


2019

NUTR455: Advanced Nutrition and Human Metabolism- A Peer Review of Teaching Project Benchmark Portfolio

Sathish Kumar Natarajan
University of Nebraska - Lincoln, snatarajan2@unl.edu

Follow this and additional works at: <https://digitalcommons.unl.edu/prtunl>

 Part of the [Higher Education Commons](#), and the [Higher Education and Teaching Commons](#)

Natarajan, Sathish Kumar, "NUTR455: Advanced Nutrition and Human Metabolism- A Peer Review of Teaching Project Benchmark Portfolio" (2019). *UNL Faculty Course Portfolios*. 144.
<https://digitalcommons.unl.edu/prtunl/144>

This Portfolio is brought to you for free and open access by the Peer Review of Teaching Project at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in UNL Faculty Course Portfolios by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

NUTR455: Advanced Nutrition and Human Metabolism: Peer review of teaching Project Benchmark Portfolio

Sathish Kumar Natarajan

Assistant Professor

Department of Nutrition and Health Sciences

University of Nebraska-Lincoln

Table of Contents

Abstracts	3
Course Description and Broader curriculum.....	4
Teaching Methods and course activities: 5	5
Analysis of Student Learning: 7	7
Objective 1: Help and prepare students for class preparation using in-class clicker questions.....	7
Objective 2: Improve students learning and exam grade points by review session.....	8
Objective 3: Examine students' knowledge on poster presentation for scientific communication.....	10
Highlight of general student comments	12
Future directions to improve the course.....	13
Summary and Overall Assessment of portfolio process	13
Appendices	14

ABSTRACT:

INTRODUCTION:

NUTR455, Advanced Nutrition and Human Metabolism is a capstone, ACE 10 course for undergraduate seniors in nutrition and health sciences that I teach in spring semesters since 2017. Among the 3 classes that I taught, spring 2019 class did awesome job in their overall performance, in-class participation, and in-class exams and in their final poster assignment.

QUESTIONS:

We analyzed three questions to as part of this teaching benchmark portfolio. 1) The role of in-class iClicker questions in improving student students understanding the key concepts and test whether it motivates the students to study course materials; 2) Tested whether review session impacted/improve student learning experience and 3) we also examined whether draft poster peer review of poster helped them improve final poster project.

RESULTS:

We found solid evidence from student response for in-class clicker questions motivates students to prepare and aids in understanding course materials. Further, review session prior to each exam facilitated and improved student preparation to obtain higher grades. Also students who attended review session significantly improved and obtained higher grades compared to students compared to students who did not attend the review session. We also found evidence that draft poster peer review significantly impacted and helped improved final poster assignment and helped improved final poster grades.

CONCLUSION:

In conclusion, in-class clicker questions, review session and draft peer review of poster profoundly impacts student learning experience and improved their overall grades in the exams and final poster assignments.

KEYWORDS:

Draft poster peer review, in-class clicker questions, review session

Course Description:

NUTR455, Advanced Nutrition and Human Metabolism, is a senior capstone, ACE 10 course for nutrition and health sciences, Nutrition and exercise science, dietetics and food science and technology major students at the University of Nebraska-Lincoln. The overall goal of NUTR455 course is to make students aware of the biochemical, physiological aspects of human nutrition. We cover a broad knowledge of food borne nutrient digestion, absorption, their transport processes and their cellular metabolism during normal and disease state. We also learn to describe the relationship of particular nutrient's function during over nutrition and under nutrition state and how these altered levels of consumption results in the development of chronic diseases. The course objectives of NUTR455 fits with the mission of the Department of Nutrition and Health Sciences. Further, this capstone course prepares and helps students to accomplish to obtain admission in pre-health school and helps them excel in their future professionals schools with nutrition and metabolism classes.

The mission of Nutrition Science major "The Nutrition Science option provides students an opportunity to intensively study the biological and physical sciences as a basis for understanding the science of nutrition. This "pre-health" option prepares students for admission to medical, dental, nursing, physician assistant, pharmacy, chiropractic and optometry schools" <https://cehs.unl.edu/nhs/programs/nutrition-science/>

Foundation: The books that we choose to teach the advanced nutrition and human metabolism starts by laying foundation to the cellular structures and subcellular role in human metabolism. The portion for first exam, we teach and make our students to recall their knowledge from what they have learned in their sophomore, life science, biochemistry and human physiology classes. These topics taught in first exam portion connects the instructor with the students. On the side note, students think that this is an easy course and give less attention and details in the second exam with human metabolism core concepts.

Course Broader Curriculum:

Course Goals.

Goal #1: Main course goal for my students is to describe the major metabolic event in different organs and in their cells and how nutrients, we eat help shape our metabolism and their critical requirement at various stages of human life. The important things to know: develop knowledge on human nutrition absorption and energy metabolism that happens during fed state, fasting state and post absorption states. Further, I also want my students to know that how nutrient and energy metabolism work during resting time and their shift in producing energy during endurance physical activity to meet the demand of a particular exercise.

Goa #2: My course goal also include developing knowledge about understanding peer-reviewed scientific journal publications and develop my students to critically assess and present the new scientific information to fulfill the gap in knowledge.

Goal #3: Impact students with nutrition related concepts and help them retain a healthy lifestyle practice. I also wanted my students to retain this knowledge from the class towards a healthy lifestyle practice and impact them and their family. Further, we also discuss and study about the change in nutrient metabolism with the consumption of high-fructose corn syrup and alcohol. The consumption of alcohol alters your gut microbiome, nutrient transport systems like Iron transporters and alter imposes the liver to do the clearance of alcohol by utilizing acetate for the production of lipids and results in alcoholic fatty liver diseases. These

knowledge could impact healthy lifestyle practice and expected to impact my student and their immediate family members.

Rationale for this course:

I teach both undergraduate (this course) and graduate student course on the complications of maternal obesity. I feel like the graduate students are more dedicated and enthusiastic in learning their material. Further graduate students will enroll in a class that will directly help them learn or develop in-depth knowledge and the graduate student's class material involves the cutting edge state of the article published in top-tier journals.

I have my heart and soul for undergraduate education, since this course is a capstone course and my job is help them recall and make them best in nutrient metabolism and concepts for their future employment or professional school admission. Further, I realized some students in my class struggle to get through the material in-class and I wanted to help as well as and bring them equal to the level of highly successful students of my class.

Key goals of this portfolio development:

Make an impact to my students learning outcome and use this to document my teaching to the promotion and tenure.

Teaching Methods and course activities:

What sort of course portfolio I would like to create?

This portfolio should provide a broad overview and three aspects of my advanced nutrition and human metabolism course such as the role of in-class clicker questions, role of review session in exam grades, how peer review helps students to improve final poster project.

What teaching methods I am using during my contact time with students?

The teaching methods of my choice is the combination of detailed lectures and in-class questions and discussion session. I usually encourage students to ask question during the lecture and have an informal presentation for the effective participation. I strongly believe the art of questioning helps the students and entire class students in understanding the concepts much better. Also, I believe that reading is not only education, however, recalling the concepts is also education. During the contact time, I use the white board to write the agenda and important concepts to be learned for the day and will have summary of discussion at the end of the class, re-calling the critical points of the day. Further, I always stay back after my class lecture time in the same room to answer any questions that students have about the class or if they wanted to go over the critical concepts again for the better understanding and to improve their learning experience in my class, NUTR 455. This usually takes more time, however I enjoy and feel happy at the end of the day for helping my students to learn.

I also employ iClicker questions during the class contact time. iClicker questions is to test the concepts of the class lecture or related concepts that we learned in the week. iClicker questions are usually multiple choice questions and all the students will be able to provide answers and we will check the percentage of students respond to the correct answer. In my experience, most of the times the students respond to the correct answer, in the event of increased percentage of wrong answer, I would go over the concept again in-class to help my students learn, and understand and prepare them for future in-class exams, online quizzes, and iClicker questions.

What course activities outside of class I am using?

My students need to take 1) weekly online quizzes, 2) reading assignments, 3) submitting a student card about them (their personal professional interest beyond the class objective), 4) work on selecting scientific topic and five articles related to their topic of interest, 5) write synopsis for each of the five articles and 6) final poster as a collective information from all the five peer-reviewed research articles.

1. The purpose of student card is to learn my students' personal interest and to connect personally and serve for their need-based mentor to help and impact their career. I believe that as an instructor, if my students are successful in achieving their future goals that will make me the happiest person in the world.
2. Writing the synopsis of each of the five articles is to help their final poster assignment and the final poster assignment is related to two of the course objective and a critical requirement for this ACE10, capstone course for the Nutrition and Health science majors.
3. The class also has reading assignments on disease perspective from the textbook is related to the applied concepts related to the in-class learning. These reading assignments on perspective is related to the objective of incorporating healthy nutrition principles into daily living and healthy lifestyle objective
4. I am also doing a review session on the evening of last class, before exam, where we discuss the concepts again and use the time to clarify any doubts that students bring to the review session.
5. Draft peer review of poster final poster. The peer-review of assignment helps a lot for students to learn and helps them to improve their poster. Further students also get idea from their peer to improve the presentation of poster project.

What course materials are I am using?

This course material is provided in the form of PowerPoint slides summarizing the concepts from the text book and students are encouraged to take class notes. I would always post my slides and lecture notes 16-24 hours prior to the class time. It is my belief that we help improve students learning experience. In addition, the reading assignments from the text books should help them answer exam and quiz (multiple choice questions) and essay type questions in the class exams.

I encourage students to mainly understand the concepts by describing or walking through the illustrated figures of the lecture slides. By doing this student should be able to prepare better for the exams. I also encourage my students to work with a partner in-class or study in groups, because verbally discussing the materials to each other helps learning and peer-teaching is another form of better learning. I learned this from my fellow colleague's in the Department of Nutrition and Health Sciences.

What is the rationale for the methods I have chosen?

Introducing new concepts during in-class lectures is an effective form of learning and at the same time have opportunity to help students clarify the concepts. Poster assignment, synopsis writing with constructive feedback from me to students and class assignments were critical for the improvement of learning experience in my NUTR455 class.

How my choices correlated with the broader curriculum or teaching objectives?

All of the methods that I employ in-class and outside of my class are related to the broader curriculum and the course objectives described in the syllabus. The course has pre-requisite of biochemistry 321 or parallel. In my experience students who are taking basic biochemistry course in parallel are the students who struggle

to excel compared to the students who has taken basic biochemistry course in prior semesters perform better due their background knowledge in biochemistry and metabolism.

This is an ACE10 required course for nutrition major students. This course would prepare pre-health and nursing students with their future nutrition, cell biology, biochemistry, and metabolism courses.

Analysis of Student Learning:

Objective 1: Help and prepare students for class preparation using in-class clicker questions:

Clicker questions impacts student learning experiences: As an instructor, my main job and responsibility is to help my students to learn and better understand the concepts. I usually post my lectures and in clicker questions the previous day to prepare my students ahead for the questions. Clicker questions are posted 16-24h prior to the lecture and it is usually a challenge question and often requires the students to read the text book and lecture slides. These clicker questions are tested in-class questions and would have 0.25-0.5 point for the correct answer. Also I use clicker questions to check my class student attendance and would give points for attending the class irrespective of their answers. We also assessed the whether clicker question helps them prepare for weekly quizzes and understand key concepts via the midterm and term evaluations. The response rate from students suggested that majority of responded students suggest that in-

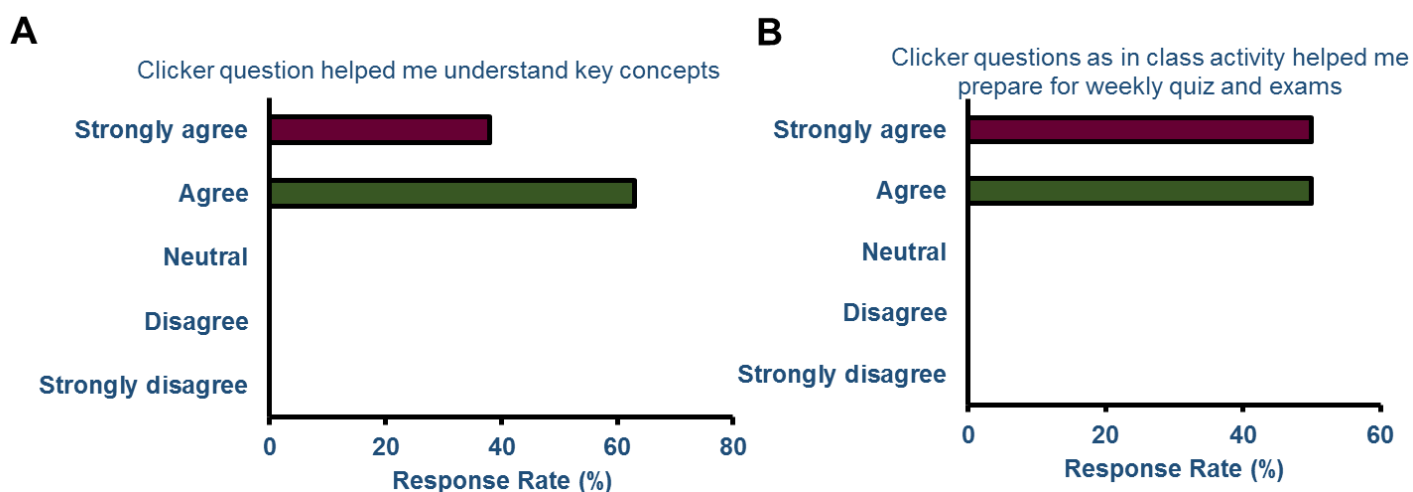


Figure 1: Clicker questions impacts student learning experiences: Thirty seven percent of students strongly agree and sixty three percent of students agree that in-class clicker questions helped them understand key concepts (A). Fifty percent of students strongly agree that clicker questions helps them prepare for online quizzes and exams. Data expressed as percent response rate among the students who participated in the quiz, n=9. Total number of students enrolled in class is 24.

class clicker questions helps them understand key concepts (Figure 1A). Further the students strongly agree (50%) and agree (50%) on how clicker questions specifically helped them prepare for weekly quizzes and exams (Figure 1B).

1.2 In-class clicker questions motivates student to prepare and aid in understanding course materials: Similar to the understanding of key concepts, eighty eight percent of students who responded to the evaluation quiz suggest that clicker question helped them in understanding the course materials (Figure 2A). In addition, the questions posted previous day motivated the students to prepare for the class lecture. However, twenty seven percent of students expressed either neutral or disagree that they would not have looked at the slides or read the book in preparation of class lecture suggesting that these one third of students are highly motivated students of my class (Figure 2B). As an example, four of my students in the class were recognized by the College of Education and Human Sciences (CEHS) student distinction reception. Since the evaluations were anonymous, we could not correlate highly motivated students are indeed the student who disagree with clicker questions helped them prepare for quizzes and exams. Further,

this class is by far the best class compared to my previous two classes of NUTR455 that I taught in spring 2017 and 2018 semesters. Also for most of students, in-class quiz question via clicker gave a positive break from this lecture heavy class as observed in the student response (Figure 3C).

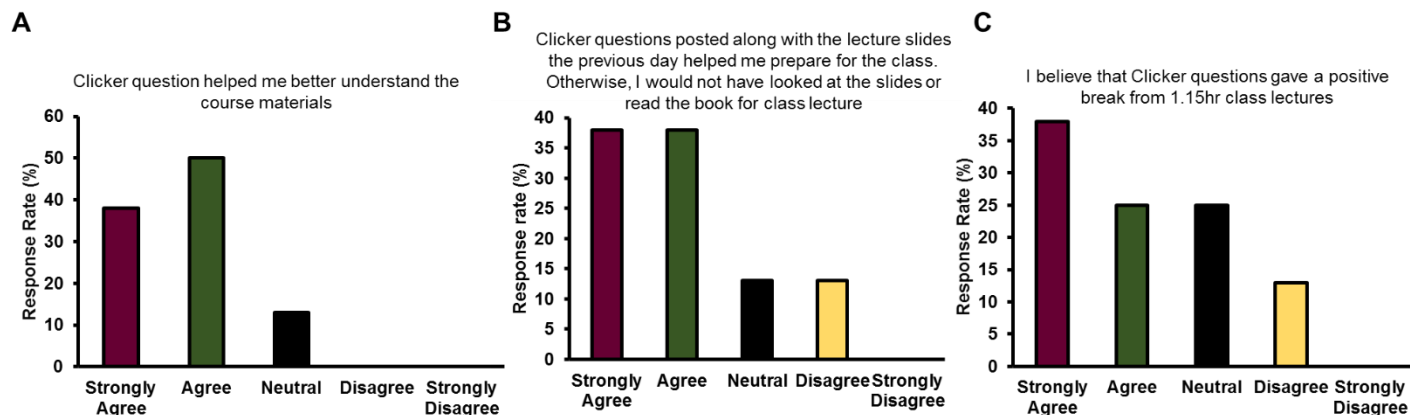


Figure 2: In class clicker questions motivates student to prepare and aid in understanding course material: Thirty eight percent of students strongly agree and fifty percent of students agree that in-class clicker questions helped them better understand the course materials (A). Majority of students (Sixty three percent) either strongly agree or agree that clicker questions helps them prepare before the class. (B). Most of the students believe that clicker questions gave a positive break in class (C). Data expressed as percent response rate among the students who participated in the quiz, n=9. Total number of students enrolled in class is 23.

