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The Lack of Nutritional Competency among the Medical Practitioners and Medical Students: A Systematic Review

Michelle K. James [a*]

[a] *School of Allied Health, College of Medical Sciences, Environmental Health, University of Guyana, Georgetown, Guyana.*

Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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Systematic Review Article

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ABSTRACT

Objective: This systematic review addressed the effects of the competency level of medical students, physicians, and practitioners in nutrition education for optimum patient care. It also addresses the perceived inadequate didactic contact hours of nutrition education.
Method: There were 55 studies selected, and 25 were used for this review including quantitative and qualitative studies. The data were divided into four groups: quantitative data, qualitative data, reports, and news articles. The categorization of the literature was as follows: 17 quantitative, 2 qualitative, 4 news articles, 1 manual, and 1 symposium report. These were evaluated to produce a credible qualitative meta-analysis of available data.
Data Sources: The systematic review used databases and citation indexes including Embosses, PubMed, JAMA Network, Medline, Elsevier, and Oxford Academics, these include journals, reports of Symposiums, and news articles to ascertain evidence-based data
Results: The findings of this review revealed the significant effect inadequate contact nutrition education has on the competency level of medical students, physicians, and practitioners.
Limitations: Limitations of this review include several external factors. Although universities are

**Corresponding author: Email: michelle.james@uog.edu.gy;*

expected to implement approximately 44 hours of nutrition education for the competency level of medical students and physicians during their tenure, this may not be the case at all schools. Many offer only 15-25 didactics hours. In addition, in some cases, the comparisons are not equal but the researcher was unable to establish the hours and a basic curriculum structure.

Keywords: Nutrition education; nutrition competency; medical students; health professionals; clinical nutrition.

1. INTRODUCTION

Nutrition education is a vital component of health and patient care and must be adequately delivered through didactic and andragogy approaches to those who are mandated with the responsibility to administer the kind of care. A myriad of researchers worldwide has published data that indicates inadequate nutritional education are been provided by reputable institutions globally for medical practitioners during medical school and clinical training [1]. Ultimately, this can lead to a negative impact on patient care since nutrition plays a key role in chronic disease management in patients with diabetes, heart disease, and other conditions. Gibbs and Chapman-Novakofski [2] suggested nutrition education is imperative for the prevention of diseases because of the large number of chronic diseases related to nutrition, as well as a documented lack of patient nutritional knowledge.

A plethora of studies in the medical community has provided startling data that some patients received conflicting information on nutrition education from their healthcare providers. This indicates there is a gap between the quality of nutrition education received and the ability of medical practitioners to provide optimum health information to improve patient nutritional practices to foster optimum health and longevity [3]. Gibbs and Chapman-Novakofski [2] expressed the need for ensuring the proper assessment of the level of health literacy in nutritional education.

Colino [4] reported only 29 percent of U.S. medical schools offer 25 hours of recommended nutrition education. This data is disquieting since medical physicians who play such an integral role in patient care is lacking the fundamentals to prevent, treat, and curb certain chronic lifestyle diseases through clinical nutrition. Rogerson, Soltani, and Copeland [5] concurred and made the observation and comparison that some accredited nutrition programs do not adequately equip their nutritionists who receive much more nutritional education than physicians; yet in many cases, it is the physician, who is providing nutritional information to most patients [5].

Adams et al. [1] stated nutritional competency affects almost everyone. The competency level of an individual does not exclude him or her from making the wrong food choices. Adams says, “Brilliance in one field doesn't always translate into nutrition” (p. 1.). Many healthcare providers perceived their medical background to be sufficient in making wise decisions on their patients’ diet, often when they do not model these behaviors themselves.

Enough evidence has confirmed that physicians are not adequately trained to address patients' nutritional needs. Therefore, it is paramount that nutrition education, be effectively incorporated in their pedagogical medical training for adequate patient care. Consequently, the researcher has evaluated numerous studies with the underlying hypothesis that poor pedagogical approach and insufficient didactic contact hours are the main contributors to the competency level of medical students, and physician in regards to providing nutrition education to patients.

