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SELF-ASSESSMENT OF EDUCATIONAL COMPETENCE AND WORK READINESS AMONG NUTRITION VOCATIONAL EDUCATION GRADUATES

Penilaian Mandiri Kompetensi Pendidikan dan Kesiapan Kerja pada Lulusan Pendidikan Vokasi Gizi

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ABSTRACT

The Nutritionist Professional Competency Standards in Indonesia are regulated by the Ministry of Health Regulation No. 342/2020, while the Indonesian National Work Competency Standards (SKKNI) for Nutritionists are outlined in the Ministry of Manpower Regulation No. 156/2019. However, no information technology (IT)-based self-assessment instrument currently exists to evaluate competency mastery and work readiness among graduates of nutrition vocational education. This study aimed to develop an IT-based self-assessment software to assess these competencies among prospective nutritionists. The research was conducted in two stages: (1) development of the software and (2) a survey using the tool. Data were analyzed descriptively and analytically. Conducted from May to October 2022, the study involved prospective graduates of a nutrition vocational program. Results showed that the software, named "askomnutritionist", was successfully developed. Findings revealed that 68.18 percent of respondents were in the Mastered category, 21.79 percent in the Fully Mastered category, and 9.03 percent in the Not Mastered category. Regarding work readiness, 61.06 percent were Ready to Work and 34.96 percent Very Ready, while 3.98 percent were Less Ready or Not Ready. A potential correlation between competency mastery and work readiness was observed. In conclusion, a small proportion of graduates still lack adequate competencies and readiness. The software can serve as a valuable tool for evaluation and curriculum integration to improve graduate quality.

Keywords: self-assessment, nutritionist, vocational education, competence, work readiness

ABSTRAK

Standar Kompetensi Profesi Nutrisionis di Indonesia diatur melalui Peraturan Menteri Kesehatan No. 342/2020, sedangkan Standar Kompetensi Kerja Nasional Indonesia (SKKNI) untuk Nutrisionis ditetapkan dalam Peraturan Menteri Ketenagakerjaan No. 156/2019. Namun, hingga kini belum tersedia instrumen penilaian mandiri berbasis teknologi informasi (TI) untuk mengevaluasi penguasaan kompetensi dan kesiapan kerja lulusan pendidikan vokasi gizi. Penelitian ini bertujuan mengembangkan perangkat lunak penilaian mandiri berbasis TI untuk menilai kompetensi tersebut pada calon nutrisionis. Penelitian dilakukan dalam dua tahap: (1) pengembangan perangkat lunak dan (2) survei menggunakan perangkat tersebut. Data dianalisis secara deskriptif dan analitik. Penelitian dilaksanakan pada Mei–Oktober 2022 dengan melibatkan calon lulusan program studi vokasi gizi. Hasil menunjukkan perangkat lunak "askomnutritionist" berhasil dikembangkan. Sebanyak 68,18 persen responden berada pada kategori Menguasai dan 21,79 persen Sangat Menguasai, sementara 9,03 persen melaporkan Tidak Menguasai. Dari sisi kesiapan kerja, 61,06 persen menyatakan Siap Kerja dan 34,96 persen Sangat Siap Kerja, sedangkan 3,98 persen berada pada kategori Kurang Siap atau Tidak Siap. Potensi korelasi antara penguasaan kompetensi dan kesiapan kerja teridentifikasi. Disimpulkan bahwa sebagian kecil lulusan masih kurang dalam penguasaan kompetensi (9,03%) maupun kesiapan kerja (3,98%). Perangkat lunak ini berpotensi menjadi instrumen penting untuk evaluasi dan integrasi kurikulum guna meningkatkan mutu lulusan.

Kata kunci: penilaian mandiri, nutrisionis, pendidikan vokasi, kompetensi, kesiapan kerja

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INTRODUCTION

Nutritionists play a critical role in addressing public health and nutrition challenges, particularly in developing countries like Indonesia, which continues to face the dual burden of malnutrition (stunting and wasting) and overnutrition (obesity)[1]. To ensure effective performance in this role, well-defined competency standards are essential. In Indonesia, the Nutritionist Professional Competency Standards are regulated under Ministry of Health Regulation No. 342/2020, while the Indonesian National Work Competency Standards (SKKNI) for nutritionists are outlined in Ministry of Work Force Regulation No. 156/2019. A competent and well-prepared nutrition workforce is vital to addressing the country's nutritional challenges, and competency-based education is key to ensuring that graduates meet current and future healthcare demands.[2]