1.3 Evidence from student comments about in-class clicker questions:

The following are the response from students in midterm evaluation about in-class clicker questions. These response suggests and demonstrate that in-class clicker questions motivates to prepare for class lectures and helps them understand key concepts.

Student a Comment: "I like the clicker questions, it keeps me engaged in the lecture"

Student B Comment: "I like that we have clicker questions to practice with and that you hold review sessions. I really appreciate you giving up your own time to help us review."

Objective 2: Improve students learning and exam grade points by review session

2.1 Review session before each exam

Apart from the class schedule, students are encouraged to attend review session for this class. Review sessions held at 42 Filley Hall at 6 PM. Review session is to clarify doubts on the exam portion and will include peer discussion on specific topics for the upcoming exam with the instructor. The purpose of the review session is to maximize student learning from the class material in preparation of exam. Five review sessions were held on the following dates

- a. Exam 1 review session: Jan 24, 2019, b. Exam 2 review session: Feb 12, 2019, c. Exam 3 review session: Mar 5, 2019; d. Exam 4 review session: Apr 2, 2019; and e. Exam 5 review session: Apr 25, 2019

2.2 Review session facilitated and improved student preparation for higher grades. All the review sessions were conducted and facilitated by the instructor. The students wrote study questions or study guides for exams that were discussed in the review session (Appendix A). These topics were student-driven and not instructor-driven topics in the review session. Further, the appendix A has notes from two students and both of them are completely different from each other. Since students are bringing the questions and discussion topics, we end up going over most of the major pathways and important concepts for the exam. This might seem boring for the students who have already mastered some topics, however, the purpose is to help all students, we feel it is okay to have them listen to repeated information for the student who needed to understand a critical concept. It is my teaching philosophy that reading is not only a way to educate students, however, recalling the critical concepts is also education.

NUTR455 course exams are not comprehensive, however, we carry the information and build our knowledge along our way to the final exam. For example, during exam 1 we learn that glycogenolysis (glycogen breakdown) and glycogen synthesis occurs in the cytosol of hepatocytes and in exam 2 portion, we would learn the biochemical steps of glycogen synthesis during the fed state or after meal intake. In exam 3 portion, we would learn how glycogen synthesis is blocked in the fasting condition and at the same time glycogen breakdown provides glucose from the liver for other major organs like the brain. These concepts were made clear in the review session and help my student to better understand and relate their previous exam portions.

When students were asked whether a review session is a useful addition, 63% of students agree or strongly agree (Figure 3A). Also, a review session was very well received by the students and 75% of students felt that a review session helped them to study and improve their exam scores (Figure 3B). 75% of students who responded also think that the review session helped them to focus on material that is critical for exams. However, 13% of students were neutral and disagree, respectively, with a review session helping them identify material to focus more for exams (Figure 3C). Since we don't see any disagreement with the review session improving their exam scores and being helpful, I believe that the students who disagree on what material they wanted to focus more could be the students of high competence. Further, these students might have high expectations of themselves and might critically follow objectives of class posted and discussed in class lectures. An example objective slide is attached as Appendix B.

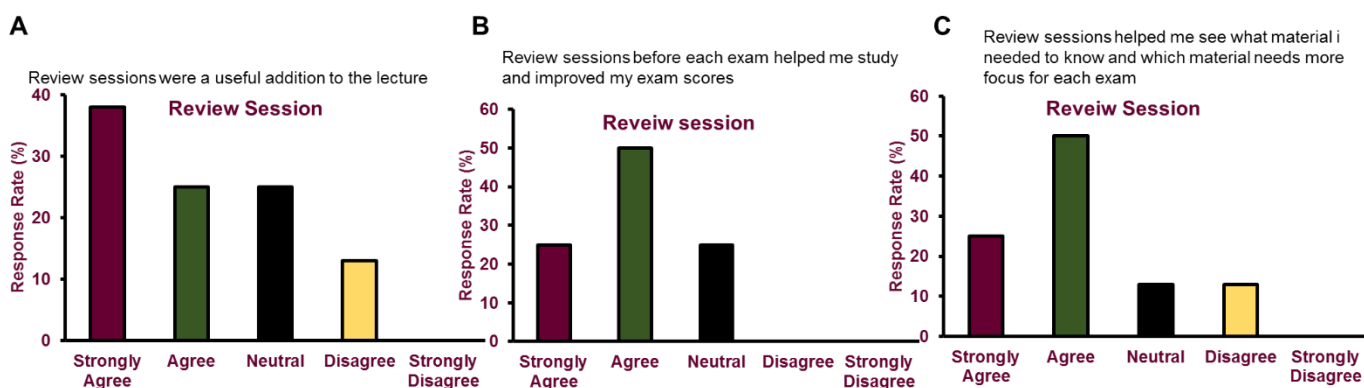


Figure 3: Review sessions facilitated and improved student preparation for higher grades. Sixty three percent of students strongly agree and agree that review sessions were helpful additions to lectures (A). A majority of students (75%) either strongly agree or agree that a review session helps them prepare and increase exam scores (B). A review session helped students to know the material to focus for exams (C). Data expressed as percent response rate among the students who participated in the quiz, n=9. Total number of students enrolled in class is 23.

2.3. Comparison of student's grade with respect to review session attendance: The overall average grade of students who attend the review session were generally higher than the average grades of

students who do not participate in review session of the course. For this benchmark portfolio, we analyzed the student's grade for exam 5 or final exam in relation to the review session attendance. Table 1 summarizes that the average grade for students who attended the review session. The students who attend review session tend to obtain higher grades in exam 5 compared to the students who do not attend the review session for exam 5. We further analyzed the difference in grades obtained in final exam by removing

TABLE 1: Comparison of exam 5 scores between the students who attended and did not attend the review session

the College of education and Human Sciences distinction and chancellors scholars in both groups from comparison. After removing the CEHS distinction and Chancellor scholars in both groups, the average grade points of students who did not attend the review session for final exam significantly decreased from 80.45 to 72.75, (T-test: $P < 0.0097$), however the grades points of students who attended the review session were unaltered (88.92 to 88.1, Table 1). These data suggest that the review session helps the students to maintain the exam grades especially to the student who are other than CEHS distinction and chancellors scholar. In summary, these data suggest that review session plays an important role in helping students to prepare for in-class exam.

	Exam 5 scores	Exam 5 scores (with out CEHS recognized distinction students, n=4)
Average scores of students who did not attend the review session	80.45 ± 16.5	72.75 ± 12.48
Average scores of students who attended the review session	88.92 ± 9.24	88.1 ± 8.24

2.4. Student comments on review session or study section.

The following are the response from students in midterm and term evaluation about the review session. These highlighted positive responses suggests and demonstrate that review sessions were extremely helpful.

Exam review session highlighted comments

Student C: "I like how much effort Sathish puts into the class and into his students. He wants us to learn and be successful in this course. The exam review and clicker questions are extremely helpful in the course and on the tests."

Student D: "I think it can be a difficult course depending on your effort on it. But the way it is designed currently makes it as stress-free as possible. Overall I enjoy the course."

Student E: "The material is interesting and you can tell the teacher cares about how you do in the class. Going to the study sessions is very helpful, but some students have jobs and other commitments outside of class."

Response implemented in the course: I posted review session questions and discussion on study guide in the canvas module section for students who could not attend (Appendix A). I also made announcement about appendix A in the canvas to let every student know about the discussion topics of review session.

Objective 3: Examine students' knowledge on poster presentation for scientific communication.

The assignment will demonstrate a comprehensive competence of nutrient metabolism; the scientific method; statistical analysis; evaluation and interpretation; communication and presentation; and delivering a final message to a lay audience. The poster presentation is among the most common forms of scientific communication at professional meetings and for delivering health concepts to lay audiences. The poster allows for direct face-to-face discussion between the author and individuals seeking to understand health information. Because the information is presented in a visual format, the poster helps facilitate discussion, understanding, and exchange of ideas in ways that written articles cannot.

Synopsis to help students to identify key data for poster project: Synopsis of each article selected should be submitted as a weekly assignment. Synopsis should be no more than 250 words/article in your sentence. The students will have to choose 5 research articles and write synopsis and identify key data to use for their poster project. This poster assignment serves as a requirement for ACE10 class and students prepare a poster regarding current health issues. You can choose the current topic in nutrition and the students are encouraged to select a topic that they are passionate.

3.1 Poster Peer Review of Draft module helped students to improve their final poster grades: Draft poster assignments were peer reviewed for feedback using the rubric provided at the end of this syllabus. Instructor used the same rubric to grade final poster assignment. This assignment was due one month before the final poster assignment due and two students peer reviewed the poster anonymously (double blinded) in the canvas. I am pleased with the constructive comments by peers to improve their peer's final poster were extraordinary and outstanding. Students were given 10 points extra credit as a reward for their time and effort to help improve their peers poster. We have chosen few example poster projects and comments made by the peers to improve their peer's final posters. The grade points obtained for draft poster submitted by a student X (**Appendix C**) graded by peer (student Y) was 68 out of 100. The comments provided by the peer is attached in **Appendix D**. The student X dramatically improved his/her poster and submitted a final poster that was graded by instructor and scored as 98/100. This dramatic 30 point improvement in final poster grade is a significant impact to the student X. The student Y also peer reviewed another draft poster on "vitamin D and cancer" and gave 90/100 score (**Appendix D**). The vitamin D and cancer poster significantly improved based on the comments provided by student Y and scored 98/100 in the final poster assignment graded by the instructor.

Student T's draft poster (**Appendix E**) scored 76/100 graded by a peer and the comment are included as **Appendix F**. As indicated in the **appendix F**, this student had unacceptable take home message and mediocre presentation of research data. The student T's graphs were somewhat accurate and are difficult to interpret and included only 3 data from three articles rather than 5 data from five different articles in the draft poster module. Student T improved his/her final poster (**appendix G**) grade to 90/100 from 76/100 points in the draft module by peer.

Ms. Seanna Block submitted a draft poster module (**Appendix I**) without the impact of nutrient section and gaps in the knowledge section. Both of her peer's commented on this and made seanna aware of her mistake and the peers scored the average 67 for her poster draft module. Ms. Seanna block is one of the best student in my class with all her exam grades, in-class clicker response and online quizzes. Ms. Block stayed after class on Thursday to clarify and discuss about her peer's assessment and took the final poster assignment as a challenge and made great strides to improve her poster. She obtained 100/100 in her final poster (**appendix J-Block Re-attempt**) with fantastic gaps in knowledge and impact of Vitamin D deficiency in dementia. Further, Ms. Block improved her aim of the study, characteristics of dementia, above and beyond in Figure 2-4 data description and in clarity of the final poster. These were above and beyond compared to her peers in class.

The average grades for draft posters by the peers were 86.15 ± 9.45 (mean \pm SD, n=24) and the average grades for the final poster graded by the instructor were dramatically increased to 93.04 ± 8.74 (mean \pm SD, n=24). This increased final poster grades compared to draft module were statistically significant, **T-test: $p < 0.002$** . In summary, draft poster module and peer review of draft poster modules helps students to significantly improve their final poster grade.

3.2 Evidence of poster peer review impacting student final poster outcome: 88% of students who responded to the term evaluation think that poster peer review process helped them to understand the expectations of final poster. 50% of students responded that peer review process impacted them to improve their final poster based on the constructive critiques provided by their peers (Figure 4). A Small percentage of students reported that a disagreement on whether peer review comments significantly improved their final poster assignment. This small percentage of disagreement could possibly because students who scored less compared to the peer review; mainly some peers reviews did not follow the rubric and graded 100/100 despite several mistakes in the final poster and this appeared in the final poster, when instructor was grading the final poster. To avoid this problem, we think that instructor should also grade draft poster and provide constructive criticism to improve students final poster. One of the student commented (*student K comment in 3.3*) that the additional inputs from instructor on draft poster would be a valuable and would significantly improve learning experience for the final poster project.

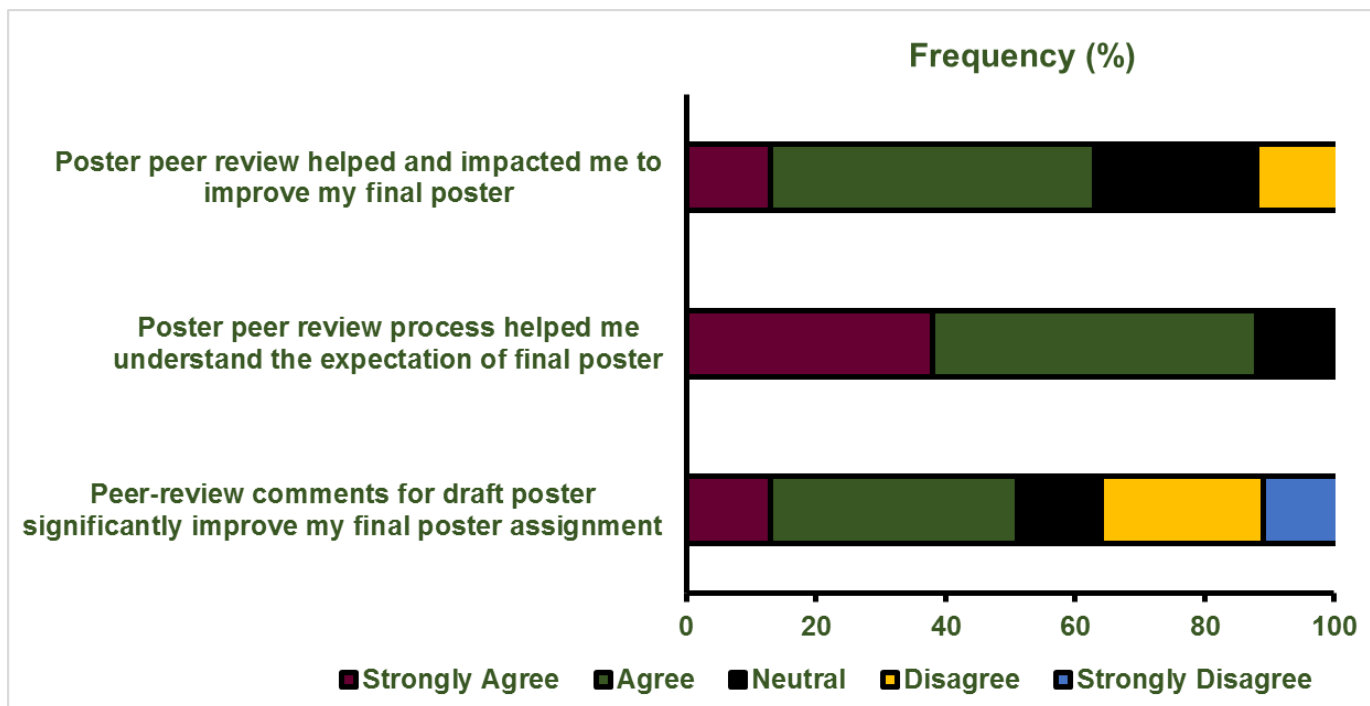


Figure 4: Student perception of how poster peer review impacted their final poster. Data expressed as percent frequency from students who participated in term evaluation, n=9. Total number of students enrolled in class is 23

Highlights of general student comments.