1.1 Statement of the Problem

The researcher conducted a comprehensive systematic literature review during the 2019-202 academic year of medical students, physicians, and practitioners concerning nutritional education received by medical practitioners, and the effects the lack of this knowledge has on the people in their care.

Research Question /Sub-problems 1 & 2:

1. **Sub-problem 1:** Does the current nutrition education curriculum for medical students and physician training adequately prepare medical students to become competent physicians and medical practitioners in nutrition education?
2. **Sub-problem 2:** Does the duration of nutrition education of the medical

practitioners adequately influence the quality of nutrition education provided for patient care in recent years?

Specific Objectives of the Review Study:

1. The review process aimed to emphasize the importance of nutrition competency amongst medical practitioners through evidence-based data.
2. Present existing data to support students' and medical practitioners' desire for quality nutrition education, which would enhance the care for nutrition-related chronic diseases.
3. To postulate the need for a new curriculum design for nutrition education with a longer duration, contemporary *andragogy* approach, and relevant information that would support optimum patient care.

The Outcome of the Review:

1. The outcome of this review will assess the competency of nutrition education among medical students, and bring this issue to the attention of the faculty administrators and program coordinators to consider the need to revise the current curriculum
2. The findings will provide guidance to develop new or modify the existing curriculum.
3. The findings of this review can help medical practitioners at the public and private medical institutions in Guyana, South America to better facilitate and meet patients' nutritional education needs.

2. METHODOLOGY

2.1 Review of Literature

The Systematic Review was conducted to highlight the insufficient time allotted to the andragogy for medical students' curriculum, causing the lack of competency in nutrition education and the ability to proficiently cater to the nutritional needs of their patients.

The systematic review process includes 55 articles of qualitative, and quantitative studies, and news articles of varying styles. The review process suggests that the average time allotted for the didactic process is below 98% of the proposed 44 hours required for competency in nutrition education and patient care.
The inclusion criteria for the systematic review process include Embosses, PubMed, JAMA Network, Medline, Elsevier, and Oxford Academics, these include journals, reports of Symposiums, and news articles to ascertain evidence-based data on the competency level of medical professionals on nutrition education and patient care. There were search keys, which include nutrition education for physicians, nutrition competency of medical students, competency level of health professionals in nutrition, clinical nutrition competency for doctors, and nutrition education for physicians to provide optimum patient care. Thus, understanding and providing evidence that there is a need for nutrition education.

2.2 Insufficient Contact Hours for Nutrition Education for Medical Students and Physicians

Adams, Kohlmeier, Powell, and Zeisel [1], in their decade-long survey, discovered that there are gaps between nutrition in medicine and the competency level of physicians. They examined key areas such as nutrition in medical school and residency programs. The Nutrition in Medicine (NIM) medical student curriculum consists only of 34-36 hours and 29 units. They concluded, "Physicians do not feel comfortable, confident, or adequately prepared to provide nutrition counseling, which may be related to suboptimal knowledge of basic nutrition science facts and understanding of potential nutrition interventions" (p.1). This is due to insufficient content hours, and basic content in the NIM curriculum for most medical schools in the United States. Yet, poor nutrition is an underlying cause of numerous chronic disease processes that physicians treat.

Crawley [6], in a systematic literature review, examined data on physician knowledge, skills, and confidence to counsel patients in nutrition. He reviewed 16 quantitative studies in his meta-analysis, as well as 3 qualitative studies, and 5 curriculum initiatives. These include 11 from the United States of America, 4 from Europe, 1 from the Middle East, 1 from Africa, and 7 from Australasia. The findings revealed that despite the diversity and geographical location of the institutions, nutrition education was incorporated as what he perceived as insufficient into the medical education curriculum. He recommends adequate nutrition education, which should be compulsory in medical training to enhance physicians' competency level in nutrition knowledge and skills. He also recommends the enhancement of the curriculum and innovative pedagogical approaches. Hanley et al. [7], in an

anonymous survey of medical students from a private urban medical school in New York, USA, evaluated the curriculum and the effect, thereof on nutrition competency. The areas measured were perceived confidence, knowledge, and skill level. The findings revealed there was a big difference in the students' dietary assessment skills and their counseling confidence level.