Under Health Law No. 36/2014, nutrition professionals in Indonesia are categorized into Nutritionists (graduates of Diploma III, Bachelor of Applied Nutrition, or Diploma IV/Bachelor of Nutrition programs) and Dietitians (graduates with additional Professional Dietitian Education). Currently, there are approximately 55,000 nutrition personnel working across various healthcare settings, including hospitals, community health centres, clinics, research institutions, and educational facilities.[3]

Nutrition vocational education in Indonesia comprises 62 study programs (40 Diploma III and 22 Applied Bachelor/Diploma IV programs) under multiple ministries and private institutions. The curriculum integrates theoretical learning, laboratory and clinical practice, and evaluations, including a National Competency Test. On average, 3,500 students graduate annually from these programs.

Health professionals, including nutritionists, are expected to master three core competencies: 1) Professional competence (technical knowledge and skills in nutrition), 2) Interprofessional competence (collaboration with other healthcare professionals), and 3) Technological competence (digital literacy for data management, nutrition apps, and IT-based healthcare solutions).[4]

The three basic competencies of health workers, including nutritionists, include professional competencies in accordance with their respective professions; interprofessional competencies that enable collaboration with other professions; and competencies in mastering information technology or digitalisation, through data literacy, human literacy, and technological literacy.[2] Professional competencies include technical knowledge and skills in the field of nutrition, while interprofessional competencies relate to the ability to work with other professions in a healthcare team. Technological competencies are becoming increasingly important with the development of information technology in nutrition practice, such as the use of nutrition applications and health data management systems[5]

However, studies indicate that nutrition education often fails to fully prepare graduates for real-world challenges, particularly in clinical skills and nutrition management[6]. Additionally, while self-assessment tools have proven effective in enhancing students' awareness of their competencies, no IT-based self-assessment instrument currently exists to evaluate nutrition graduates' competency mastery and job readiness in alignment with Ministry of Health Regulation 342/2020 and SKKNI 156/2019[6].

To address this gap, this study aims to develop an IT-based self-assessment software to assess educational competency mastery and work readiness among nutrition vocational graduates. The findings are expected to:enhance the quality of nutrition education by identifying competency gaps, serve as an evaluation tool for students and institutions, and support industry stakeholders in assessing graduate readiness. By bridging the gap between academic training and workplace demands, this tool can help produce better-prepared nutritionists, ultimately contributing to improved public health outcomes in Indonesia

RESEARCH METHOD

This study employed a two-stage design. The first stage involved the development of *self-assessment software* designed to identify the mastery of educational competencies and work readiness of nutrition vocational education graduates in Indonesia. The second stage

consisted of a survey/observation using the developed software to assess participants' competencies. This study was conducted from May to October 2022 and used a descriptive and analytical approach to analyse the data.

The research population included final-year students or prospective graduates of vocational nutrition education programmes in Indonesia who were registered as participants in the 2022 National Vocational Nutrition Education Competency Examination. The research sample consisted of students from Diploma III Nutrition and Applied Nutrition (Diploma IV) programmes who were members of the Indonesian Association of Vocational Nutrition Education Institutions (AIPVOGI). The link *to the Self-Assessment Software* for Mastery of Nutritionist Competencies and Nutritionist Work Readiness was shared with 62 member institutions of AIPVOGI to be forwarded to their prospective graduates. A total of 315 respondents were willing to participate in this study, with 173 students from the Diploma III programme and 142 students from the Applied Nutrition Bachelor's programme.

Data collection was conducted online using *self-assessment* software designed specifically for this study. The software, called *askomnutritionist*, consists of two main parts: 1) Self-assessment of educational competency mastery, based on the Nutritionist Competency Standards set out in Minister of Health Regulation (Permenkes) No. 342 of 2020; 2) Self-assessment of work readiness, based on the Indonesian National Work Competency Standards (SKKNI) for Nutritionists as stipulated in Minister of Manpower Regulation (Permenaker) No. 156 of 2019. Participants are asked to assess their competency mastery and work readiness on a scale of 1 to 4, where: 1 = Not yet mastered; 2 = Less mastered; 3 = ly mastered; 4 = Very mastered.

The software also collects demographic data, including study programme, gender, age, length of study, type of programme (regular or transfer), cumulative GPA, and final project research field (e.g. Clinical Nutrition, Community Nutrition, Food Service Management, Nutrition Education, or Nutrition Research and Development).