Student F Comment: “Really enjoy the in depth biochemical information provided. The more we know about the biochemical pathways of the body, the better chances we have an understanding the essence of nutrition.”

Student G Comment: “The lectures can be a little long winded or boring at times. But I think that comes with the material we are covering. Depending on each student's career goals or interests, the material we cover is either going to be extremely interesting or extremely boring”

Student H comment: “I like this course a lot as it ties everything I've learned over my undergraduate career together and makes me use all my knowledge and skill.”

Student I: “I enjoy the course and learning more and more with nutrition and how to apply previous knowledge that I've already learned.”

Student J comment in an email: “I just wanted to say thanks for a great semester, I was able to make connections from previous classes that I have taken and put everything together in a whole picture and really understand it and also better my skills at looking at dissecting scientific articles to get a better understanding of what they are trying to say as well as pick out ones that are meaningful. Thanks again for a great semester.

Student K comment in term evaluation: “for the draft poster I don't think we should solely rely on peer review, I think we could get a lot better feedback from you on the draft.”

Future directions to improve the course:

- Post study guide prior to the review session.
- Assess the effectiveness of weekly synopsis assignment to help student understand the scientific method and interpret various sources of nutrition information
- One-on-one meeting to discuss synopsis 1 assignments and instructor grade the draft module poster as student comment to provide constructive criticism to help improve their final poster assignment.
- Have a free day for snow cancellation, possibly remove the class on thermodynamics because we cover parts of this portion again in the physical activity and sports nutrition chapter for exam 4. Make sure not to use exam question on the removed section for that class
- In addition to peer review, Instructor should also review and give constructive critiques to improve draft poster project

Summary and Overall Assessment of portfolio process

In summary, the in-class clicker questions, review session and draft peer review of poster profoundly impacts student learning experience and improved their overall grades in the exams and final poster assignments. This benchmark portfolio helped me to document and analyze the impact of my students learning outcome/experiences in my NUTR455 course and it was a great rewarding experience to me.

The impact of review session in helping everyone including outstanding students or CEHS distinction scholars was not a surprise. However the review session did help all of my class students irrespective of their previous performance in other classes. When we removed the outstanding students or CEHS distinction scholars from the analysis in table 1, we found that review session helps in maintaining the exam grades if you attend them compared to non-attending students. This is a rewarding achievement to me and motivates me further improve my teaching style and encourages me to plan and implement novel innovative approach to improve my students learning experiences.

I am so grateful for the peer review of teaching program personals for this giving this opportunity to analyze my teaching style, assess the outcome by using backward design and it is truly an amazing experience to me. Further, coming to retreats and small group meetings made me realize that we have strong teaching community and everyone wants to improve their teaching methods and thrive to impact students learning to the best of their students. The biggest challenge to us was make our student work hard despite their other class load and interest to the subject.

Appendices

Appendix A

Review Session for Exam 3:

Notes from student #1:

Phenylketonuria describe it and know the Defects of urea cycle enzyme

Effects of high sodium intake

Sickle cell anemia-protein structure hemoglobin

Difference between endogenous and exogenous lipid transport

Chylomicron formation

Functions of TAG

As long as we eat we will always have LDL high. After heavy exercise, we push our bodies toward starvation mode.

Chapt6_1 TRUE/FALSE Questions Slide 24: 1=T; 2=T; 3=F; 4=F

Know that Chylomicrons are the largest in size, then VLDL, then LDL then HDL

-Know where they are synthesized and where they go in circulation (Slides 39-42 Chap5_3)

Know the regulating enzymes for urea cycle (rate limiting enzyme: arginosuccinate synthetase. Pg 188) and the link to proline metabolism

Amino acid involved in making nitric oxide is arginine by nitric oxide synthase

Fetus deficient in b-Hydroxyl acetyl-CoA dehydrogenase can lead to severe liver disease due to the accumulation of the substrate 3-hydroxy fatty acids in the placenta which are transferred to maternal circulation to cause maternal liver injury. Each beta-oxidation cycle, Fatty acid lose 2 carbon, acetyl coA.

Synthesis of Triacylglycerol & phospholipids figure 5.32 slide Chap5_3 slide 13

Don't forget to read info in the announcement area of canvas for before Exam 3!!

Know branching amino acids and why they are important, help in promoting muscle protein synthesis and increase muscle growth. BCAA: leucine, isoleucine and valine

Alanine and aspartate Aminotransferases in circulation is a measure of liver injury

Keto acids

Ketone body formation

Urea cycle and why it is important? Because if it isn't cleared it will damage the brain, hepatic encephalopathy

Arginine, look in the book for it

Structure of a peptide bond

Interactions between the bonds

Primary, secondary, tertiary, Quaternary structures

Know the alanine ->glucose cycle

Notes from student #2:

HDL - upregulated when you need cholesterol, if you don't need cholesterol it is not upregulated

What is raised during exercise? HDL

What is highest in circulation following exercise? LDL (always highest)

Postmenopausal women are more prone to heart attack than men of similar age - true

Cholesterol and phospholipids are secreted into bile

Which amino acid is responsible for sickle cell anemia? Know about the disease

Know urea cycle - not defects though! (what is the rate limiting enzyme (argininosuccinate synthetase - PAGE 188) and how proline metabolism is linked (TCA cycle))

How is nitric oxide made - through the amino acid arginine - second messenger

B-Oxidation - B-hydroxyacyl-CoA dehydrogenase - Step 3

Every single cycle you lose two carbon fatty acids as acetyl CoA - which goes to TCA

Branched chain amino acids are important in making new protein synthesis (leucine, valine, isoleucine)

Why is liver function test important? Hepatocyte injury results in leaked enzymes

Negative nitrogen balance = losing weight

Positive nitrogen balance = gaining weight

Know about atherosclerosis

Tertiary and quaternary have same structure

- Tertiary is within one polypeptide

- Quaternary is two or more peptide interactions

Milk is best - has all essential amino acids

Appendix B

Objectives

After studying the lecture and the assigned reading the student will be able to:

1. Describe the absorption of vitamin A and its role in vision
2. Explain the role of vitamin A deficiency in two forms of blindness
3. Describe the roles of vitamin D and K in health
4. Explain the mechanism of vitamin A and Zinc regulation of gene expression
5. Describe the effects of iodine deficiency on health
6. Describe the synthesis, action and regulation of thyroid hormone.
7. Describe the roles of Ca^{2+} , Mg^{2+} , Iodine, Copper, Selenium, and Molybdenum on health

CHARACTERISTICS OF MATERNAL OBESITY

- Obesity is a culmination of lifestyle factors as well as genetic predisposition (1).
- Maternal obesity inflicts many health complications upon the mother and her offspring, such as fetal macrosomia, pre-eclampsia, gestational diabetes mellitus, and fetal or infant death (5).
- Type 1 and type 2 diabetes, as well as a higher maternal age, increase gestational obesity rate.
- Maternal obesity is seen as a high risk factor for development of childhood obesity, increasing the likelihood by 1.5- to 4-fold. (3).
- These studies were conducted with the thought that maternal obesity and the side effects of it was associated with an increased incidence of their offspring developing obesity and obesity-related diseases (1,2,3,4,5).

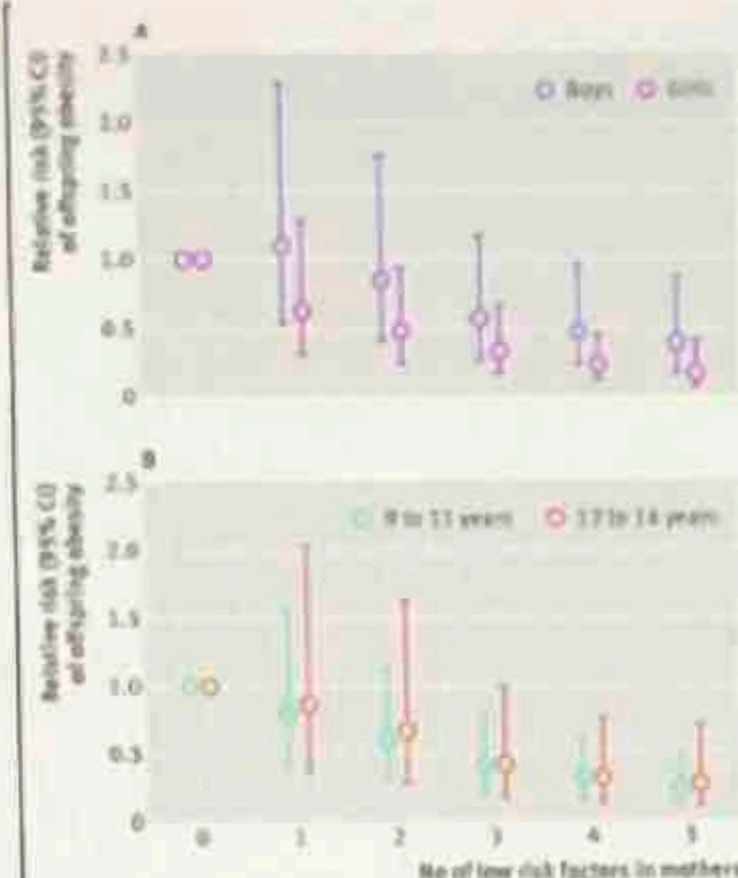
RESEARCH QUESTION

Do the complications of maternal obesity affect offspring, and if so, in what ways?

RESULTS CONT'D

**Need to make graphs for studies 2, 4, and 5.

RESULTS



GAPS IN KNOWLEDGE

- It is known that childhood obesity can lead to an increased risk in obesity-related disease and premature death, however, it is unknown if there is an association between maternal lifestyle factors in child's childhood an adolescence and incidence of childhood obesity (1).
- Research supports the hypothesis that offspring from mothers with type 1 diabetes have an increased likelihood of fetal and newborn complication, but it is unknown if obesity in type 1 and type 2 diabetic mothers increase their offspring's risk of asphyxia-related impediments (2).
- Human umbilical vein endothelial cells (HUVEC) are useful in observing metabolic phenotypes and gene expression in offspring; how does gestational obesity affect lipid metabolism and mitochondrial structure and function, as well as its side effects (3).
- Vitamin D deficiency is inherently common among pregnant women, but does significant gestational weight gain affect 25(OH)D serum levels to become deficient (4)?
- How do maternal, fetal, and newborn complication from obese mothers compare to those of normal weight mothers in Omani women and offspring (5)?

TAKE HOME MESSAGE

- Maternal obesity affects both the mother and her offspring in many ways, specifically through:
- Maternal lifestyle factors,
 - Positive correlation between incidence of newborn seizures and Apgar scores,
 - Altered gene expression for lipid metabolism and,
 - Low 25(OH)D serum levels.

	FFA	DAG	TAG	CE	PL
14:0	1.4	3.3	1.3	1.1	1.1
16:0	1.3	1.1	1.3	1.0	1.1
18:1	1.2	1.2	1.4	1.0	1.1
17:0					
18:0	1.4	1.1	0.9	0.9	1.1
18:1w9	1.2	1.1	1.3	1.0	1.1
18:1w7	1.2	1.2	1.2	1.1	1.2
18:2	1.2	1.2	1.7	1.1	1.1
18:3w6			2.2	1.0	
18:3w3	1.4		1.8	1.6	
20:3w6	1.2		1.2	0.9	1.0
20:4	1.1	2.0	1.7	1.0	1.1
20:5			1.1	0.7	0.9
22:4w6			2.1		1.1
22:5w6			1.8	1.3	1.1
22:5w3			1.8		1.0
22:6	1.1		1.2	1.0	1.1
Total	1.2	1.1	1.3	1.0	1.1

* Increased in ov-ob. P<0.05

Increased >20% in ov-ob

Decreased >20% in ov-ob

REFERENCES

1. Dhana, K., Haines, J., Liu, G., Zhang, C., Wang, X., Field, AE.,...Sun, Q. (2018). Association between maternal adherence to healthy lifestyle practices and risk of obesity in offspring: results from two prospective cohort studies of mother-child pairs in the United States. *BMJ*, 362: k2486. doi: [10.1136/bmj.k2486](https://doi.org/10.1136/bmj.k2486)
2. Cnattingius, S., Lindam, A., Persson, M. (2017). Risks of asphyxia-related neonatal complications in offspring of mothers with type 1 or type 2 diabetes: the impact of maternal overweight and obesity. *Diabetologia*, 60(7): 1244-1251. doi:10.1007/s00125-017-4279-2
3. Costa, SMR, Isganaltis, E., Matthews, T., Hughes, K., Daher, G., Dreyfuss, JM.,...Patti, M. (2016). Maternal obesity programs mitochondrial and lipid metabolism gene expression in infant umbilical vein endothelial cells. *International Journal of Obesity*, 40: 1627-1634. doi:10.1038/ijo.2016.142
4. Zutshi, A., Santhosh, J., Sheikh, J., Naeem, F., Al-Hamed, A., Khan, S., Al-Said, E. (2018). Implications of Early Pregnancy

Appendix D

MATERNAL OBESITY COMPLICATIONS EXTEND BEYOND THE MOTHER

Component	Excellent	Good	Mediocre	Unacceptable	Possible points
Main characteristics of disease or health outcome you chose	Explanation of disease characteristics is accurate, complete and concise; draws upon relevant scientific literature	Explanation of disease characteristics is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of disease characteristics is somewhat accurate and complete; somewhat verbose	Explanation of disease characteristics is mostly inaccurate or incomplete; lacks scientific validity	16/20
Impact of nutrient, dietary pattern, physical activity, or other lifestyle factor	Explanation of impact is accurate, complete and concise; draws upon relevant scientific literature	Explanation of impact is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of impact is somewhat accurate and complete; somewhat verbose	Explanation of impact is mostly inaccurate or incomplete; lacks scientific validity	12/20
Gaps in knowledge	Explanation of knowledge gaps is accurate, complete and concise; draws upon relevant scientific literature	Explanation of knowledge gaps is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of knowledge gaps is somewhat accurate and complete; somewhat verbose	Explanation of knowledge gaps is mostly inaccurate or incomplete; lacks scientific validity	16/20
Presentation of research data	Charts/graphs/figures are accurate, easily interpreted, and uncluttered and included all five articles	Charts/graphs/figures are mostly accurate and can be interpreted and included data from 4 articles	Charts/graphs/figures are somewhat accurate, but may be difficult to interpret and included data from 3 articles	Charts/graphs/figures are mostly inaccurate and difficult to interpret; legends and/or citations are absent	10/20
Take-home message	Message is concise and supported by scientific evidence; easily understood by a layperson	Message is supported by scientific evidence; generally understood by a layperson	Message is somewhat supported by scientific evidence; generally understood by a layperson; somewhat verbose	Message is poorly supported by scientific evidence; difficult to understand; verbose	6/10
References and citations	References are accurate; citations are accurate and directly link to the research data presented	References are mostly accurate; citations are mostly accurate and directly link to the research data presented	References are somewhat accurate; citations are somewhat accurate, but may not directly link to the research data presented	References are inaccurate; citations are inaccurate and are not linked to the research data presented	10/10
Total					70/100

COMMENTS:

- **There are some grammatical errors throughout the project. Take another glance through!**
- **Is there evidence supporting that Type 1 causes increase in gestational obesity? I could see that relationship with Type 2, but not with Type 1.**
- **For gaps in knowledge, did you just describe the findings that were inconclusive in the studies?**
- **Need to add descriptions with the graphs!**
- **Professor Natarajan stated to not use any charts, so I would take the chart out and try to perhaps make your own graph with that information? Or take it out completely and replace with something else!**
- **You stated that a gap in knowledge related gestational weight gain to vitamin D levels. However, you then have this relationship as a fact in your take home message. Is there evidence supporting this? I would recommend putting this in one place or the other, not both.**
- **I would make the take home message more succinct. Exemplify these findings in a separate conclusions section. The take home message should be a sentence or two I believe.**
- **Once you add more material and clean up the current material a bit, I think you will have good research to present!**

VITAMIN D SUPPLEMENTATION AND CANCER

Component	Excellent	Good	Mediocre	Unacceptable	Possible points
Main characteristics of disease or health outcome you chose	Explanation of disease characteristics is accurate, complete and concise; draws upon relevant scientific literature	Explanation of disease characteristics is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of disease characteristics is somewhat accurate and complete; somewhat verbose	Explanation of disease characteristics is mostly inaccurate or incomplete; lacks scientific validity	19/20
Impact of nutrient, dietary pattern, physical activity, or other lifestyle factor	Explanation of impact is accurate, complete and concise; draws upon relevant scientific literature	Explanation of impact is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of impact is somewhat accurate and complete; somewhat verbose	Explanation of impact is mostly inaccurate or incomplete; lacks scientific validity	19/20
Gaps in knowledge	Explanation of knowledge gaps is accurate, complete and concise; draws upon relevant scientific literature	Explanation of knowledge gaps is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of knowledge gaps is somewhat accurate and complete; somewhat verbose	Explanation of knowledge gaps is mostly inaccurate or incomplete; lacks scientific validity	15/20
Presentation of research data	Charts/graphs/figures are accurate, easily interpreted, and uncluttered and included all five articles	Charts/graphs/figures are mostly accurate and can be interpreted and included data from 4 articles	Charts/graphs/figures are somewhat accurate, but may be difficult to interpret and included data from 3 articles	Charts/graphs/figures are mostly inaccurate and difficult to interpret; legends and/or citations are absent	17/20
Take-home message	Message is concise and supported by scientific evidence; easily understood by a layperson	Message is supported by scientific evidence; generally understood by a layperson	Message is somewhat supported by scientific evidence; generally understood by a layperson; somewhat verbose	Message is poorly supported by scientific evidence; difficult to understand; verbose	10/10
References and citations	References are accurate; citations are accurate and directly link to the research data presented	References are mostly accurate; citations are mostly accurate and directly link to the research data presented	References are somewhat accurate; citations are somewhat accurate, but may not directly link to the research data presented	References are inaccurate; citations are inaccurate and are not linked to the research data presented	10/10
Total					90/100

COMMENTS:

- For gaps in knowledge, maybe display a few examples of the other factors.