Siperpina et al. [8] noted 25 contact hours of nutrition education, which is usually provided to medical students, is insufficient and leaves them unable to deal with patient nutritional issues. Medical students and doctors experienced disadvantages in nutrition education because the information received is focused on pathogenesis rather than nutritional educational issues that are challenging to patients. They added that rather than educating doctors about nutrition care, they are saturated with similar information taught in core classes. These can include morbidities such as cancer, hospitalization malnutrition, and cancer treatment. Additionally, most medical institutions do not provide their students with nutrition education activities that enhance their skills, and ability in clinical practice, as would be in other areas of medicine [8], particularly at the primary care level. Gramlich et al. [9] in an investigative survey study conducted in Canada with 933 Canadian medical students, from nine English and French universities found students were comfortable with providing patients with basic nutrition counsel on the role of prevention of nutritional disorders but were less confident in providing adequate counsel to treat nutritional disorders and nutrient requirements across the lifespan.

Gramlich et al. discovered that students who participated in their survey believed more nutrition education must be provided so that they are adequately prepared to cater to the needs of their patients in nutrition education. Sierpina et al. [8] presented conclusive evidence that there is a nutritional deficiency in healthcare education.

> Surprisingly, in reviewing the American College of Graduate
> Medical Education requirements for postgraduate education in
> family medicine, internal medicine, and cardiology, we found
> either very cursory or no requirements for competencies in the
> area of nutritional training. Medical school training is limited
> to an average of 19 hours dedicated to nutrition, and only 25% of medical schools offer a nutrition course (p.g.1, 2013).

A survey conducted in 2014 involving 217 medical schools in the Western European Union countries addressed the required and or optional nutrition contact hours for medical directors of accredited medical schools. Of the 32 (14.7%) schools in 10 countries that participated, 68.8% did some nutrition education. This means almost 24% did not include nutrition education at all.

In a similar study done in Europe, European educators were satisfied with the amount of nutrition education hours offered. Despite the claim of satisfaction of European educators, the issue remains a concern for consumers and patients, who are losing confidence in medical doctors [10].

Additionally, findings reveal conflicting data to support the recommended hours for nutrition degree programs in the Caribbean region. The recommendation of hours ranges from 1,200 hours to 300 hours for various related activities such as supervised contact hours, research, and clinical hours [11]. There is no indication of the actual contact hours for medical school, but it is common practice to have between 26 and 28 hours of nutrition education in the Caribbean. There are no specific directives given for the recommended hours for medical school in the data retrieved. Please see the breakdowns in Fig. 1.

2.3 Lack of Nutrition Competency for Adequate Patient Care

Though there is an increase in non-communicable diseases due to poor lifestyle practices, universities continue to provide basic training to doctors, and medical students who are unable to meet the needs of their patients by providing pertinent answers to questions related to nutrition [8]. Sierpina et al. also stated a great gap exists between the nutrition education offered to medical students, and the knowledge required to provide adequate care for patients. According to Adams, Kohlmeier, Powell, and Zeisel, [1], physicians who attempt to offer nutritional counseling to their patients do not feel confident to provide adequate information due to the insufficient training received to properly deal with their patients. They noted physicians in most medical schools across the US are at a disadvantage with inadequate training in the area of nutrition education.