The data is analysed using descriptive and analytical methods. Descriptive statistics are used to summarise the demographic characteristics of respondents and their self-assessed competency levels. The analytical approach involves comparing competency levels and work readiness between students in the Diploma III programme and the Applied Bachelor's programme. Data were cleaned and processed using appropriate statistical software, and the results were presented in tables and figures.

This study proposes the hypothesis that there is a significant difference in educational competence and work readiness between graduates of Diploma III programmes and Applied Bachelor's programmes. To test this hypothesis, a comparative analysis was conducted using statistical tests appropriate for ordinal data (e.g., Mann-Whitney U test or Kruskal-Wallis test). The significance level was set at $p < 0.05$.

This study has obtained ethical approval from the Health Research Ethics Committee of the Yogyakarta Ministry of Health Polytechnic with number e-KEPK/POLKESYO/ 0584/VI/2022 dated 18 July 2022. Written consent was obtained from all participants via the software interface before they proceeded with the survey. Participants were assured of the confidentiality of their responses and the right to withdraw from the study at any time without penalty.

The askomnutritionist software was developed in collaboration with information technology (IT) experts to ensure ease of use and accessibility. The software is designed to be easy to navigate, with clear instructions and a simple interface. The admin panel allows researchers to manage content, monitor responses, and download data for analysis. The reliability and validity of the software were tested through initial trials and feedback from a small group of nutrition students prior to the main data collection phase.

RESULTS

Self-Assessment Software

The Self-Assessment Software for Mastery of Nutrition Education Competencies and Work Readiness for Nutritionists was developed based on a website. The choice to use a website was based on the ease with which respondents could recognise and use the software. The list of questions for self-assessment of mastery of

nutrition education competencies refers to Minister of Health Regulation (Permenkes) Number 342 of 2020, while the list of questions for work readiness competency mastery refers to the Indonesian National Work Competency Standards (SKKNI) for Nutritionists as stated in Minister of Manpower Regulation (Permenaker) Number 156 of 2019.

In developing the Askomnutritionist *software,* researchers have designed the content material. To develop this software, researchers collaborated with website developers (media and information technology experts). The application is installed on the website and can be easily found through *Google's* search menu. It is relatively simple to use, and the images and descriptions in the software content are easy to understand and use. Figure 1 shows the main page of the software.

To edit or download respondents' results, researchers can use the login menu with their designated account and *password*. Researchers can add images, content/material, sentences, or manage the display, as well as download results from the respondent field. Figure 2 shows the main page of the *admin/software* manager at .

Self-assessment of the level of mastery of nutrition education competencies is the range of nutrition competency mastery perceived and mastered by prospective graduates before graduation. Nutritionist competencies are based on the Nutritionist Competency Standards listed in Minister of Health Regulation No. 342 of 2020. The range of competency mastery is a score of 1 to 4. The parameters used are a score of 1 if the competency is not mastered, a score of 2 if the competency is not mastered, a score of 3 if the competency is mastered, and a score of 4 if the competency is mastered very well.

Survey Results

Respondent Characteristics. This study used respondents who were students or prospective graduates of vocational nutrition study programmes in Indonesia, consisting of diploma III nutrition study programmes and applied bachelor's degree study programmes in nutrition and dietetics. The subjects of this study were final-year students or prospective graduates of vocational nutrition study programmes who were registered as participants in the 2022 National Vocational Nutrition Competency Examination. The research subjects came from Diploma III Nutrition Study Program and Applied Bachelor or Diploma IV Nutrition Study Program, which are members of the Indonesian Association of Vocational Nutrition Higher Education Institutions (AIPVOGI). Figure 1 shows the characteristics of respondents based on type of study program, gender, and cumulative grade point average (GPA).