- **For critical result 1, is the difference significant enough? You did explain this in the conclusion. Maybe just add “non-significant” to the figure 1 description.**
- **For critical result 2, I would add a header y-axis. Is this demonstrating number cancer occurrences? Is this difference significant as well? I see small differences, but not major ones. In addition, the placebo group also had increases from baseline to 6-months, so is the vitamin D supplementation really the cause of the increased quality of life?**
- **For critical result 4, I would put axis labels on it. I assume the x-axis is the vitamin D levels, but I would maybe add that for clarification.**
- **I am confused as to what critical result 5 is demonstrating. What is the purpose of showing the cardiovascular group? Is that the placebo group?**
- **Overall, this is a great poster! As long as you clean it up a little bit, I think this is a great presentation of the material that you found!**

CHARACTERISTICS OF COMMON FAD DIETS

- Diets such as the vegan/vegetarian diets have limit animals products and have shown to decrease total cholesterol as well as providing weight loss for individuals who follow these diets strictly. (1)
- The Mediterranean diet shows us that it can reduce as well as decrease the risks of cardiovascular diseases such as heart attack, stroke, and even hypertension. (2)
- Studies show that in relationship to the low carbohydrate/high carbohydrate diets body fat was significantly lower in the low carb diets. In high carbohydrate diets we found elevated glucose levels. (3)
- Diets with high sodium intake have increased risk of cardiovascular disease which can result in death. Diets that restrict sodium intake can lead to blood pressure that falls in normal range (120/80), weight loss and cholesterol in the healthy range. (4)
- The main focus of these studies was to analyze the differences in popular fad diets and the effects that these diets have on the health of our bodies.

GAPS IN KNOWLEDGE

- Do the diets identified work will men and women of all ages?
- How long before risk factors are decreased or risk factors arise with or without complete adherence to the diets.
- How long should you stay on the diet after you are in the "healthy ranges".
- There are very small sample sizes in the vegan/vegetarian diet study as well as the low carb vs. high carb diets, so I would like to see a larger sample size with similar results to fully believe in those results.

RESEARCH RESULT QUESTIONS

- How does the vegan diet affect BMI in the seven day trial?
- What is the difference in Mediterranean diet versus vegan diet in body mass?
- What affects do sodium rich and sodium restricted diets have on systolic and diastolic blood pressure?

RESEARCH RESULTS

The effects of Vegan Diet on BMI

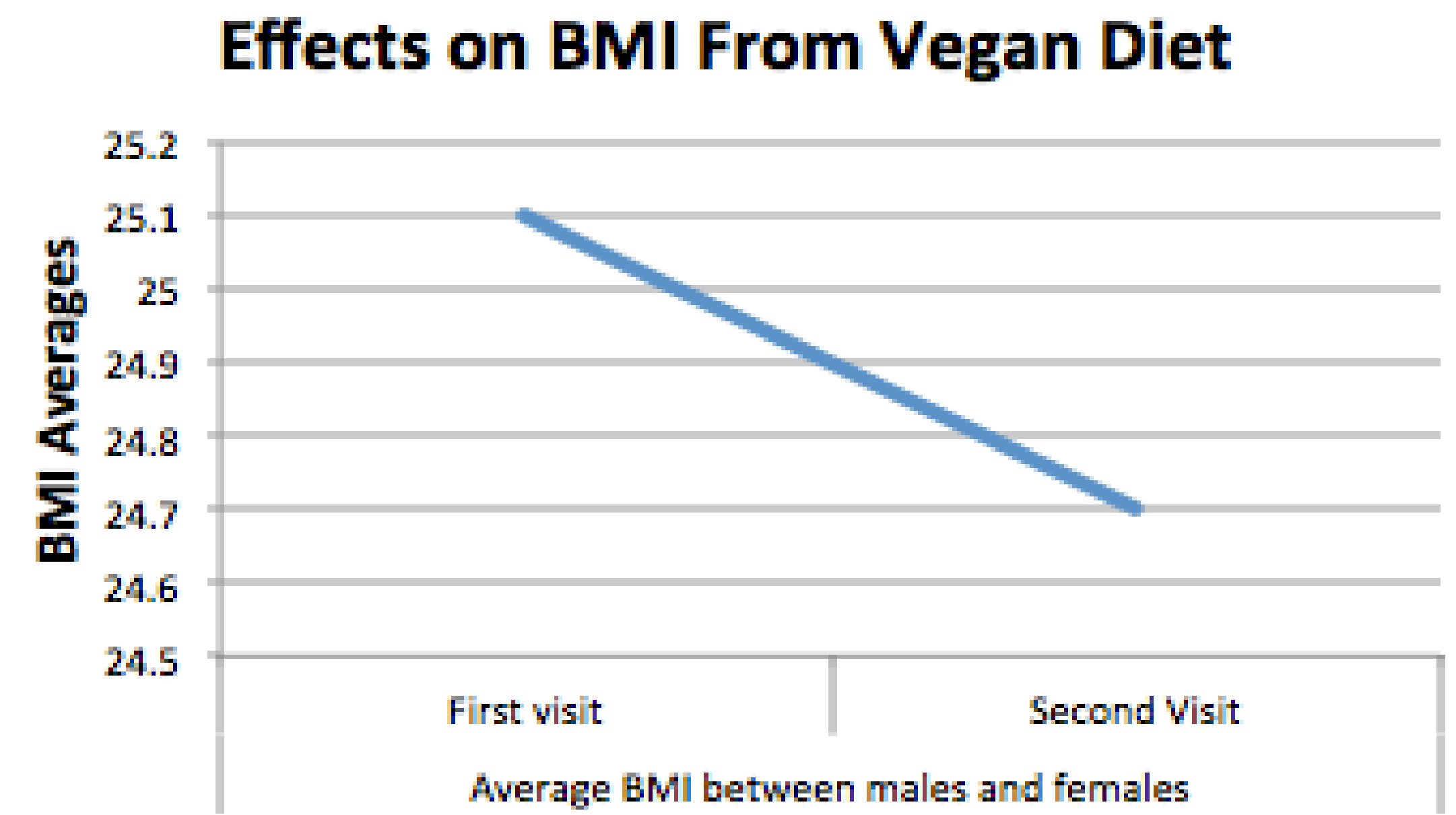


Figure 1: Four males and eight females participated in this study, less than or equal to 0.05 difference between the two groups. The first visit was the initial visit before the vegan diet started, the second visit was four weeks after while only on the vegan diet.

The effects of Vegan Diet/Mediterranean Diet on Body Weight

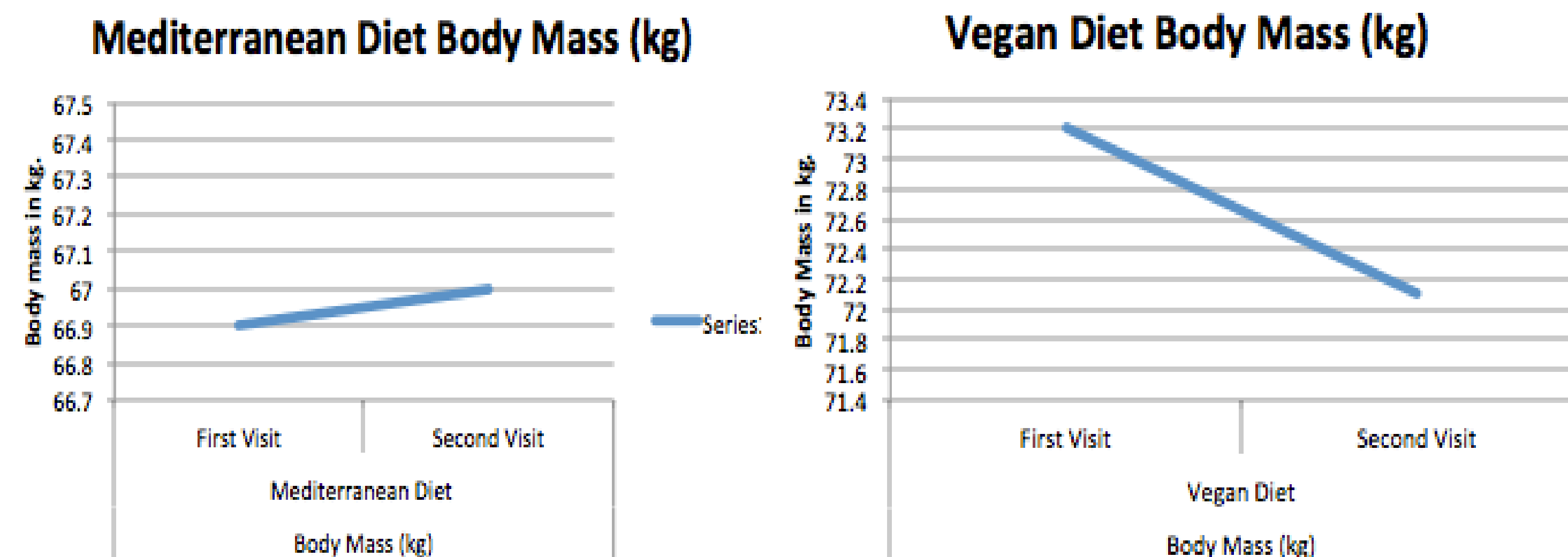


Figure 2: Each graph shows relationship on average between body mass of the first initial visit and the second visit after being on diet for four weeks. The med diet had two males and 10 females while the vegan diet had four males and eight females. As you can see there was a very slight increase of weight while on the Mediterranean diet as compared to a slight weight loss on the vegan diet. In both of these diets there was a difference of less than or equal to 0.05 difference between the males and female groups.

The effects of sodium restricted diets versus diets high in sodium in blood pressure

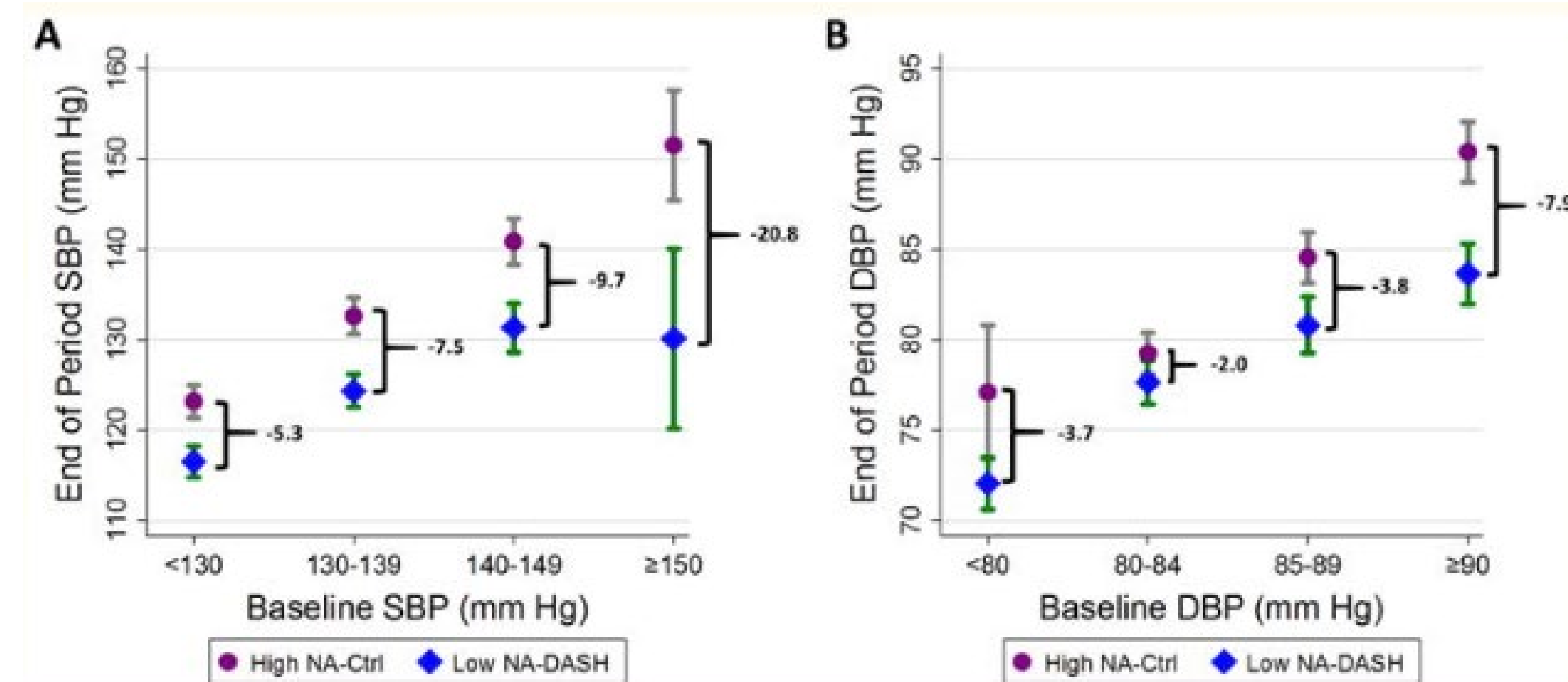


Figure 3: This relationship shows the average systolic blood pressure and diastolic blood pressure compared to baseline readings after intake of a high sodium diet compared to the dash or low sodium diet.

SUMMARY

- Following a strict vegan diet can lead to:
 - Decreased BMI
 - Decreased Body Mass
- Following a Mediterranean diet can lead to:
 - Overall reduced cardiovascular disease
- Following a low carb diet can lead to:
 - Decreased LDL cholesterol
 - Increased HDL cholesterol
 - Decreased glucose levels
- Following a high carb or carbohydrate loading diet can lead to:
 - Increased LDL
 - Decreased HDL
 - Increased Glucose levels
- Following a sodium restricted diet can lead to:
 - Decreased Systolic blood pressure
 - Decrease diastolic blood pressure
- Following most of these fad diets can provide potential benefits to health with a strict following of the diet. Each of these diets may require a supplementation of certain nutrients. Most of the fad diets are designed to reduce the obesity epidemic that we have. These diets were put in place to reduce cardiovascular disease which is the leading cause of death in the united states.

TAKE HOME MESSAGE

- Fad diets can provide good changes to the body if taken for short periods of time. Limiting nutrients in the body can actually decrease your health long term.
- Vegan, Vegetarian, Mediterranean, and a diet that restricts sodium can all be beneficial in reducing the risk of obtaining cardiovascular disease. While diets that are high in sodium and even the western diet can lead to weight gain and actually increase the risk of cardiovascular disease.
- More studies need to be conducted in terms of how long these diets should be taken in. Are these studies gender specific? Do the diets work for all age groups similarly?

