilities were articulated. Legal-regulatory capability broadly paralleled the predominantly practice-facing international pattern; policy was explicitly represented but concentrated in relatively few statements; advocacy was explicit but generally more broadly framed and less often specified in relation to structural, policy, regulatory, or broader systems level targets; and food systems, food environments, and sustainability represented the clearest systems level area not explicitly represented in either Indonesian standard.

The professional pathways examined were not limited to public health nutrition roles, and the findings should not be interpreted as an assessment against a public health nutrition competency framework. Nevertheless, literature on the public health nutrition workforce provides useful contextual evidence when interpreting competencies concerned with population, policy, organisational, and systems action. Such literature has conceptualised population-level nutrition practice as requiring capabilities beyond nutrition science alone, including assessment, intervention management, and policy-related processes [20,21]. Rather than serving as an external benchmark, these perspectives reinforce a central interpretation of the present findings: professional preparedness for population-level action depends not simply on whether a competency domain is named, but on what professionals are expected to do and at what level that action is directed.

Population- and systems level capability in contemporary nutrition practice

The relevance of legal-regulatory, policy, advocacy, and broader systems level capabilities does not imply replacing individual nutrition assessment, counselling, clinical care, or other established professional functions. Rather, these capabilities may complement individual-level practice by enabling professionals to recognise and engage with determinants that operate beyond individual choice. Contemporary nutrition problems arise within interacting social, economic, environmental, commercial, and political systems. The Global Syndemic Commission, for example, conceptualised obesity, undernutrition, and climate change as interconnected challenges shaped by common societal drivers, while the commercial determinants of health literature demonstrates how commercial actors and practices can influence political and economic systems, policies, environments, behaviours, and ultimately population health [1,5].

This perspective is broadly consistent with contemporary health workforce frameworks. WHO competency frameworks for universal health coverage and the essential public health functions emphasise alignment between workforce preparation, population health needs, health-system demands, and the functions health workers are expected to perform [10,22]. Broader nutrition-workforce literature similarly highlights the need for professionals who can work across sectors, engage decision makers, and complement technical nutrition expertise with communication, advocacy, and leadership capabilities [23]. These frameworks do not establish the minimum competency profile for newly qualified nutrition professionals, but they support consideration of whether entry to practice preparation provides a sufficient foundation for recognising when programme, policy, regulatory, organisational, or systems level determinants are relevant to nutrition practice.

These findings are particularly relevant in the Indonesian context. National analyses indicate that addressing nutrition challenges requires action beyond individual behaviour change and service delivery, including stronger policy and regulatory measures, healthier food environments, greater policy coherence, and improved coordination and system capacity [13,14]. Against these needs, the Indonesian competency standards already provide a substantial foundation for broader professional action. The main issue identified through international comparison is therefore not whether these capabilities are present, but how clearly their functions, targets, and orientation towards population and systems change are articulated. This does not imply that refining competency standards alone would improve nutrition outcomes, but it identifies areas that may warrant attention in future workforce development.

Legal-regulatory capability: beyond professional compliance?

Legal-regulatory capability showed substantial convergence between the Indonesian and international standards. It was nearly universal across the international pathways and was predominantly practice-facing, emphasising legal awareness, professional responsibility, compliance with legislation, and practice within regulatory boundaries. The Indonesian Nutritionist and Dietitian standards similarly addressed legal problems, professional responsibility, compliance with legislation, and related legal dimensions of professional practice. Indonesia should therefore not be characterised as having a

categorical deficit in legal-regulatory competency, nor did the international corpus demonstrate a recurrent expectation that newly qualified nutrition professionals should draft legislation or independently undertake regulatory reform.

The predominance of this compliance-oriented pattern nevertheless raises a broader question when nutrition practice is viewed from a population health perspective. Public health law scholarship conceptualises law not only as a framework governing professional behaviour but also as a determinant and potential instrument of population health. Legal epidemiology, for example, examines laws and legal practices as factors affecting the distribution and prevention of disease and evaluates the effects of legal interventions on health outcomes [24]. Public health law competency models provide a further contextual example: they have been developed across different career stages and are grounded in understanding law as a tool that can contribute to public-health action [25,26]. These models concern public health practitioners rather than nutrition professionals, but they provide a useful conceptual distinction between professional compliance and broader legal-regulatory literacy.

For nutrition professionals, future competency development could therefore consider whether foundational legal-regulatory literacy for population health is appropriate alongside professional legal compliance. At entry level, this need not involve legislative drafting, formal legal interpretation, or independent regulatory reform. A proportionate foundation might involve recognising relevant laws and regulations, understanding how regulatory arrangements may enable or constrain nutrition and public-health objectives, interpreting their implications using appropriate evidence, and recognising when specialist legal or multidisciplinary expertise is required. Such capability could become relevant when nutrition practice intersects with food marketing, fiscal measures, food standards, procurement, institutional food environments, or other regulatory determinants of dietary health. This is a forward looking interpretation prompted by the findings rather than an entry-to-practice requirement established by the comparative corpus itself.