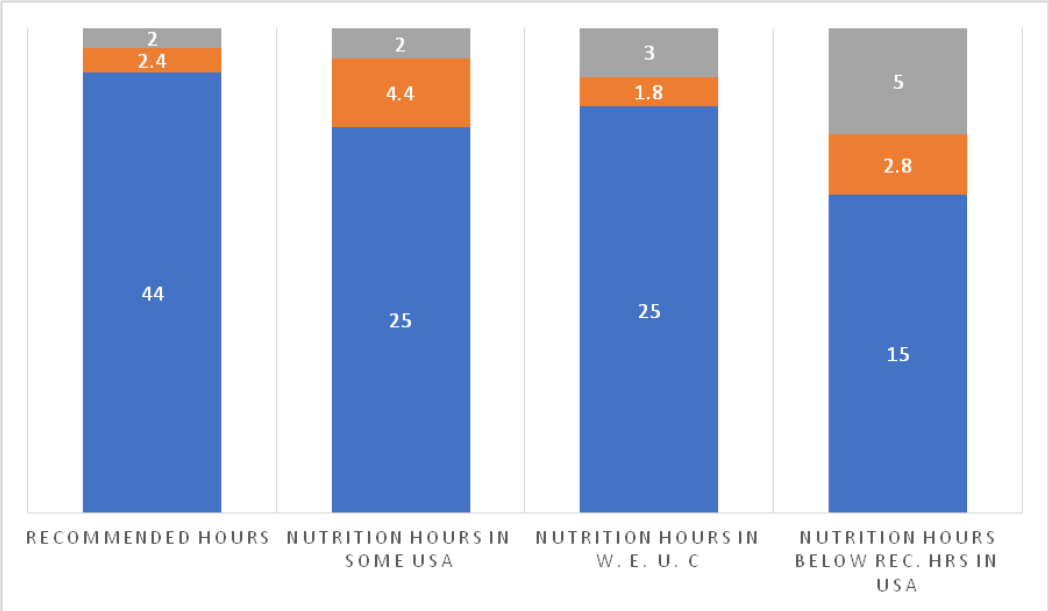

Fig. 1. Recommended hours for medical schools of 44 hours in blue, compared to actual hours implemented by accredited universities in the United States of America, West European Union countries, and the Caribbean also in blue

Rogerson, Soltani, and Copeland [5] stated there is a great gap between medicine and nutrition education. Though physicians are expected to provide overall nutrition care for their patients, the need for a thorough knowledge of nutrition is not given much attention in medical schools. This is complicated by the fact that nutritional needs and guidance vary on patient age, sex and condition.

Connor, Cialdella-Kam, and Harris [12] evaluated medical students' use of nutrition resources and their perceived competence in providing basic nutritional counseling. They examined all 657 first through fourth-year students at the Case Western Reserve University, to ascertain their main source of nutrition information for their patient care. There was a 47% response rate. Respondents reported 42% (n-132) use professional resources, 38% (n-119) use consumer resources, and 20% (n- 61) stated they do not use any nutrition resources. However, most resources used are obtained from unreliable consumer-based websites, rather than authentic medical sources. This accounts for 70 % (n- 219), who feel confident in providing basic nutrition information for their patients. Thus, it is recommended that medical students should rely on sound consistent nutrition information from medical sites and not trust consumer sites, which may not be peer-reviewed, or they may refer their patients to registered dietitians.

In a cross-sectional study of 90 primary care physicians from 48 chronic disease clinics in the city of Jeddah, Kingdom of Saudi Arabia (KSA), between February and May 2019, nutrition competency was measured with questionnaires. Findings reveal 98 % of the participants who responded claimed to be competent in their care but reported they provided low levels of nutrition care. The researchers correlated data with nutrition care and the physicians' confidence in nutrition knowledge ($r=0.57$) and communication ($r=0.52$). Three factors were identified as predicting whether physicians provide nutrition care to patients: confidence in counseling about nutrition ($p<0.001$), having previous nutrition education ($p=0.005$), and a higher professional qualification ($p=0.008$).