REFERENCES

Rogerson, David, et al. *Contrasting Effects of Short-Term Mediterranean and Vegan Diets on Microvascular Function and Cholesterol in Younger Adults: A Comparative Pilot Study*. 3 Dec. 2018, (1)

McDougall, J, et al. "Effects of 7 Days on an Ad Libitum Low-Fat Vegan Diet: the McDougall Program Cohort." *Current Neurology and Neuroscience Reports*, U.S. National Library of Medicine, 14 Oct. 2014,(2)

Mihrshahi, S, et al. "Vegetarian Diet and All-Cause Mortality: Evidence from a Large Population-Based Australian Cohort - the 45 and Up Study." *Current Neurology and Neuroscience Reports*, U.S. National Library of Medicine, Apr. 2017, www.ncbi.nlm.nih.gov/pubmed/28040519. (3)

Michalczyk, Małgorzata et al. "No Modification in Blood Lipoprotein Concentration but Changes in Body Composition after 4 Weeks of Low Carbohydrate Diet (LCD) Followed by 7 Days of Carbohydrate Loading in Basketball Players" *Journal of human kinetics* vol. 65 125-137. 31 Dec. 2018, doi:10.2478/hukin-2018-0102 (4)

Juraschek, Stephen P et al. "Effects of Sodium Reduction and the DASH Diet in Relation to Baseline Blood Pressure" *Journal of the American College of Cardiology* vol. 70,23 (2017): 2841-2848. (5)

Appendix F:

THE EFFECTS OF TYPICAL FAD DIETS ON THE BODY

Component	Excellent	Good	Mediocre	Unacceptable	Possible points
Main characteristics of disease or health outcome you chose	Explanation of disease characteristics is accurate, complete and concise; draws upon relevant scientific literature	Explanation of disease characteristics is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of disease characteristics is somewhat accurate and complete; somewhat verbose	Explanation of disease characteristics is mostly inaccurate or incomplete; lacks scientific validity	18/20
Impact of nutrient, dietary pattern, physical activity, or other lifestyle factor	Explanation of impact is accurate, complete and concise; draws upon relevant scientific literature	Explanation of impact is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of impact is somewhat accurate and complete; somewhat verbose	Explanation of impact is mostly inaccurate or incomplete; lacks scientific validity	16/20
Gaps in knowledge	Explanation of knowledge gaps is accurate, complete and concise; draws upon relevant scientific literature	Explanation of knowledge gaps is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of knowledge gaps is somewhat accurate and complete; somewhat verbose	Explanation of knowledge gaps is mostly inaccurate or incomplete; lacks scientific validity	18/20
Presentation of research data	Charts/graphs/figures are accurate, easily interpreted, and uncluttered and included all five articles	Charts/graphs/figures are mostly accurate and can be interpreted and included data from 4 articles	Charts/graphs/figures are somewhat accurate, but may be difficult to interpret and included data from 3 articles	Charts/graphs/figures are mostly inaccurate and difficult to interpret; legends and/or citations are absent	12/20
Take-home message	Message is concise and supported by scientific evidence; easily understood by a layperson	Message is supported by scientific evidence; generally understood by a layperson	Message is somewhat supported by scientific evidence; generally understood by a layperson; somewhat verbose	Message is poorly supported by scientific evidence; difficult to understand; verbose	2/10
References and citations	References are accurate; citations are accurate and directly link to the research data presented	References are mostly accurate; citations are mostly accurate and directly link to the research data presented	References are somewhat accurate; citations are somewhat accurate, but may not directly link to the research data presented	References are inaccurate; citations are inaccurate and are not linked to the research data presented	10/10
Total					76/100

COMMENTS:

- **There are a few typos throughout the poster so make sure to go back through and check your work again.**
- **For the take home message, I would shorten its length. Make it a sentence or two. I do not think you need #3 in the take home message since it is included in the gaps in knowledge section.**
- **In the end, it seemed like you were focusing a lot on cardiovascular disease so perhaps add more about cardiovascular disease to the characteristics section? You only mentioned its purpose as it relates to the diet of high sodium.**
- **There were no results relating to the high/low carbohydrate diet. I would add in some results concerning that topic instead of having two graphs concerning the Vegan Diet. Or perhaps take out the high/low carbohydrate diet and keep the focus on the Vegan Diet if there are more findings concerning it.**
- **If possible, perhaps you could narrow down the scope of the research a little to focus on only a few diets. That might be tricky to do now, but I think it would make it more focused. You could go more in depth on a few diets compared to having five fad diets you are trying to explain, show research, and draw conclusions for.**
- **Overall, this is a great poster! I think if you just make it a little more succinct you will be set!**

CHARACTERISTICS AND IMPACT OF COMMON FAD DIETS

- Diets such as the vegan/vegetarian diets have limit animals products and have shown to decrease total cholesterol as well as providing weight loss for individuals who follow these diets strictly. (1)
- The Mediterranean diet as well as the vegan and vegetarian diets show us that they can reduce as well as decrease the risks of cardiovascular diseases such as heart attack, stroke, and even hypertension. (2,3)
- This study shows that in relationship to the low carbohydrate/high carbohydrate diets body fat was significantly lower in the low carb diets. (4)
- Diets with high sodium intake have increased risk of cardiovascular disease which can result in death. When eating salts, sodium gets into the bloodstream, which does not let your kidneys remove watering, which increases blood pressure. Diets that restrict sodium intake can lead to blood pressure that falls in normal range (120/80), weight loss and cholesterol in the healthy range. (5)
- The main reason for starting a fad diet like the ones discussed in this poster is to decrease obesity and to maintain a steady weight loss. Obesity is very prevalent in today's society especially in America. Recently obesity has been considered an epidemic. Obesity is a predisposing factor for type 2 diabetes, heart disease and stroke. The main focus of these studies was to analyze the differences in popular fad diets and the effects that these diets have on the health of our bodies.

GAPS IN KNOWLEDGE

- Do the diets identified work will men and women of all ages?
- How long before risk factors are decreased or risk factors arise with or without complete adherence to the diets.
- How long should you stay on the diet after you are in the "healthy ranges".
- There are very small sample sizes in the vegan/vegetarian diet study as well as the low carb vs. high carb diets, so I would like to see a larger sample size with similar results to fully believe in those results.

RESEARCH QUESTIONS

- How does the vegan diet affect BMI in the seven day trial?
- Are there any differences in body mass when using a Mediterranean diet versus the use of the vegan diet?
- What affects do sodium rich and sodium restricted diets have on systolic and diastolic blood pressure?

RESULTS OF THE STUDIES

The effects of Vegan Diet on BMI

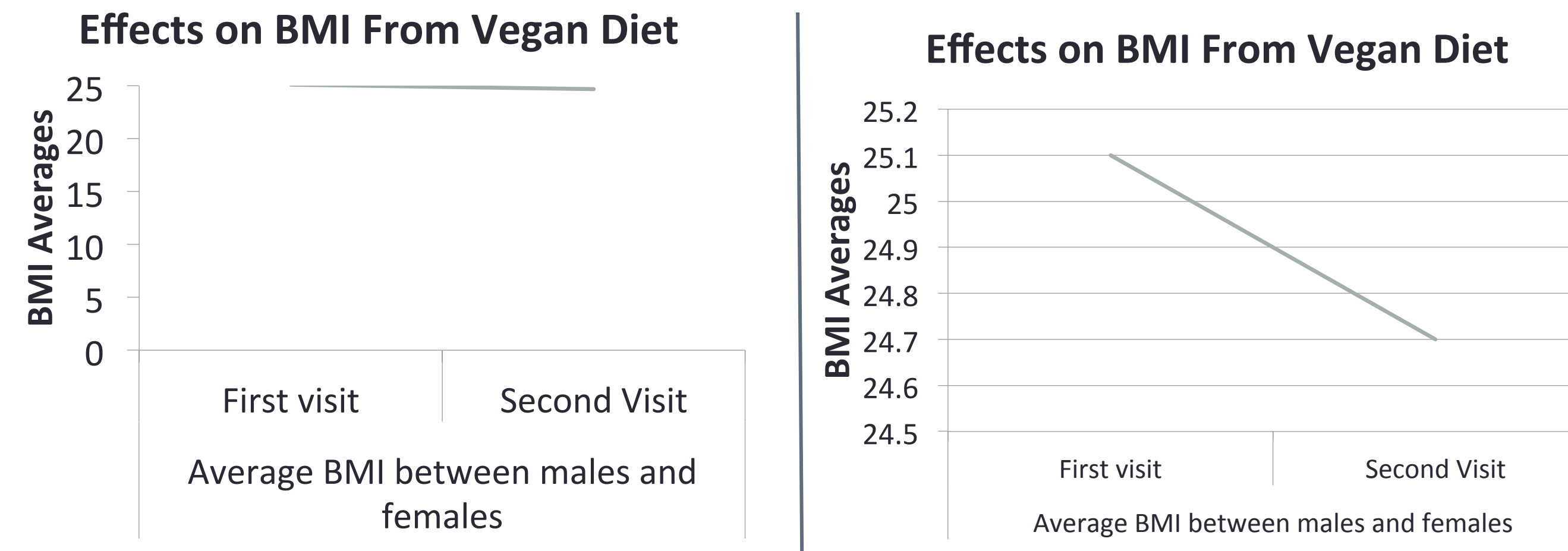


Figure 1: Four males and eight females participated in this study, less than or equal to 0.05 difference between the two groups was not statistically significant. The first visit was the initial visit before the vegan diet started, the second visit was four weeks after while only on the vegan diet. Both of these graphs are the exact same. As you see on the graph on the left we start the BMI at zero and see that there doesn't look like there is any change at all but look at the graph on the right and see exactly that there is quite a change in just a four week trial when in taking the vegan diet. (1)

The effects of Vegan Diet/Mediterranean Diet on Body Weight

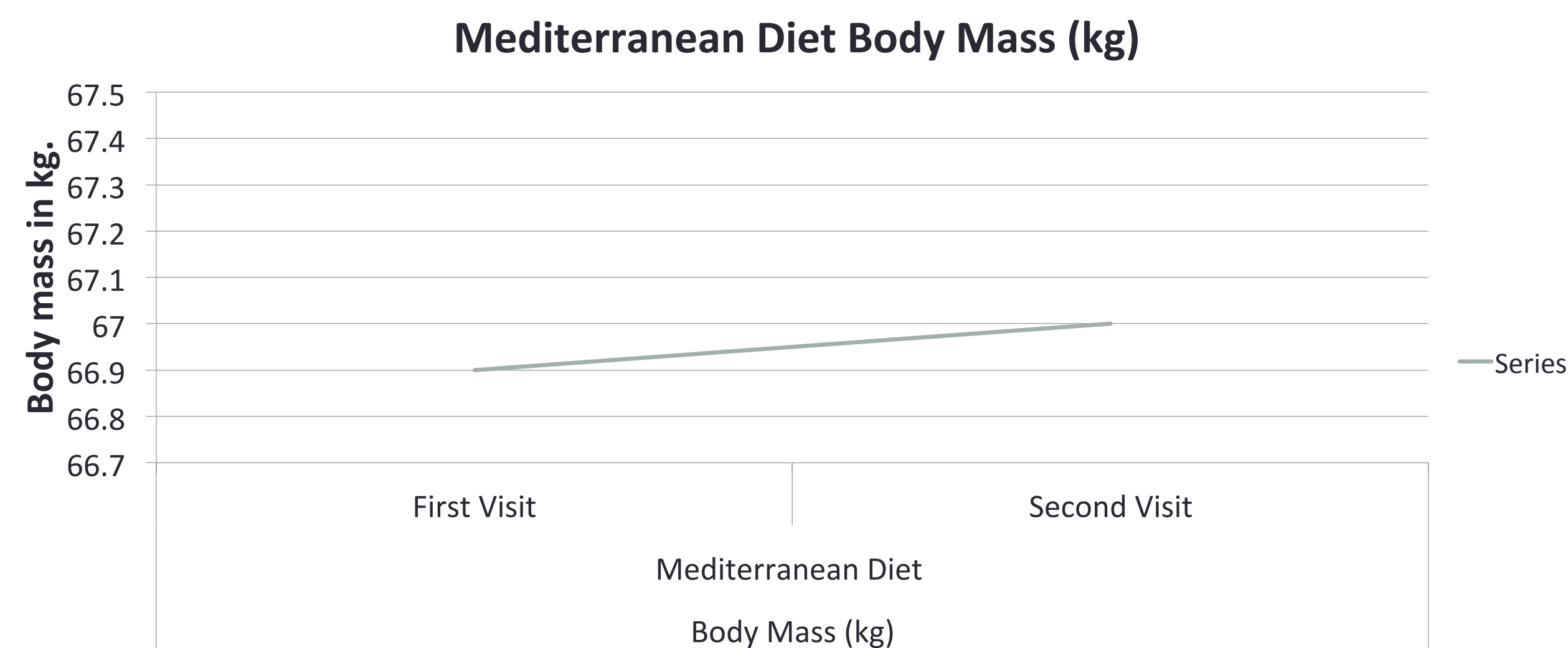


Figure 2. The med diet had two males and 10 females while the vegan diet had four males and eight females. As you can see there was an very slight increase of weight while on the Mediterranean diet but being on the med diet gives you health benefits and the tiny bit of weight gain is not a bad thing because it is lean body weight. Following a Mediterranean diet can lead to overall decreased cardiovascular disease. There was no statistical difference in data. (2)

The effects of sodium restricted diets versus diets high in sodium in blood pressure

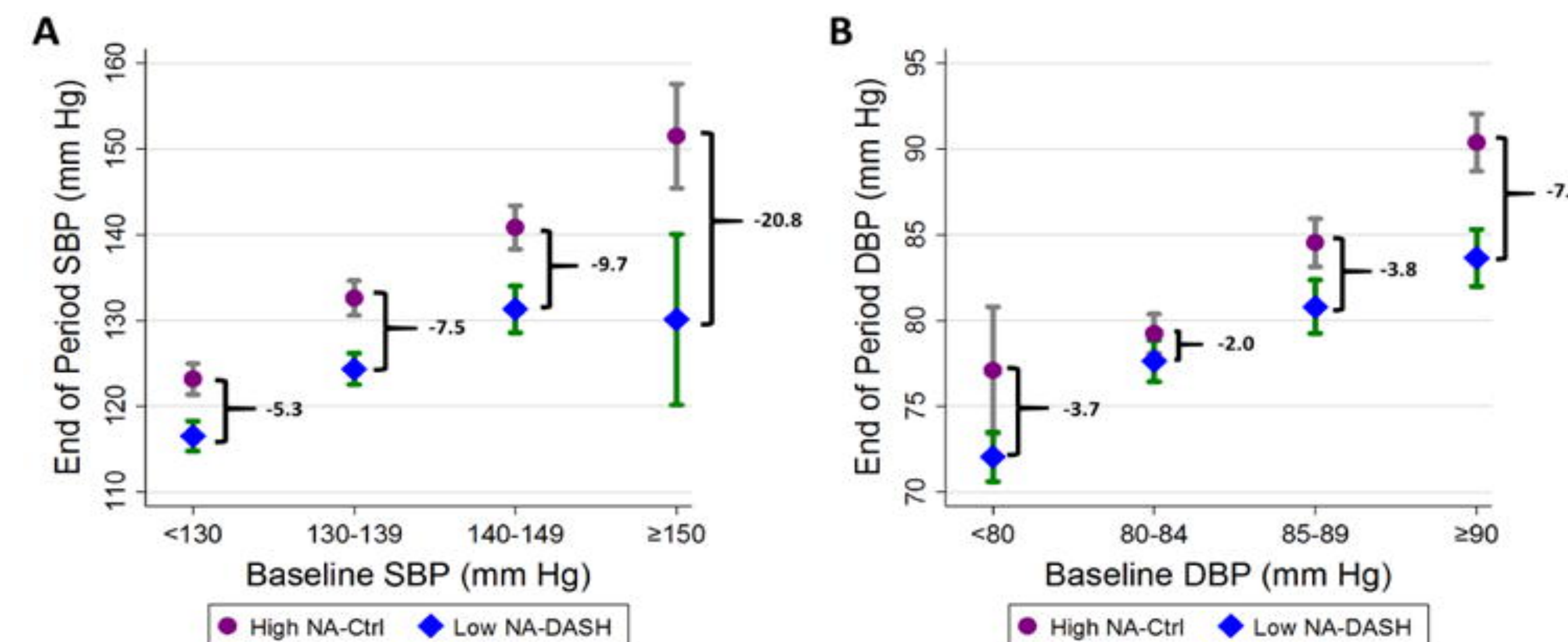


Figure 3: This relationship shows the average systolic blood pressure and diastolic blood pressure compared to baseline readings after intake of a high sodium diet compared to the dash or low sodium diet. Following a diet low in sodium can decrease systolic as well as diastolic blood pressure. (5)