Policy capability: cognitive demand, performance expectations, and systems orientation are distinct

Policy capability demonstrated a different pattern. The Indonesian standards cannot reasonably be described as cognitively shallow in this domain. The Nutritionist standard requires analysis of policy choices across fiscal, administrative, legal, ethical, social, and political dimensions, while the Dietitian standard includes evidence-informed policy recommendations. The comparative distinction was instead that policy-related competencies were concentrated in relatively few statements and that their explicit objects remained primarily programmes, institutions, or communities. Selected international standards articulated a wider range of policy functions, with the New Zealand Dietitian standard providing the clearest example of policy development explicitly directed towards food, nutrition, and health systems.

This pattern illustrates why cognitive demand, performance expectations, and systems orientation should be treated as distinct dimensions of competency. A competency may require analysis, evaluation, or recommendation and therefore involve substantial cognitive complexity without explicitly identifying a

broader system as its object of action. Conversely, a competency may clearly target policy or systems change while using less cognitively complex wording. Performance expectations add a further distinction: an analytically demanding statement may remain positioned as a knowledge requirement, whereas a competency expected to be performed in practice may not necessarily contain wording that supports assignment of a distinct cognitive-process category. Cognitive demand and performance expectations therefore capture different properties of competency and should not be collapsed, either with each other or with systems orientation, into a single hierarchy.

For Indonesia, the implication is therefore more specific than simply adding more policy competency. Future refinement could clarify both the professional function involved and the object of policy action, distinguishing where appropriate among policy literacy, implementation, analysis, evidence translation, recommendation, evaluation, contribution to policy development, and influence. Public health nutrition and broader nutrition-workforce literature supports the relevance of policy-related functions to population-level nutrition practice and engagement with decision-making processes [21,23], but the present study does not establish that all such functions should be expected at the same level of professional entry.

Advocacy: from generic capability to strategically specified action

Advocacy showed a similar distinction between presence and articulation. Both Indonesian professional pathways explicitly include advocacy, but most statements frame it broadly as engagement with various parties to address nutrition or dietetic problems. The Dietitian standard provides an important exception by linking advocacy with evidence informed policy recommendations. Several international standards were more explicit about advocacy strategy or target, including structural interventions, health equity, professional value, and legislative or regulatory issues. The comparative issue is therefore not whether advocacy exists in Indonesia, but how clearly the intended action, audience, and target of change are specified.

Evidence from nutrition policy processes illustrates why such specification may matter. In a qualitative study of obesity-policy development in Quebec, nutritionists participated through strategic partnerships, evidence development and communication, engagement in policy processes, and negotiation with other actors [27]. Experience from one policy context cannot determine what newly qualified practitioners should be expected to perform independently. It does, however, demonstrate that advocacy can involve identifiable strategies, relationships, evidence use, and policy targets rather than functioning simply as generic communication. At a foundational level, competency standards might therefore distinguish recognising advocacy opportunities, identifying relevant stakeholders or decision-makers, defining an intended target of change, selecting appropriate evidence, and choosing context-appropriate engagement strategies from the more advanced capability to lead complex advocacy processes.

Systems level capability and the emerging food systems dimension

An important counterbalance to the preceding discussion is that the Indonesian standards already contain a substantial systems level foundation. Both Nutritionist and Dietitian explicitly represent systems and structural determinants, population assessment or surveillance, programme action, stakeholder or intersectoral engagement, and organisational or service governance. The findings therefore do not support a broad claim that Indonesian nutrition professional standards are dominated by individual level functions or that systems thinking is generally absent. Adding a generic competency labelled *systems thinking* would consequently be unlikely to address the more specific patterns identified in this analysis.

Universal representation of the broader SYS domain nevertheless concealed substantial variation in its internal configuration. Stakeholder engagement was universal, systems determinants and programme action were represented in eight pathways, population assessment and organisational governance in seven, and food-systems capability in five. These pathway profiles illustrate why broad domain presence should not be interpreted as a uniform form of systems capability: Hong Kong's SYS-POP representation was embedded in a competency spanning individual, group, community, and population practice, whereas the United States profile was weighted towards programme action, stakeholder engagement, and organisational or service governance rather than structural determinants, population assessment, or food systems capability.

A more useful question concerns how existing systems level capabilities connect with one another for example, whether population intelligence informs programme or policy decisions, whether stakeholder engagement is connected to influence or system change, and whether policy and legal-regulatory capabilities are explicitly linked to broader system objectives. These connections were not always evident from individual competency statements. Their absence from explicit wording should not automatically be interpreted as absence from education or practice, but they represent an area where future competency architecture could potentially provide greater coherence.