Kris-Etherton et al. [13] presented evidence from a symposium held April 27, 2014 at the ASN Scientific Sessions and Annual Meeting at Experimental Biology 2014 in San Diego, CA, under the theme "Nutrition Competencies in Health Professionals' Education and Training, A New Paradigm." They found a myriad of inconsistencies in medical education, which include the lack of support f the transfer of nutrition education, and alarming evidence that proposed that nutrition education is not required

for educating and training physicians in many countries, including the United States, United Kingdom, and Australia. Additionally, findings revealed nutrition education for healthcare professionals is uncoordinated and runs contrary to the central aim of nutrition education.

Mogre, Stevens, Aryee, Matorwmasen-Akkermans, Abubakari, and Scherpgier, [14], conducted a cross-sectional study of 114 medical doctors in Ghana, who participate in an online/paper-based survey. The survey examined Ghanaian doctors at various levels for nutrition care practices, competencies, barriers when providing nutrition care, personal perceptions of their effectiveness of training, and learning resources in nutrition education. Findings revealed 70% of those who participated were unable to provide needed patient care. Further, only ≤ 40% of the patients were able to receive care; more than 80% referred their patients to dietitians or nutritionists. This is not a bad thing if nutritionists are more skilled. Their comfort levels of providing nutrition counseling correlated positively ($r = 0.288$; $p = 0.002$) with attitudes about nutrition overall. Additionally, barriers and other variables were examined such as inadequate knowledge, counseling skills, and lack of time proved to a significantly challenging to devote additional time to nutrition education.

The School of Medicine and Health Sciences of the University for Development Studies in Ghana had 23 undergraduate clinical fifths to final-year medical students participate in a semi-structured individual interview. The views and expressions were audio-recorded and later transcribed verbatim. The aims were to examine perceived barriers, nutrition care, doctor's role in nutrition care, and strategies to improve nutrition education. Researchers reported medical students agree doctors have an imperative role to play in patient care. However, a number of factors such as the "lack of priority for nutrition education, lack of faculty to provide nutrition education, poor application of nutrition science to clinical practice, and poor collaboration with nutrition professionals they are unable to provide optimum care" were found [15]. The students recommended innovative teaching and learning strategies, restructuring of the curriculum to facilitate a more robust approach and the implementation of specialists such as dietitians and nutritionists to participate in the curriculum review process.

Alkhaldy [16] in a cross-sectional study in Saudi Arabia examined 117 physicians who participated in a questionnaire survey that examined physician nutritional knowledge related to malnutrition. The mean nutrition score among the 117 Saudi physicians in the hospitals of Jeddah, Saudi Arabia was a score of 50% based on 100P. Physicians' confidence level was low when dealing with the management of malnutrition in their patients' screening (79%), assessment (78%), and treatment (78%) stages. Even though 61% of patients believe their doctors are competent in nutrition education, only 14% of these doctors concurred with their patients.

Crowley, Ball, and Hiddink [17] conducted a systematic review between May 1 and July 1, 2018, using search terms such as nutrition in medical education, and medical nutrition education, including 4th-year and freshmen students. They found that nutrition education was implemented inadequately in countries such as the USA, Europe, Australia, the Middle East, and Africa from the data examined in the review. Thus, the lack of adequate nutrition education affects the competency level of practitioners to provide patient care

Danek, Berlin, Waite, and Geib, [18] in a qualitative interview survey of medical students, residents, and physicians at a Midwestern medical school, participated in one-on-one, and focused group sessions, to evaluate the efficacy of the current levels of nutrition training, and ways to improve program curriculum. The NVivo qualitative software was used to analyze the coded data collected. Findings reveal the medical students felt that their nutrition education was poorly integrated into the curriculum. Danek et al. [18] further stated the participants expressed dissatisfaction during shadowing experiences. They observed little nutrition counseling implemented to patients, coupled with outdated nutrition information for patient care.

2.4 Lack of Nutrition Competency and Health Ethics

Nutritional skills, eating habits, and competency levels are paramount for university students and for their patients' education after training. Howard, Edge, and Munro [3] stated that a sound nutritional background offers the foundation that helps people despite their age to make wise choices in their eating habits. Hence, university students who eat foods because of personal preference, and taste, and not because of nutritional benefits, set a bad precedent for their

patients and need to be educated on nutrition for better health. Physicians who work for long hours often eat what is available to them in the presence of their patients, which are often junk foods low in nutrition.