Mortality Risk Between Diets

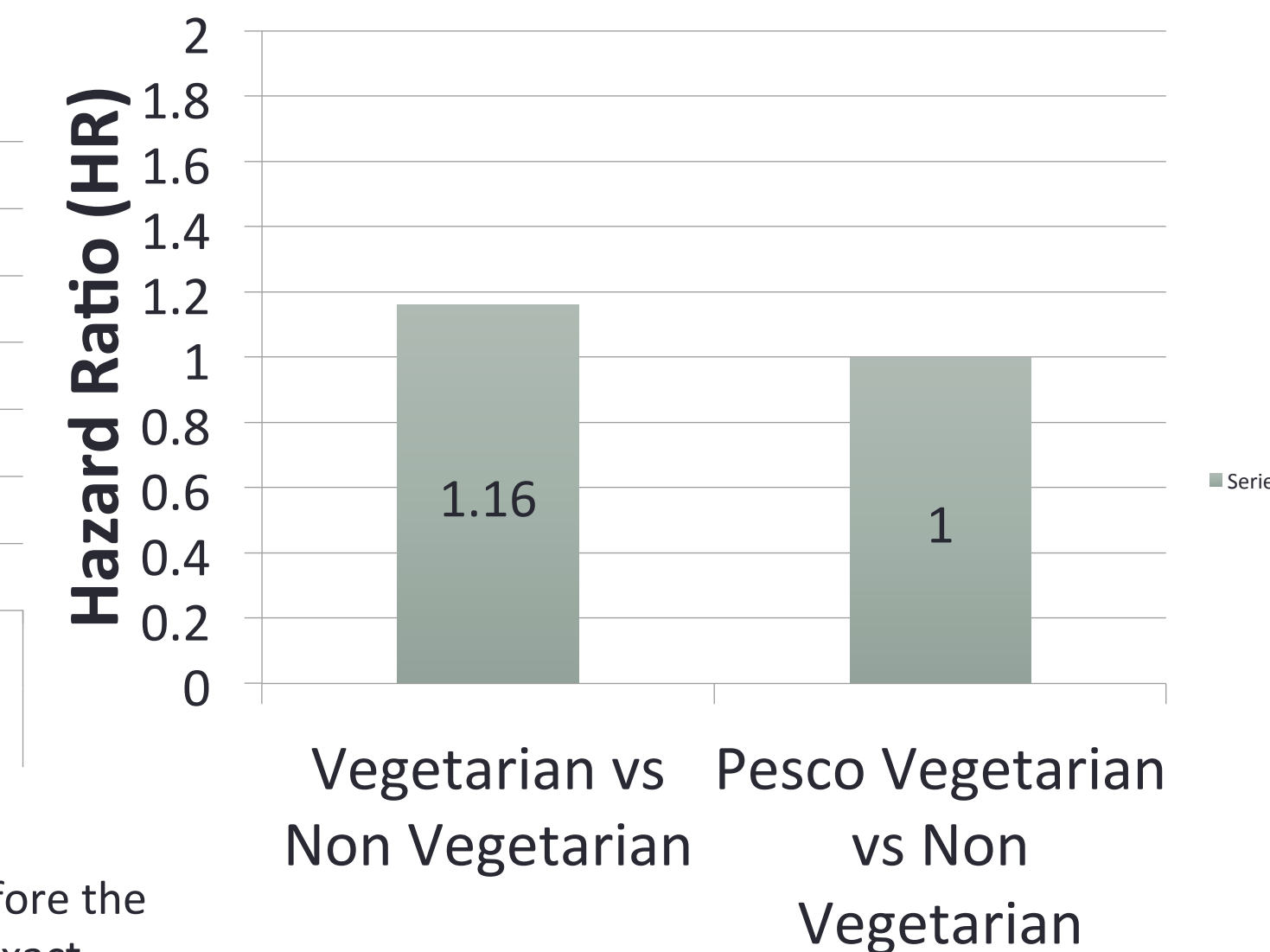


Figure 4: In this study we looked at mortality rates between vegetarian diets and non veg diets. This study was conducted over six years. In this study we have a HR factor of 1.16 correlated with veg vs non veg and a hazard ratio of 1 or no change in the pesco vs non veg diet. Although there is not a huge difference over a longer period of time this could be much more significant. (3)

Differences In Fat Mass After Diet

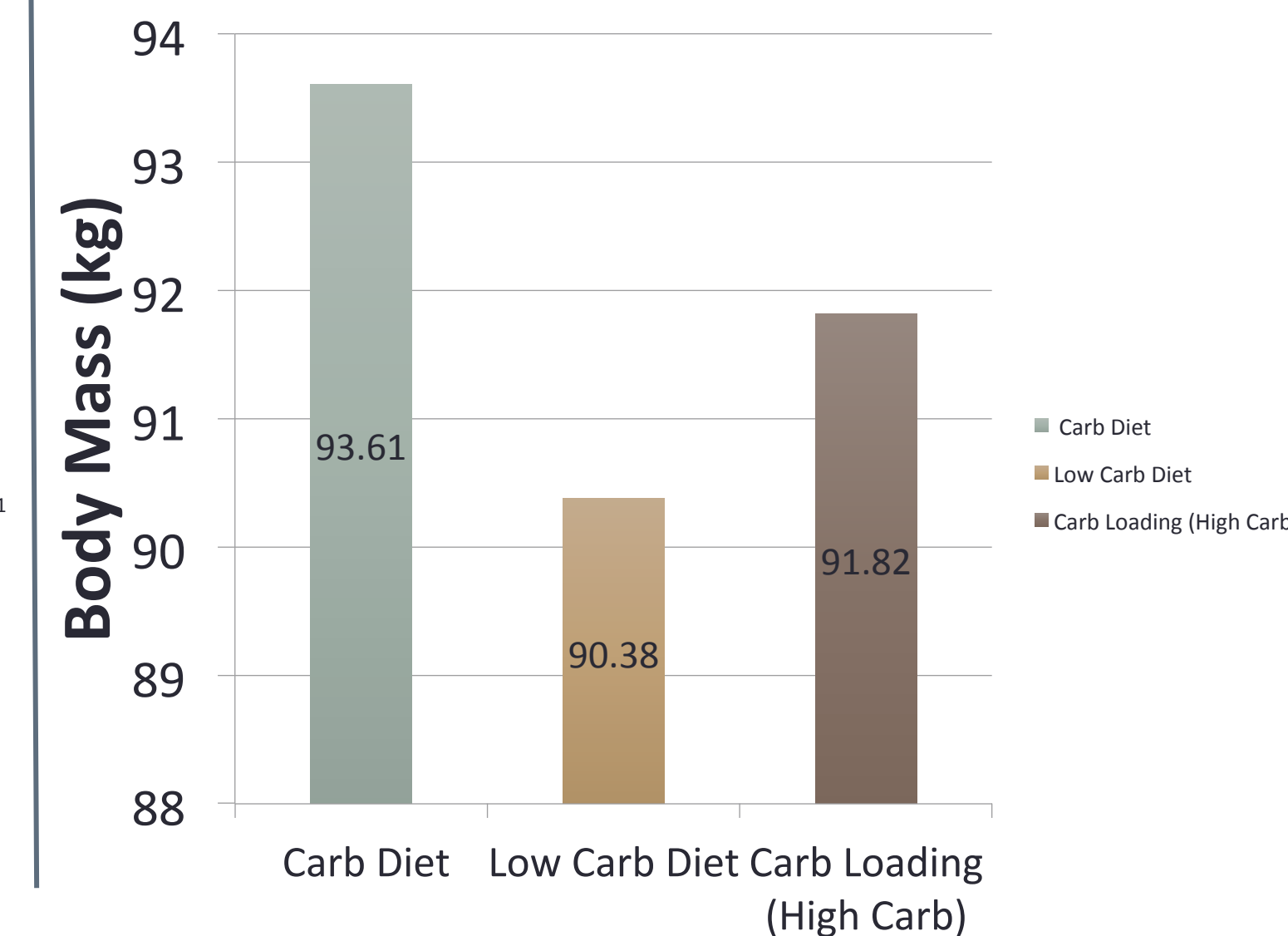


Figure 5: In this study there was 11 individuals who started on a normal carb diet the first 30 days. They all switched to a low carb diet for four week and ended on a high carbohydrate diet the last seven days of the study. As you can see there are slight differences between the three. Following a low carb diet lead to the biggest decrease in body mass while following the regular carb diet over a long period of time contributes to the highest body mass in the population studied. (4)

SUMMARY

In summary, following each of these fad diets can provide potential benefits to health with a strict following of the diet. Some of these diets may require a supplementation of certain nutrients to get proper daily requirements. For example the vegan diet will need supplementation of vitamin B12 as well as vitamin D supplementation to get the proper daily values of each. Most of the fad diets are designed to reduce the obesity epidemic that we have. These diets were put in place to reduce cardiovascular disease which is the leading cause of death in the United States. Though more studies need to be conducted on each of these diets to know the exact specifics, I think we have a pretty good understanding on the benefits of each of these fad diets.

TAKE HOME MESSAGE

- Fad diets can provide changes to the body if taken for short periods of time. Limiting micronutrients in the body can actually decrease your health long term if not careful.
- Vegan, Vegetarian, Mediterranean, and a diet that limits sodium can all be beneficial in reducing the risk of getting heart disease. Diets that are high in sodium and even the western diet or typical American diet can lead to weight gain and actually increase the risk of heart disease.

REFERENCES

- Rogerson, David, et al. *Contrasting Effects of Short-Term Mediterranean and Vegan Diets on Microvascular Function and Cholesterol in Younger Adults: A Comparative Pilot Study*. 3 Dec. 2018,
- McDougall, J, et al. "Effects of 7 Days on an Ad Libitum Low-Fat Vegan Diet: the McDougall Program Cohort." *Current Neurology and Neuroscience Reports*, U.S. National Library of Medicine, 14 Oct. 2014,
- Mihirshahi, S, et al. "Vegetarian Diet and All-Cause Mortality: Evidence from a Large Population-Based Australian Cohort - the 45 and Up Study." *Current Neurology and Neuroscience Reports*, U.S. National Library of Medicine, Apr. 2017, www.ncbi.nlm.nih.gov/pubmed/28040519.
- Michalczyk, Małgorzata et al. "No Modification in Blood Lipoprotein Concentration but Changes in Body Composition after 4 Weeks of Low Carbohydrate Diet (LCD) Followed by 7 Days of Carbohydrate Loading in Basketball Players" *Journal of human kinetics* vol. 65 125-137. 31 Dec. 2018, doi:10.2478/hukin-2018-0102
- Juraschek, Stephen P et al. "Effects of Sodium Reduction and the DASH Diet in Relation to Baseline Blood Pressure" *Journal of the American College of Cardiology* vol. 70,23 (2017): 2841-2848.

Appendix H: The effects of Vitamin D deficiency and the onset of dementia and Alzheimer's disease

Dept. of Nutrition and Health Sciences, University of Nebraska - Lincoln

ABSTRACT

With the global population increasing its life span, Alzheimer's disease and dementia are becoming more prevalent in today's society. Despite this, there has been no treatment for the brain condition. Alzheimer's Disease (AD), and dementia are considered chronic and enduring disorders of the mental processes caused by brain disease and/or injury. As a result, the purpose of this research is to determine if vitamin D deficiency has a negative impact on the onset of dementia, and Alzheimer's disease through a number of scientific studies. One such study concluded that there was an associated risk of severe vitamin D deficiency at <25 nmol/l at baseline and a risk for mild cognitive impairment when measuring serum 25-hydroxyvitamin D concentrations. Similarly, another study tested the impact of blood vitamin D concentrations in healthy older adults and found there is an association with low vitamin D levels and significantly increased risk AD and dementia. A final study tested the impact of vitamin D blood levels in an ethnically diverse population and found it was associated with accelerated cognitive decline within an ethnic population. These results support that vitamin D deficiency is associated with the onset of dementia and Alzheimer's disease. Thus, Vitamin D levels can serve as a nutritional marker in aging populations to screen for cognitive decline, and to the onset of dementia, and it can be concluded that increasing serum vitamin D levels will help to decrease the overall prominence of these brain diseases and find a potential preventative treatment.

AIM OF STUDY

- The overall aim of this study is to establish the effect that vitamin D levels (serum 25-hydroxyvitamin D (25(OH)D)) has on the risk of getting dementia, Alzheimer's disease, and cognitive decline in general.

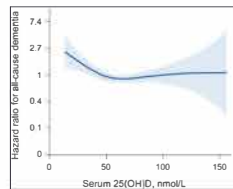
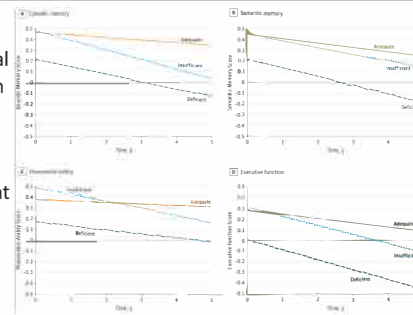


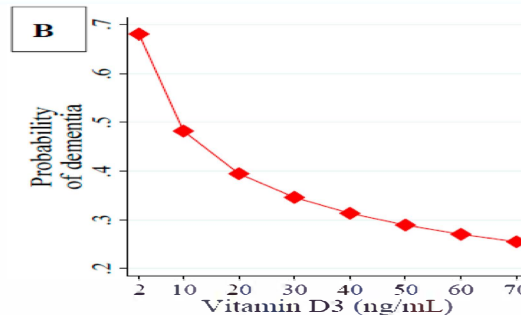
Fig. 1. Shows a smoothing spline plot of the hazard ratio for dementia by serum 25(OH)D concentrations.

TRAJECTORY OF THE DOMAINS OF COGNITIVE FUNCTION OVER TIME USING VITAMIN D BASELINE LEVELS

Fig. 2. Shows the trajectories of several domains of cognition for participants at their baseline evaluation with adequate, insufficient and deficient serum vitamin D levels.



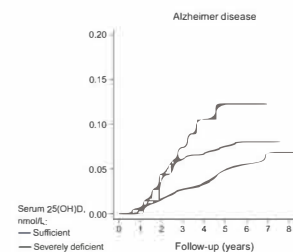
RELATIONSHIP BETWEEN VITAMIN D LEVELS AND THE PROBABILITY OF DEMENTIA



- Figure 3. Shows the relationship between Vitamin D levels from blood serum, and the probability of dementia in a patient.

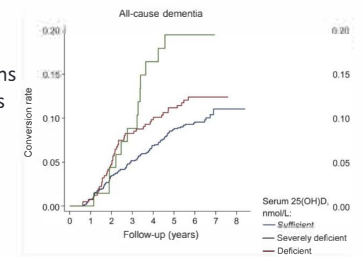
ALZHEIMER DISEASE RATES COMPARED TO VITAMIN D CONCENTRATIONS

- Fig. 4. Shows a Kaplan-Meier Plot of Alzheimer Disease rates versus Vitamin D concentration over yearly follow-ups. This shows that when vitamin D levels are considered sufficient, a patient has the lowest risk of an Alzheimer's diagnosis.



ALL-CAUSE DEMENTIA RELATED TO CONCENTRATIONS OF VITAMIN D

- Fig. 5. Shows a Kaplan-Meier Plot using All-cause dementia versus Vitamin D concentrations during yearly follow-ups which shows that when vitamin D levels are deemed sufficient a patient has the lowest risk of receiving a dementia diagnosis.



SUMMARY

- Patients deficient in Vitamin D displayed decreased baseline memory, visuospatial ability, and executive function scores.
- Vitamin D levels can serve as a nutritional marker to screen for cognitive decline in aging populations.
- Low levels of Vitamin D has been associated with brain structural abnormalities, cognitive decline and dementia.
- Utilizing serum 25-hydroxyvitamin D as a biomarker for Alzheimer's Disease could aid in the diagnosis and treatment of AD.
- The results concluded that there is an association with low vitamin D concentration levels significantly increased the risk of dementia and Alzheimer disease.