Figure 1
Main Page of The Software

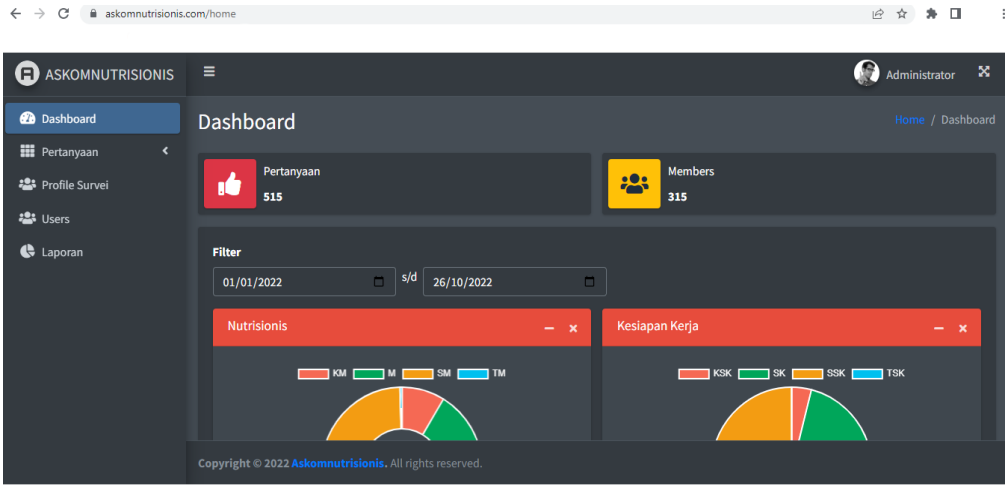

Figure 2
Page for The Software Administrator

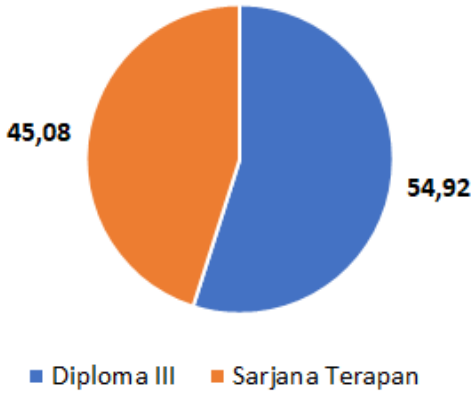

Figure 3
Characteristics of Respondents
based on Study Programme

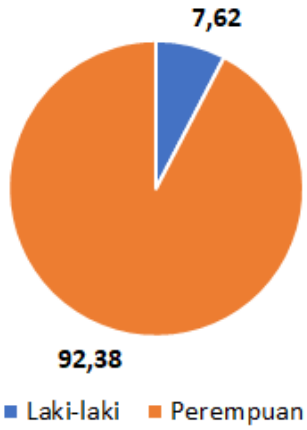

Figure 4
Characteristics of Respondents
based on Gender

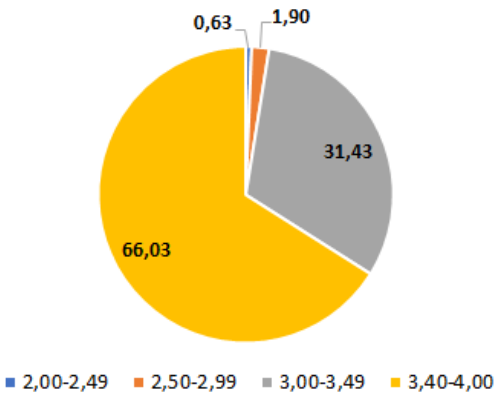

Figure 5
Characteristics of Respondents based on Grade Point Average

The number of respondents who completed the software came from prospective graduates or graduates of Diploma III Nutrition, totalling 173 people (45.08%), and Bachelor of Nutrition and Applied Dietetics, totalling 142 people (54.92%). Respondents were predominantly female students, at 92.38 percent. Most respondents had a GPA above 3.00. There were 99 respondents (31.43%) with a GPA between 3.00 and 3.49, and 208 respondents (66.03%) with a GPA between 3.50 and 4.00.

This survey/research activity was announced openly to all nutrition vocational programmes in Indonesia. Researchers did not force prospective graduates to become respondents. Information was conveyed to university leaders responsible for nutrition vocational study programmes through official letters and announcement brochures.

Respondents came from 19 provinces, both on the island of Java and outside Java. The province with the highest number of respondents was East Java. The three provinces with the lowest number of respondents were Bali, Riau, and South Sulawesi.

Level of Mastery of Nutritionist Competencies. Self-assessment of the level of mastery of nutritionist competencies is a self-assessment of the range of work readiness based on the nutritionist competencies that prospective graduates feel they have mastered after graduation. Nutritionist Work Competencies are based on the Indonesian National Work Competency Standards (SKKNI) for Nutritionists as stipulated in the Minister of Manpower and Transmigration Regulation No. 156 of 2019.