Scientific evidence has shown that there is a growing demand for physicians to provide pertinent information and counseling sessions for patients who suffer from obesity and poor dietary practices that contribute to the massive public health and economic burdens. A curriculum that facilitates pedagogies, technologies, and competency-based assessment is recommended. Thus, the recommendation is made for reforms with a robust nutrition education and training program for physicians, who would adequately prepare them to cater to the needs of their patients, by providing counsel in nutrition education, and incorporating nutrition as the catalyst to patient care [19].

Emily, Hargrove, Berryman, Yoder, and Beverly [20] in a descriptive cross-sectional study with first- and second-year osteopathic medical students' assessed the nutrition knowledge, and attitudes toward nutrition counseling of future practicing physicians. The assessments used were a combination of questionnaires and a quiz related to the variables listed. Findings reveal that 257 students participated in the study with 139 first-year, and 118 second-year students. The school's passing rate was 72.5% compared to the average scores of the quiz for the groups were 69.5 % and 74.2 % (based on 100%) respectively for the first and second-year students, which demonstrates somewhat mediocre nutritional knowledge.

Schreiber and Cunningham [21] in their reviewed study of the teaching hours for the six years of training for The Royal College of Surgeons in Ireland-Bahrain (RCSI-B stated that American physicians feel that they do not adequately receive training to provide nutritional counseling. Schreiber and Cunningham added that the number of teaching hours in American medical schools is falling below 15 hours of the 25-44 of the National Academy of Sciences and nutritional education recommended hours.

RCSI-B is one of many schools with this problem and recommends that the required teaching hours be implemented into the curriculum to adequately prepare physicians so that they can effectively provide counsel for their patients.

Lepre, Mansfield, Ray, and Beck [22] say 11 million deaths are related to a sub-optimal diet. "While medically trained clinicians are well-placed to provide nutrition care, medical education remains insufficient to support clinicians to deliver nutrition advice as part of routine clinical practice" (p. 1).

The lack of adequate nutrition education for medical professionals is now a global challenge. In a national cross-sectional online survey conducted between September 2019 and January 2020 in Australia with 195 medical students from 20 Australian medical schools. The survey reported revealed moderate nutrition knowledge among the students. Additionally, Australian medical students indicate the need and importance of nutrition education but only low to moderate nutrition knowledge and skills are provided [23].

3. FINDINGS

Overall findings revealed there are great disparities between nutrition education, physicians' competency, and the quality of the information provided for medical students to care adequately for patients. This conclusion was supported by numerous peer-reviewed studies. Many medical institutions have failed to provide adequately their medical practitioner, and students with essential skills in clinical nutrition, patient counseling, motivational interviewing, the performance of nutritional assessment, and other related resources. In this contemporary era with a myriad of nutritional disorders, universities, nationally and globally, do not adequately train healthcare practitioners in nutrition education to deal with the prevention and management of non-communicable diseases such as diabetes, hypertension, and heart diseases [8].

This deficiency in nutrition education among medical schools and physicians has brought to light a needed reform in nutrition education in medical schools so that physicians can provide adequate patient care. Evidence from the studies reviewed has also proposed that stakeholders and curriculum developers implement a robust plan to better equip medical students and physicians in all areas of nutrition education for adequate patient care.

The *andragogy* nutrition educational blueprint used for medical schools and physicians to adequately train for proper patient care is inadequate. Globally, many accredited universities deliver 25 of the 44 recommended hours of nutrition education. Some universities, including those in the Caribbean, fall into this bracket with others still below 19 hours. See Fig.

1. Medical students, physicians, and other critical frontline healthcare workers are unable to provide pertinent nutrition and clinical information for their patients. This plight has caused patients to lose confidence in their physicians who are unable to answer questions, and provide adequate information related to lifestyle diseases, portion sizes, recommended dietary allowance, and other clinical nutrition issues [24,25] .