TAKE HOME MESSAGE

A deficiency in Vitamin D can significantly impact cognitive function, and lead to the onset of dementia, and Alzheimer's disease.

REFERENCES

- Miller, J. W., Harvey, D. J., Beckett, L. A., Green, R., Farias, S. T., Reed, B. R., . . . Decarli, C. (2015). Vitamin D Status and Rates of Cognitive Decline in a Multiethnic Cohort of Older Adults. *JAMA Neurology*, 72(11), 1295-1303. doi:10.1001/jamaneuro.2015.2115
- Łukaszuk, E., Bień-Barkowska, K., & Bień, B. (2018). Cognitive Functioning of Geriatric Patients: Is Hypovitaminosis D the Next Marker of Cognitive Dysfunction and
- Moon, J., Lim, S., Han, J., Kim, K., Choi, S., Kim, K., & Jang, H. (2015). Serum 25-hydroxyvitamin D level and the risk of mild cognitive impairment and dementia: The Korean Longitudinal Study on Health and Aging (KLoSHA). *Clinical Endocrinology*, 83(1), 36-42. doi:10.1111/cen.12733
- Littlejohns, T. J., Henley, W. E., Lang, I. A., Annweiler, C., Beauchet, O., Chaves, P. H. M., . . . Llewellyn, D. J. (2014). Vitamin D and the risk of dementia and Alzheimer disease. *Neurology*, 83(10), 920-928. doi: 10.1212/WNL.0000000000000755
- Ouma, S., Suenaga, M., Hatip, F., Hatip-Al-Khatib, I., Tsuboi, Y., & Matsuda, Y. (2018). Serum vitamin D in patients with mild cognitive impairment and Alzheimer's disease. *Brain Behavior*, 8(3). doi:doi: 10.1002/brb3.936

Appendix I: The effects of Vitamin D deficiency and the onset of dementia and Alzheimer's disease

Seanna Block, Dept. of Nutrition and Health Sciences, University of Nebraska - Lincoln

AIM OF STUDY

- The aim of this poster is to determine the effect that vitamin D levels (serum 25-hydroxyvitamin D (25(OH)D)) has on decreasing the risk of Alzheimer's disease, dementia and cognitive decline.

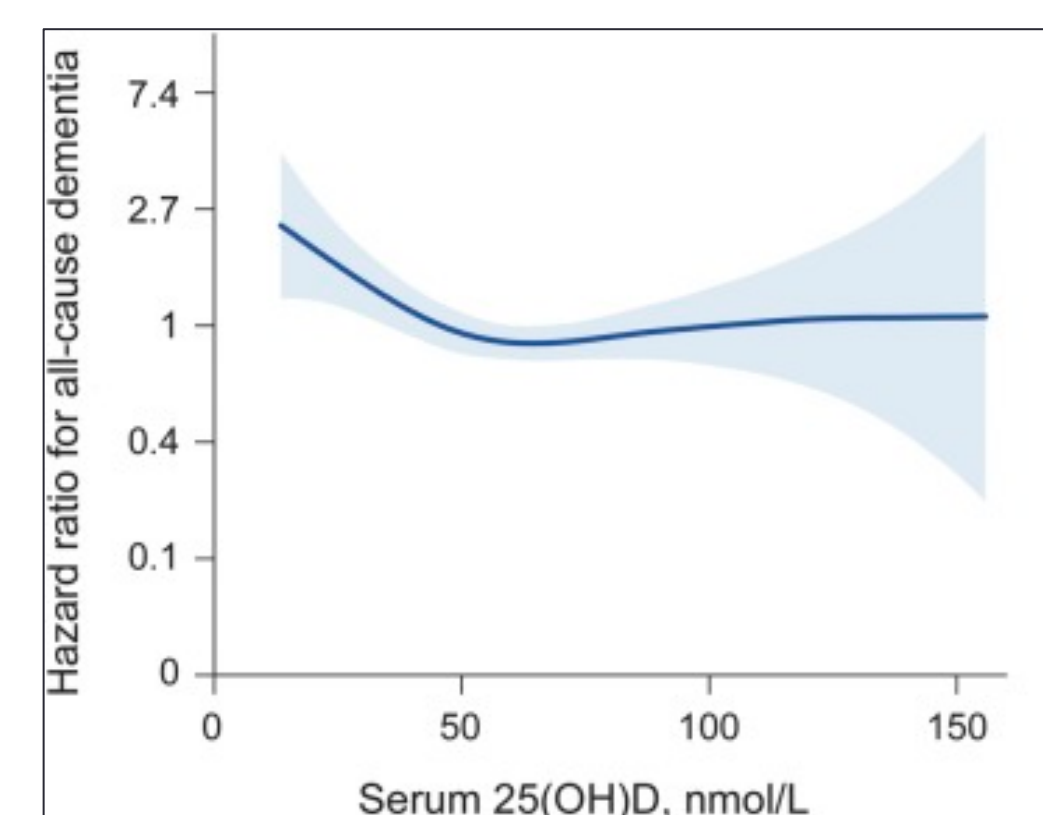


Fig. 1. Smoothing spline plot showing the hazard ratio for dementia by serum 25(OH)D concentrations. (4)

CHARACTERISTICS RELATED TO VITAMIN D DEFICIENCY AND DEMENTIA

- With an increase in life span, Alzheimer's disease and dementia are becoming more prominent in society, yet there has been no treatment found for the condition.
- Dementia, and Alzheimer's Disease (AD) are chronic, persistent disorders of the mental processes caused by brain disease or injury.
- Vitamin D has been linked to not only bone changes, but also to the onset of cognitive dysfunction when in insufficient levels. (2)
- Vitamin D has been found to produce a rise in the amount of neurotrophins expressed within the hippocampus, which has neuroprotective functions. Vitamin D in low levels also is connected to brain atrophy. (2)
- The bioactive form of vitamin D, its receptor, 1,25 dihydroxyvitamin D3, and the synthesis enzyme, 1 alpha hydroxylase, are all located within the brain, which has the potential to explain the effects of vitamin D deficiency on dementia Alzheimer's disease. (4)
- One major role of Vitamin D is that it stimulates macrophages to clear amyloid plaques from the brain. (4)
- It is also believed that sufficient vitamin D levels help control protein homeostasis, slows down the aging process, and decreases many pathological symptoms in AD like amyloid plaques. Thus, vitamin D levels could be an indicator of AD in patients. (5)
- Vitamin D levels can serve as a nutritional marker in aging populations to screen for cognitive decline, and to the onset of dementia, making it applicable to everyone. (2)

SUMMARY

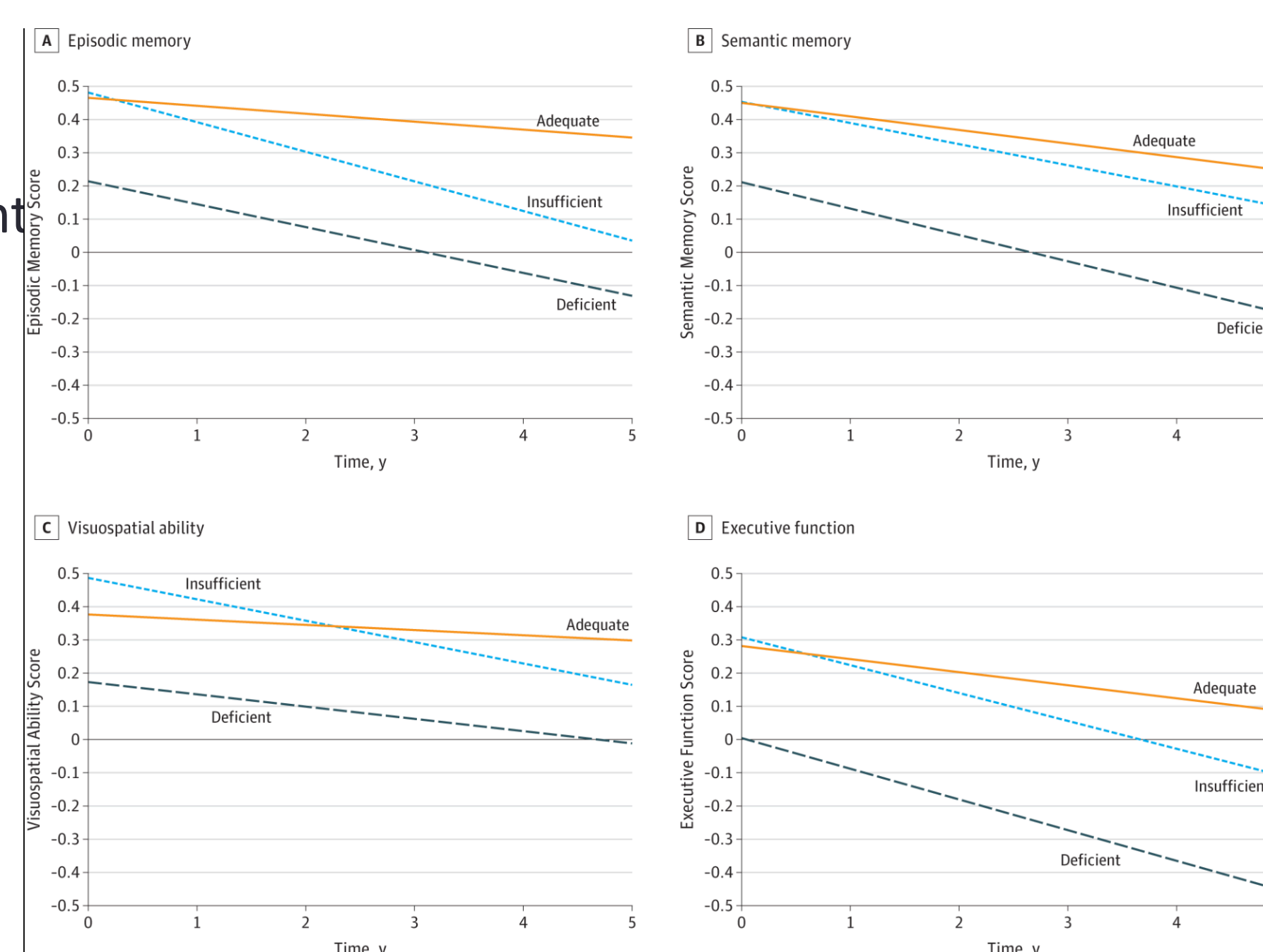
- Patients deficient in Vitamin D displayed decreased baseline memory, visuospatial ability, and executive function scores. (1)
- Vitamin D levels can serve as a nutritional marker to screen for cognitive decline in aging populations. (2)
- Low levels of Vitamin D has been linked to negative changes in brain structures, a decline in cognition, as well as dementia. (3)
- Serum 25-hydroxyvitamin D can be utilized as a biomarker for the diagnosis and treatment of Alzheimer's Disease. (4)
- The results concluded that there is an association with low vitamin D concentration levels significantly increased the risk of dementia and Alzheimer disease. (5)

GAPS IN KNOWLEDGE

- While a link between vitamin D deficiency, and dementia has been found, the concentration of vitamin D needed to maintain optimal health and cognition is still unknown.
- It is also unknown if supplementation after dementia has been diagnosed can reverse the cognitive dysfunction.
- While it can be concluded that vitamin D deficiency affects cognitive functioning, and that appropriate intake of Vitamin D is of great importance as one ages, the exact amount of vitamin D for supplementation will have to be further studied.
- A majority of these studies were conducted using ethnic populations, and thus more research will have to be conducted in order to make a more inclusive conclusion.

TRAJECTORY OF COGNITIVE FUNCTION DOMAINS OVER TIME BASED ON VITAMIN D BASELINE

Fig. 2. Shows the trajectories of cognitive domains for participants with adequate, insufficient and deficient serum vitamin D levels at the baseline evaluation for episodic and semantic memory, visuospatial ability, and executive functioning. The insufficient and deficient slopes differed significantly for both episodic memory, and executive functioning. (1)



INCIDENCE OF COGNITIVE DECLINE WITH VITAMIN D DEFICIENCY OVER 5 YEAR PERIOD

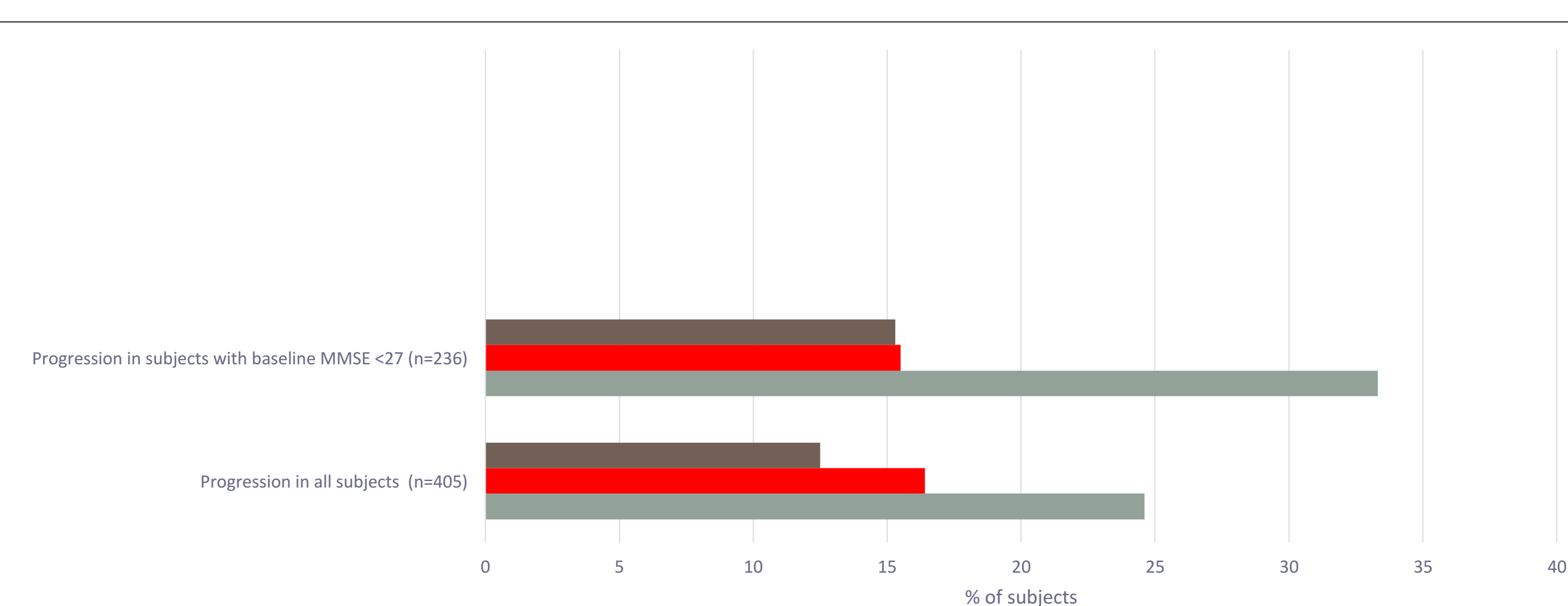


Fig. 3. Shows the decline in cognitive function over a 5 year period, using serum 25(OH)D levels. It shows that a decrease in 25(OH)D, of <25 nmol/L, was linked to a greater risk of such decline in all subjects, as well as in subjects with a baseline Mini Mental State Examination score of <27. (3)