Within this broader domain, food systems, food environments, and sustainability constituted the clearest selectively unrepresented area in the Indonesian standards. This distinction should not be confused with food-service capability, which is present in both Indonesian pathways. In the present analysis, food service management was distinguished from food-systems capability: the former concerned the organisation and delivery of food services, whereas the latter encompassed relationships among food production, supply, access, governance, food environments, sustainability, and population nutrition outcomes. Five of the nine international professional pathways explicitly represented such concepts, indicating that this is a meaningful but not universal component of contemporary entry to practice requirements.

This pattern is consistent with previous international work showing uneven incorporation of sustainable-food-system concepts in dietetic preparation. Higgins et al.[28] identified sustainable-food-system content in 16 of 23 dietetic training standards, with most documents using broad descriptors and content generally reflecting lower levels of cognitive complexity. Subsequent literature has continued to

identify the need for stronger and more systematic integration of sustainability competencies within nutrition and dietetics education [29,30]. These studies use a different set of documents and address education more broadly than the standards analysed here, but they reinforce the interpretation that food systems capability is an evolving rather than universally standardised professional expectation. For Indonesia, consideration of food systems should therefore involve substantive discussion of whether such a distinct systems level capability is relevant to professional roles, rather than simply relabelling existing food service competencies.

Implications for competency development in Indonesia

Taken together, the findings support selective refinement rather than wholesale reconstruction of the Indonesian Nutrition Professional Standards. Both Nutritionist and Dietitian Professional Standards already contain substantive foundations for population and systems level practice. The comparative analysis points instead towards several areas where expectations could potentially be made more explicit or interconnected: distinguishing professional legal compliance from broader legal-regulatory literacy; clarifying policy functions and their intended objects; specifying the strategies and targets of advocacy; and considering whether food systems and food environments warrant more explicit representation within the broader systems domain.

Such refinement should remain proportionate to the purpose of entry to practice requirements. The objective need not be to make every newly qualified nutrition professional a specialist legal analyst, policy maker, advocate, or food-systems expert. A more relevant question is what minimum foundational capability enables professionals to recognise system determinants, understand how policy and regulation relate to nutrition outcomes, participate appropriately in advocacy and intersectoral processes, use evidence in population-level decisions, and recognise the limits of their own authority and expertise. More complex capabilities may subsequently be developed through professional experience, continuing professional development, postgraduate education, or specialist pathways.

The UK Voluntary Register of Nutritionists provides one example of staged professional development in which more advanced Registered Nutritionist (RNutr) competencies are differentiated by specialist area, including Public Health and Food [31]. This post-entry model was outside the comparative corpus and is not proposed here as an entry to practice benchmark for Indonesia. It simply illustrates that foundational competence and more specialised capability need not be located at the same stage of professional development. Similar questions about progression and specialisation may therefore be relevant when considering how increasingly complex population-health and food-systems functions are situated within the longer-term development of the nutrition profession.

The present study cannot determine the final wording, proficiency level, educational strategy, or assessment approach for any future competency refinement. Nor can it establish whether all population- and systems level capabilities should be shared equally between Nutritionist and Dietitian or differentiated according to professional roles and scopes of practice. These issues require stakeholder consultation, professional consensus, and implementation research. The contribution of the present

analysis is more specific: to identify how current standards configure these capabilities and where international comparison reveals convergence, variation, or areas of less explicit articulation.

Strengths and limitations

This study has several strengths. It analysed competency-bearing statements rather than relying solely on document titles or keyword occurrence, retained hierarchical context where available, and distinguished substantive competency representation from cognitive demand and performance expectations. Explicit attention to the object and orientation of policy and advocacy statements was particularly important because it prevented higher cognitive complexity from being equated automatically with systems orientation. The international analytical framework was also stabilised before application to the Indonesian standards, reducing the risk that categories were constructed primarily around anticipated Indonesian differences. Verbatim extraction, source identifiers, hierarchy checks, and human source verification further supported analytical traceability.

Several limitations require caution. The selected professional pathways were purposively identified and do not represent an exhaustive census of nutrition and dietetics competency requirements worldwide. The included documents also differed in normative authority, structure, level of detail, and relationship to education, accreditation, credentialing, or registration. Counts of coded statements or pathways should therefore not be interpreted as measures of professional strength or maturity. Documentary representation also cannot establish how competencies are taught, assessed, experienced during supervised practice, or performed in professional settings; capabilities not explicit in core standards may be addressed elsewhere in curricula, accreditation requirements, institutional training, or continuing professional development. Interpretation of performance expectations using Miller's pyramid was also constrained by differences in document architecture and therefore could not be determined with equal confidence across all professional pathways. Finally, the Indonesian Nutritionist standard encompasses heterogeneous nutrition qualification levels rather than a single homogeneous professional entry pathway, which limits direct equivalence with international pathways defined around more discrete entry points.