The PRISMA guidelines were implemented as a reference during the process of the systematic review since there was no registration protocol followed during the process. The procedure began in 2018 during the preparation for the proposal of research, but due to the Novelty Corona Virus COVID-19, the plan was aborted and a systematic review was proposed. Thus, the course began in April 2020 and concluded in August 2020. The systematic review was conducted using studies from databases and citation indexes that include Embosses, PubMed, JAMA Network, Medline, Journals, reports of Symposiums, and news articles to ascertain evidence-based data. Literature from 2010 to 2019 was included; various search phrases such as nutrition education for physicians, nutrition competency of medical students, competency level of health professional in nutrition, clinical nutrition competency for doctors, and nutrition education for physicians to provide optimum patient care were used to find applicable articles. Both full-text and abstract articles were reviewed.

3.1 Data Analysis

The literature was analyzed in a robust manner by the researcher to capture relevant information regarding the topic evaluated. Two specialists from the United States and Haiti respectively reviewed and made their contribution to the authenticity of the findings. The data revealed that limited didactic hours allotted to nutrition medical education are insufficient and contribute to the lower nutritional competency levels of physicians and medical students in patient care.

4. CONCLUSION

The plethora of evidence showed in almost all of the studies scrutinized, physicians and medical students agree that the training received is inadequate to care properly for their patients.

The findings reveal that many reputable universities globally do implement the required teaching hours for proper orientation in nutrition education. However, these required hours are not enough. Many physicians are unable competently care for the nutritional needs of their patients, and in some instances, physicians give conflicting nutrition information obtained from untrustworthy sources of reference.

Nutrition competency among physicians is therefore a challenge and an area that is neglected greatly by those at the helm of the *andragogy* implementation of training for physicians. Many physicians and medical students agree that they are indecisive in many areas of nutrition education because of the limited didactic nutrition education for adequate patient care. More nutritional educational resources must be provided for physicians and students so that they can provide optimum care for their patients.

5. RECOMMENDATION

Physician competency improvement in nutrition needs to be remedied to serve the nation's population. It is imperative that greater emphasis is placed on lifestyle medicine rather than pathology for adequate patient care. The satisfactory patient care, and an adequate didactic approach, coupled with a comprehensive nutrition education curriculum, are lacking in medical students' and physicians' training and need urgent attention for adequate patient care.

Adams, Kohlmeier, Powell, and Zeisel, [1] noted there is a free online Nutrition in Medicine (NIM) project designed to improve physician skills and to provide clinical relevance and evidence-based medical nutrition information for adequate patient care. Medical practices should encourage medical providers to complete continuing education in nutrition since they did not receive adequate knowledge in medical school.

Undergraduate and medical school education needs to be reformed to provide more emphasis on the "well care" of patients including nutritional guidance to prevent chronic conditions such as obesity and heart diseases and others related to nutrition disorders and diseases.

6. SUMMARY

The systematic review of the competency level of physicians and medical students in nutrition education was conducted by the researcher at the University of Guyana, Turkeyen Campus. There were several studies selected for the

review, and twenty-five (25) of the studies were examined for the systematic review. The methodology involved searching a number of studies using search phrases such as nutrition education for medical students and physicians, nutrition competency level of the health professional, clinical nutrition competency, and nutrition care for patients.

Ninety-eight percent of the data examined in this systematic review showed that physicians and medical students receive minimal or basic *andragogy* and training in nutrition education at tertiary institutions globally. This has led to a lack of competency level in nutrition education for optimum patient care. The purpose of this systematic literature review is to report what is found in the literature concerning this issue.

The review demonstrated there is a gap between nutrition education received by physicians and medical students, and their competency level, for patient care. The evidence also supports the notion that limited contact hours implemented in didactic delivery contribute greatly to the quality of nutrition education received by physicians and medical students.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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