The range of work competency mastery is scored from 1 to 4. The parameters used are: score 1 if not yet ready to work for that competency, score 2 if not quite ready to work for that competency, score 3 if ready to work for that competency, and score 4 if very ready to work for that competency.

Table 1
Characteristics of Respondents Based on Province of Origin

Province	Total (n=315)	Percentage (%)
Bali	1	0.32
Bengkulu	9	2.86
DIY	43	13.65
Gorontalo	10	3.17
West Java	8	2.54
Central Java	5	1.59
East Java	83	26.35
West Kalimantan	15	4.76
South Kalimantan	20	6.35
Central Kalimantan	35	11.11
Riau	2	0.63
Lampung	12	3.81
North Maluku	12	3.81
NTT	25	7.94
South Sulawesi	1	0.32
Central Sulawesi	4	1.27
North Sulawesi	7	2.22
West Sumatra	13	4.13
South East	10	3.17

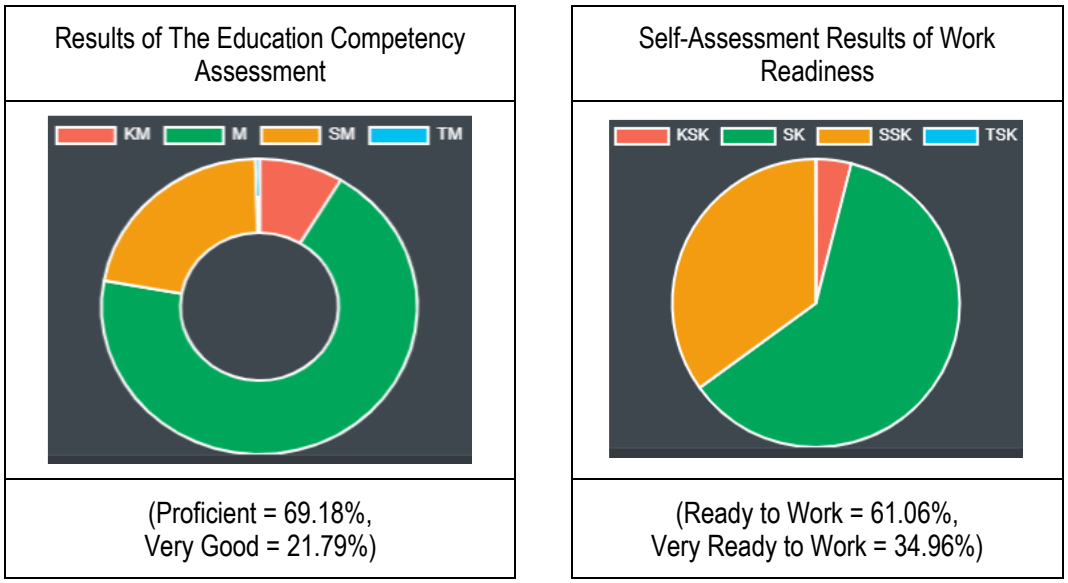

Figure 6
Summary *of* Self-Assessment Results on Mastery of Nutritionist Competencies
Education and Work Readiness of Nutritionists

The results *of the self-assessment* of educational competency mastery can be seen in Figure 6. These results show that 68.18 percent stated that they had mastered (M) and 21.79 percent stated that they had mastered very well (SM). However, there were still 9.03 percent who stated that they had not mastered (KM) and did not master (TM).

The results of *the self-assessment* of mastery of nutritional work readiness competencies show that 61.06 percent stated that they were ready to work (SK) and 34.96 percent stated that they were very ready to work (SSK). There were still 3.98 percent who stated that they were not ready to work (KSK) and not ready to work (TSK).

This study also provides information to vocational nutrition education providers that there are still 9.03 percent who state that they do not master (KM) and do not master (TM) nutrition education competencies. This information can be used for reflection and evaluation in the implementation of education. These results would be more interesting if they were linked to the results of the national competency examination (UKOMNAS) for Indonesian vocational nutrition students.