Finally, external public health, public health nutrition, public health law, and workforce literature was used to interpret the potential relevance of the competencies identified, not as an additional set of standards against which the included pathways were scored. Similarly, post-entry models such as RNutr were considered only as contextual examples of professional development and were not incorporated into the comparative dataset. Maintaining these distinctions is important because the purpose of the study was to characterise formal entry-to-practice expectations rather than assess conformity with a predetermined public health nutrition model.

These considerations underscore the importance of interpreting competency standards not only by domain presence, but also by the form, target, and orientation of professional action they articulate.

Conclusion

Entry to practice competency requirements for nutrition professionals extend beyond individual level practice, but the representation and articulation of legal-regulatory, policy, advocacy, and systems level capabilities vary across professional pathways. Systems level capability was universally represented internationally, while legal-regulatory capability was nearly universal. Policy and advocacy were less consistently represented, and all four domains differed in how professional action was articulated and directed. The analysis further showed that cognitive demand, performance expectations, and systems orientation capture distinct properties of competency and should not be collapsed into a single hierarchy.

Application of this analytical lens to Indonesia showed that both Nutritionist and Dietitian professional standards already contain substantial foundations for population- and systems level practice. The main opportunities therefore lie in selective refinement rather than wholesale reconstruction: clarifying policy functions and their intended objects, specifying advocacy strategies and targets, considering whether professional legal compliance should be complemented by foundational legal-regulatory literacy for population health, and examining whether food systems, food environments, and sustainability warrant more explicit representation. Future competency development work could also consider how foundational capabilities appropriate at entry to practice should be distinguished from more advanced expertise developed through professional experience, continuing professional development, postgraduate education, or specialisation. Stakeholder consultation and implementation research are needed to determine how these capabilities should ultimately be articulated, differentiated across professional roles, taught, and assessed within the Indonesian context.

Abbreviations

ADV: advocacy; ANutr: Associate Nutritionist; CRDN: Competencies for Registered Dietitian Nutritionists; ICDA: International Confederation of Dietetic Associations; LR: legal-regulatory; NCDs: non-communicable diseases; POL: policy; RDN: Registered Dietitian Nutritionist; RNutr: Registered Nutritionist; SRQR: Standards for Reporting Qualitative Research; SYS: broader systems level capability; SYS-DET: systems and structural determinants, equity, and power; SYS-FS: food systems, food environments, and sustainability; SYS-ORG: organisational or service governance, leadership, and change; SYS-POP: population or community assessment, surveillance, and priority-setting; SYS-PROG: population or community programme and intervention action; SYS-STK: stakeholder, partnership, and intersectoral engagement; WHO: World Health Organization.

Declarations

Ethics approval and consent to participate

Not applicable. This study analysed publicly available institutional documents and did not involve human participants, human data, human tissue, or animals.

Clinical trial number: not applicable.

Consent for publication

Not applicable.

Availability of data and materials

The core document register and illustrative competency statements are provided in Additional files 1 and 2. The document register, extraction matrices, codebook, and adjudicated dataset supporting the conclusions of this article are available from the corresponding author on reasonable request.

Use of generative artificial intelligence

A generative artificial intelligence tool (Chat GPT 5.6-Sol) was used only as a supporting tool during the preliminary identification of potentially relevant competency statements and to suggest provisional analytical codes. AI-generated suggestions were treated as provisional and were not used as final analytical outputs. All source verification, final inclusion and exclusion decisions, coding, comparative analysis, interpretation, discussion of the findings, and manuscript development were undertaken by the authors, who take full responsibility for the content of the manuscript.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

WKYP: Conceptualised the study, developed the analytical framework and document search and selection strategy, coordinated document identification and extraction, contributed to coding, comparative analysis, synthesis and interpretation of the findings, and prepared the original draft of the

manuscript.

SF: Contributed to document selection and appraisal, comparative analysis and interpretation, and provided substantive input from a public health nutrition perspective, particularly in contextualising population and systems level nutrition action and strengthening the discussion.

DDAA: Contributed to the conceptual and analytical framing of legal-regulatory competencies, interpretation of findings related to law, regulation and policy, and critical revision of the manuscript from a legal perspective.

LF: Contributed to the analysis and interpretation of the findings, provided practice-based perspectives from field experience particularly regarding negotiation, advocacy, systems thinking, problem-solving, and the translation of professional competencies into policy and programme action and critically reviewed the manuscript.

All authors contributed to the interpretation of the findings, critically reviewed the manuscript, and read and approved the final version.

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