DISCUSSION

Mastery of Educational Competencies

Competency standards or frameworks are an important part of competency-based education. Competency standards describe the skills and abilities required by the world of work, which serve as a guide for the curriculum to prepare graduates to enter the world of work. Competency-based assessment involves measuring students' competencies by analysing their performance and achievements against competency standards or processes used to measure students' ability to apply theory to practice, and is an important part of educating the future workforce.[7]

The results of this study indicate that students in the Applied Nutrition Bachelor's Programme have a higher level of educational competency mastery compared to students in the Diploma III Nutrition Programme. The results of this study indicate that students in the Applied Nutrition Bachelor's Programme have a higher level of educational competency mastery compared to students in the Diploma III Nutrition Programme. This difference can be attributed to the different curriculum structures and duration

of education between the two programmes. The Applied Nutrition Bachelor's Degree Programme (STr) has a study period of four years or eight semesters with a total of 144 credits, similar to the Bachelor's Degree Programme (S1). Meanwhile, the Diploma III (D3) programme has a study period of three years or six semesters with a total of 112 credits.[8,9] A longer education programme tends to provide more time for the development of practical and theoretical skills, which ultimately increases the competence of graduates.[2]

The difference in competency levels can also be explained through the Indonesian National Qualifications Framework (KKNI), in which Diploma III graduates are equivalent to level 5, while Applied Bachelor's degree graduates are equivalent to level 6. This difference in levels reflects the higher level of knowledge and skills possessed by Applied Bachelor's degree graduates compared to Diploma III graduates.[10]

Competency development is a continuous process of improving knowledge, attitudes, and skills, and is influenced by many factors. In a systematic review conducted by Rizany I et al., six factors were identified that influence the development of nursing competencies: (1) work experience, (2) type of nursing environment, (3) level of education attained, (4) adherence to professionalism, (5) critical thinking, and (6) personal factors. Work experience and education have been shown to significantly influence the development of nursing competencies.[11] STr students have work experience during laboratory practice and field work practice (PKL) in health centres, villages, and hospitals, which provides them with more time to develop their competencies. Work experience during PKL and guidance from *clinical instructors* help improve student competencies.

Research on medical students shows that PBL significantly improves critical thinking skills and case-based performance compared to traditional lectures. PBL students scored an average of 12 percent higher in critical thinking and 15 percent higher in case-based tasks (p < 0.05).[12] This is relevant to the research findings that some students still lack mastery of certain competencies, so the PBL approach can be a solution to improve competency mastery.

The existence of students who do not master and lack competence poses a challenge for education managers in both study programmes. This condition can be used as input to review direct practical experience in the field (PKL). Other studies show the gap between theory and practice in nutrition education. Students stated that direct demonstrations and hands-on practice were far more interesting and effective. Through this method, they stated that they felt more prepared to discuss dietary choices with patients and thus overcome gaps in their practice. A notable result is an increase in confidence in integrating nutrition into patient care, as students realise how nutritional interventions influence clinical decision-making[13] Practical field experience (PKL) has a significant impact on students' work readiness. Students who have intensive field experience tend to be better prepared for the world of work because they have been exposed to real-life situations in the field[14]

The results of this study indicate that if nutrition education competencies are related to work competencies, there is likely to be a meaningful relationship, namely that nutrition education competencies influence or have a significant relationship with work readiness. When reviewing each competency statement that must be mastered, it can be seen that the field and number of nutrition education competencies are broader and more numerous. This can be expected from the number of respondents who stated in their self-assessment that they did not master or did not master a larger number (percentage) than work readiness competencies, namely 9.03 percent compared to 3.98 percent. Mastery of educational competencies has a positive correlation with work readiness, especially in the health sector. They emphasise the importance of integrating theory and practice in the education curriculum to enhance graduates' work readiness.[7]

The scope and number of competencies in nutrition education are broader and more in-depth than those in work readiness. This means that students are required to master various theoretical and practical aspects during their studies, which can lead to feelings of insecurity in mastering all of these competencies. On the other hand, work readiness competencies often focus more on specific practical skills, so students feel more prepared in these aspects.

Education level is positively related to nutritionists' perceptions of implementing the Nutrition Care Process (NCP). The higher the education level, the better the perception and confidence in implementing NCP.[15] This shows that higher educational competence can improve readiness in work practice. Furthermore, other studies shows that students' perceptions of vocational competence have a significant influence on work readiness, with a contribution of 19.9 percent.[16] This confirms that understanding and mastering competencies during education plays an important role in preparing students to enter the world of work.

Feelings of inadequate educational competence may be caused by a lack of practical experience or limitations in learning methods. Emphasise on the importance of interprofessional education in improving collaboration and communication between health workers, which in turn can improve the work readiness of nursing students.[17] A similar approach can be applied in nutrition education to strengthen competency mastery through more comprehensive practical experience.

Academic achievement and industrial work experience contribute significantly to students' work readiness.[18] This indicates that improving the quality of learning and adding practical experience can reduce the percentage of students who feel they have not mastered educational competencies. Another study found that nutrition entrepreneurship education is positively associated with entrepreneurial motivation among students.[19] This suggests that the integration of theory and practice, as well as an emphasis on entrepreneurial skills, can increase graduates' confidence and work readiness.

Evidence-based practice (EBP) in nutrition uses a systematic framework that includes the 5A Model: Assess, Ask, Acquire, Appraise, and Apply. This framework enables nutrition practitioners to identify, analyse, and synthesise the latest scientific evidence to support optimal clinical decision-making[20]. Applied nutrition undergraduate programmes in Indonesia still show weaknesses in terms of comprehensive research methodology, critical assessment skills for evaluating scientific literature, training in systematic reviews and meta-analyses, and implementation research in the context of nutrition.[21]

Work Competency Readiness

Significant differences in work readiness between Diploma III and Applied Nutrition Bachelor's degree students indicate that the Applied Nutrition Bachelor's degree programme is more effective in preparing graduates to enter the workforce. Applied bachelor programs (D4) generally include more structured practicums, industry collaboration, and courses that integrate theoretical and practical knowledge so that students gain real work experience that increases their self-efficacy and work readiness[22].

Several competencies that have not yet been mastered are areas that need to be improved, such as competencies in nutrition research. Nutrition students are often not exposed to research methods during their studies[23]. Therefore, integrating more intensive research training into the curriculum could be a solution to improve these competencies.

The results of this study have important implications for the development of nutrition vocational education curricula in Indonesia. Educational institutions should consider increasing their focus on weak competencies, such as nutrition problem management and research. In addition, collaboration with industry and health institutions can help ensure that the curriculum remains relevant to the needs of the job market.

Formative evaluation, such as continuous feedback, can improve students' mastery of competencies. Formative evaluation helps students identify their strengths and weaknesses, allowing them to focus more on developing competencies that they have not yet mastered.[24] This can be applied in vocational nutrition education to improve the quality of graduates.

Outcome-Based Education (OBE) has been proven effective in improving graduates' work readiness. Biggs & Tang (2015) found that OBE ensures graduates have the skills and knowledge necessary to enter the workforce.[25] This is relevant to the research recommendation to improve the quality of nutrition vocational education curricula.

The Fourth Industrial Revolution demands a fundamental transformation in the approach to vocational education, particularly in the fields of nutrition and health. Research shows that more than half of Indonesia's workforce currently

consists of workers with low levels of education who are not exposed to the internet in their main jobs, creating a significant digital divide. In the context of vocational nutrition education, this challenge is even more complex because graduates must master 21st century skills, which include critical thinking, creativity, collaboration, communication, and technology literacy.[26]

The Partnership for 21st Century Skills framework identifies three categories of essential skills: Learning Skills (4 C's), Literacy Skills (IMT), and Life Skills (FLIPS). For nutritionists, the integration of these three categories is critical in addressing the complexity of public health challenges that require an interprofessional approach and the optimal use of digital technology.[27]

This study has several limitations. First, data were collected through *self-assessment*, which may be influenced by respondents' perception bias. For future research, it is recommended to use *a mixed method* that combines quantitative and qualitative approaches. This can provide a deeper understanding of the factors that influence students' mastery of competencies and work readiness. For example, in-depth interviews with students and lecturers can reveal specific challenges in the learning process.

Secondly, the research sample only included students who were registered as prospective participants in the National Competency Examination, so the results may not represent the entire population of nutrition vocational students in Indonesia.

CONCLUSION

This study shows that students in the Applied Nutrition Bachelor's Programme have a higher level of educational competency and work readiness compared to students in the Diploma III Nutrition Programme. However, there are still areas of competency that need to be improved, particularly in terms of nutrition problem management and research. Recommendations to improve the curriculum and collaboration with industry can help produce more competent and work-ready graduates.

RECOMMENDATIONS

Further research could examine the extent of industry involvement in vocational nutrition education, including internship programmes, joint training, and curriculum development. This study could provide concrete recommendations for improving the relevance of the curriculum to industry needs. In addition, self-assessment software can be integrated with the Academic Information System (SIAKAD) or the campus Learning Management System (LMS), so that competency assessments can be carried out regularly each semester and the results are immediately stored in the student's portfolio.

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