SIGNIFICANCE OF SERUM 25(OH)D3 LEVELS IN MALES AND FEMALES OF VARYING COGNITIVE DIAGNOSES

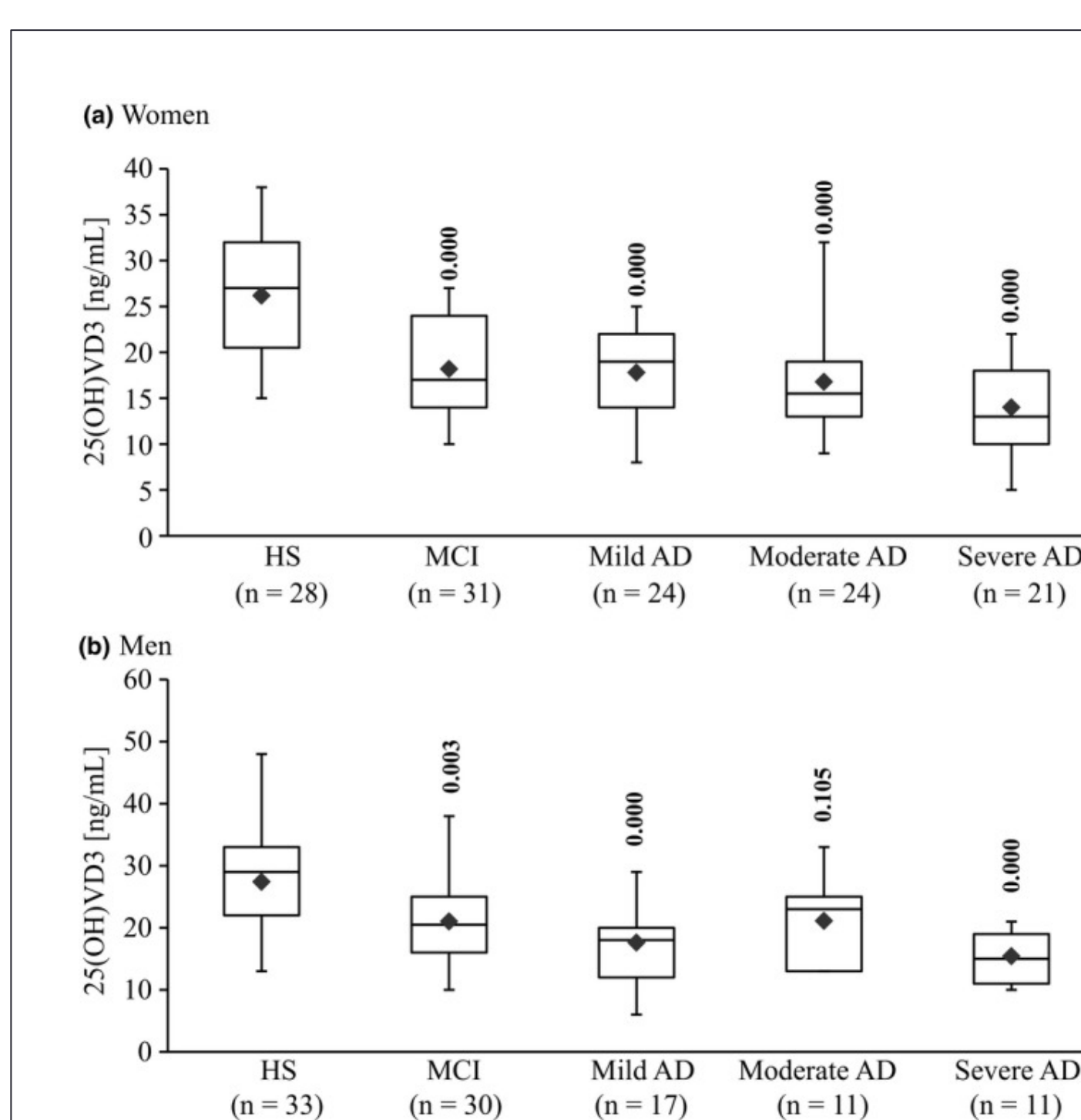
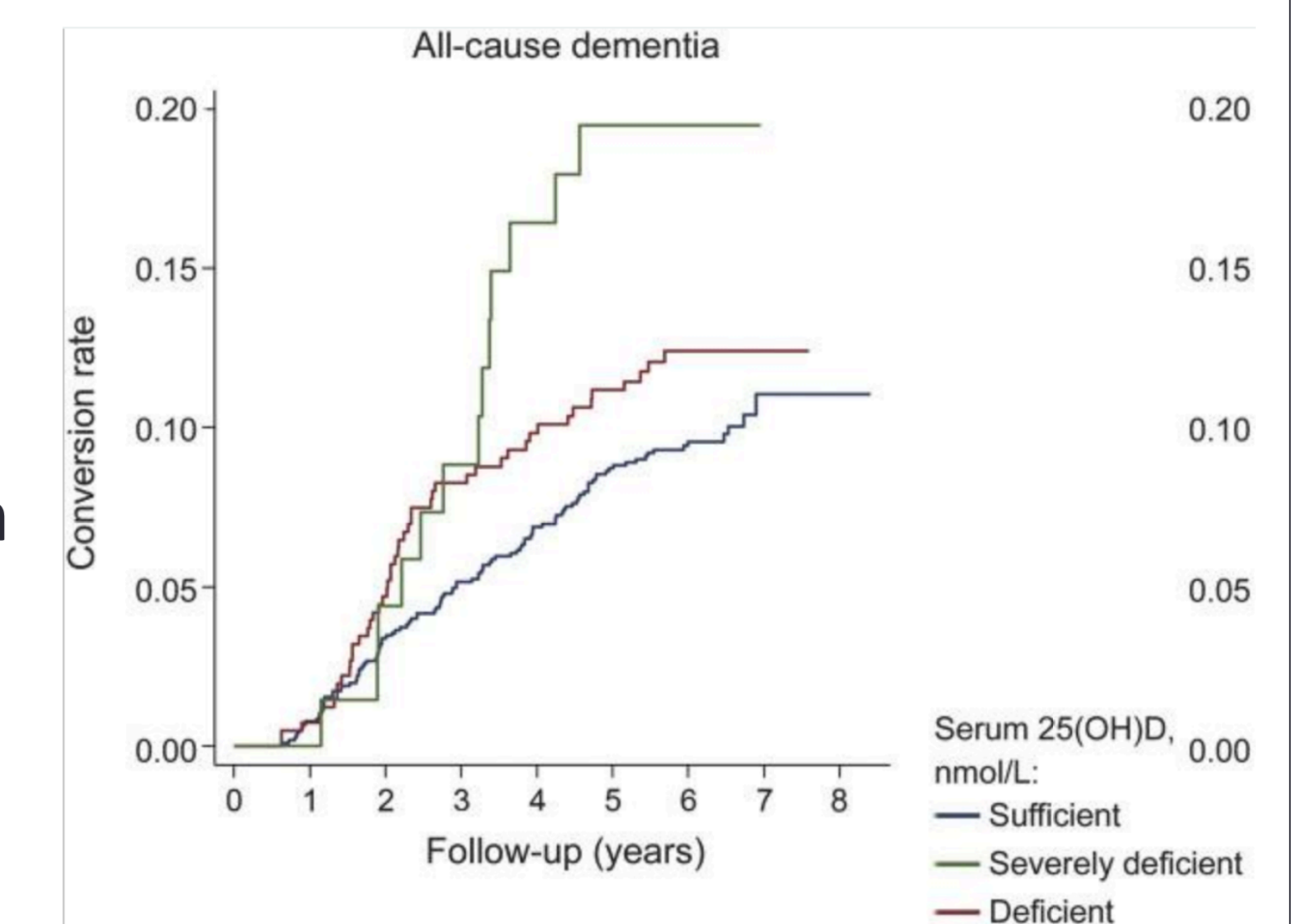


Fig. 4. Shows a box-and-whisker plot of serum 25(OH)D3 levels for healthy (HS), mild cognitive impairment (MCI), mild AD, moderate AD, and severe AD in both male and female participants. The levels of statistical significance are shown above each box plot, showing that 25(OH)D3 concentrations were overall lower in participants with MCI, than HS in both women and men.

INCIDENT ALL CAUSE DEMENTIA COMPARED TO VITAMIN D CONCENTRATIONS

Fig. 5. Shows a Kaplan-Meier Plot of All-cause dementia in risk of Vitamin D concentration over yearly follow-ups, which demonstrates when vitamin D levels are sufficient you have the lowest risk of dementia diagnosis, and an increasing risk when levels become deficient. (4)



RELATIONSHIP BETWEEN VITAMIN D LEVELS AND THE PROBABILITY OF DEMENTIA

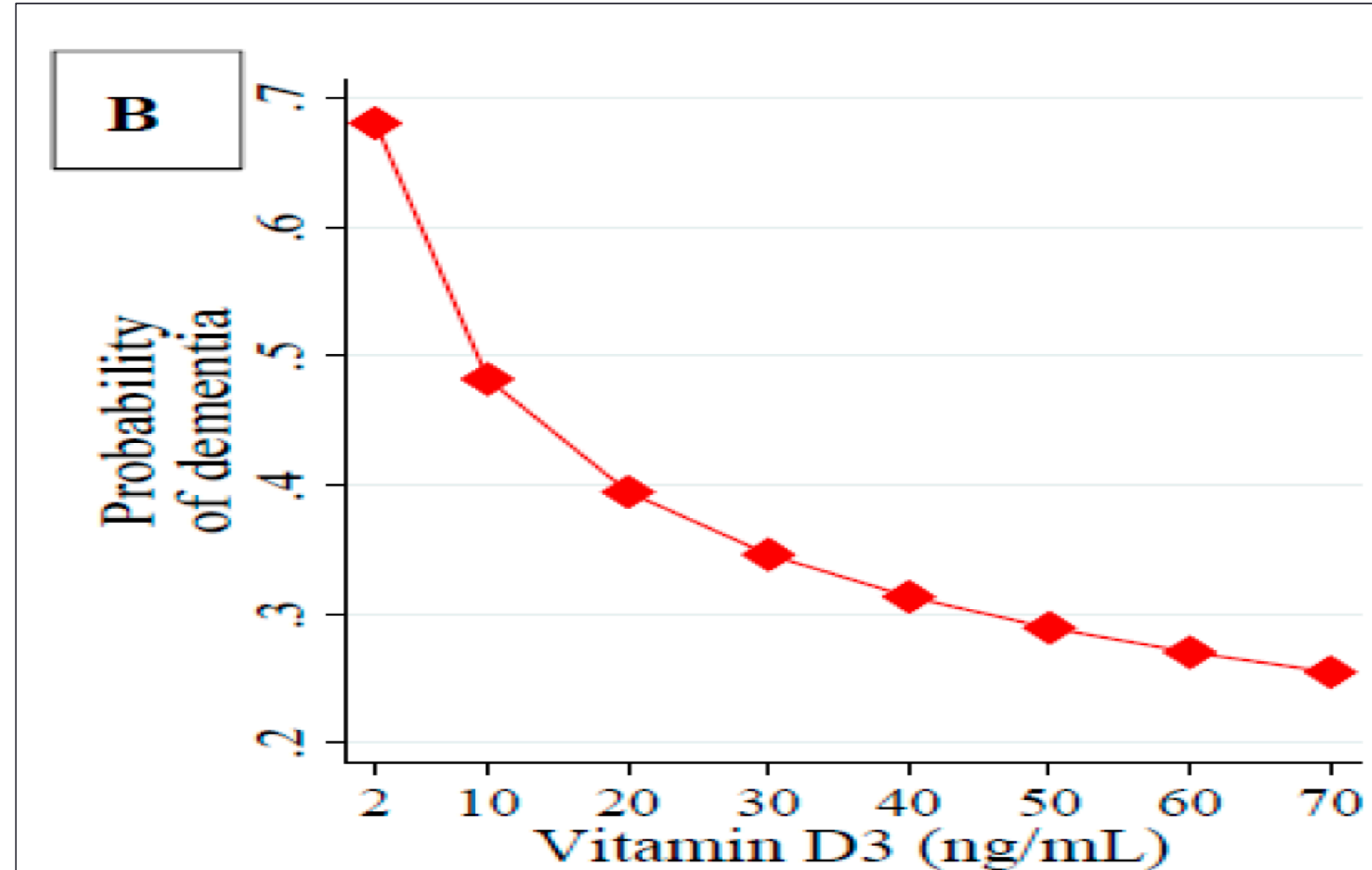


Figure 6. Shows the connection between Vitamin D levels from blood serum, and the probability of dementia in a patient, showing that as vitamin D levels decrease, the probability of dementia increases. (2)

TAKE HOME MESSAGE

A deficiency in Vitamin D can significantly impact cognitive function, and lead to the onset of dementia, and Alzheimer's disease.

REFERENCES

- Miller, J. W., Harvey, D. J., Beckett, L. A., Green, R., Farias, S. T., Reed, B. R., . . . Decarli, C. (2015). Vitamin D Status and Rates of Cognitive Decline in a Multiethnic Cohort of Older Adults. *JAMA Neurology*, 72(11), 1295-1303. doi:10.1001/jamaneurol.2015.2115
- Łukaszzyk, E., Bień-Barkowska, K., & Bień, B. (2018). Cognitive Functioning of Geriatric Patients: Is Hypovitaminosis D the Next Marker of Cognitive Dysfunction and
- Moon, J., Lim, S., Han, J., Kim, K., Choi, S., Kim, K., & Jang, H. (2015). Serum 25-hydroxyvitamin D level and the risk of mild cognitive impairment and dementia: The Korean Longitudinal Study on Health and Aging (KLoSHA). *Clinical Endocrinology*, 83(1), 36-42. doi:10.1111/cen.12733
- Littlejohns, T. J., Henley, W. E., Lang, I. A., Annweiler, C., Beuchet, O., Chaves, P. H. M., ... Llewellyn, D. J. (2014). Vitamin D and the risk of dementia and Alzheimer disease. *Neurology*, 83(10), 920-928. doi: 10.1212/WNL.0000000000000755
- Ouma, S., Suenaga, M., Hatip, F., Hatip-Al-Khatib, I., Tsuboi, Y., & Matsunaga, Y. (2018). Serum vitamin D in patients with mild cognitive impairment and Alzheimer's disease. *Brain Behavior*, 8(3). doi:doi: 10.1002/brb3.936

NUTR 455, Advanced Nutrition
Department of Nutrition and Health Sciences
Spring 2019
Animal Science Building, Room # A230, Tu/Th 10:00-11:15 AM

Instructor: Sathish Kumar Natarajan, Ph.D.
snatarajan2@unl.edu
Phone: 402-472-7227
Office: 229 Filley Hall, East Campus, UNL

Office Hours: Monday 9-12 AM or by appointment. Email is the most efficient and immediate form of communication with me. Most questions can be handled by email. Telephone messages will be returned as soon as possible, usually within 24 hours. Appointments are recommended for questions or concerns requiring lengthy discussions.

Course Description: Biochemical and physiological aspects of human nutrition. Nutrient transport, storage, and utilization under various metabolic states and relationships to the development of chronic diseases.

Prerequisites:

- BIOC 321 and 321 Lab (Elements of Biochemistry) or BIOC/BIOS/CHEM 431 (Biomolecules and Metabolism)
- BIOS 213 (Human Physiology) or ASCI 240 (Anatomy and Physiology of Domestic Animals) or parallel

Textbook: *Advanced Nutrition and Human Metabolism, seventh edition*, by Sareen S. Gropper, Jack L. Smith and Timothy P. Carr (Cengage Learning, 2018).

Course Objectives: As an outcome of classroom instruction, assignments, and *active participation*, students should be able to:

- Describe metabolism within cells, organs, and the whole body.
- Describe changes in metabolism and nutrient requirements at various stages of life.
- Understand nutrient and energy metabolism during the absorptive, postabsorptive, and fasting states.
- Understand nutrient and energy metabolism during physical activity and at rest.
- Understand the scientific method and interpret various sources of nutrition information.
- Incorporate healthy nutrition principles into daily living.

Teaching/Learning Methods: NUTR 455 is a 3 credit-hour lecture course. The textbook is the primary reference for the course; some additional materials will also be available on Canvas. Emphasis will be placed on understanding the biochemical concepts illustrated by the figures in the textbook. My teaching style focuses on applying the concepts to *health and well-being*, and every effort will be made to provide useful examples in class. In keeping with the spirit of active learning, students are encouraged to ask questions and to participate in classroom discussion whenever possible.

Strategies for Successful Learning: The examinations will be based mainly on the concepts illustrated by the figures. Therefore, you should prepare for exams by describing or “walking through” the figures in a narrative way. It is strongly encouraged that you study with a partner or in groups so that you can verbally describe the figures to each other. Students from previous semesters have said that studying this way is very helpful, although it may be new to some of you. While there is only a limited amount of assigned reading in the textbook, you should read as much of the textbook as required to help you master the figures.

Classroom Environment: The instructor is committed to offering a course that maintains an atmosphere of ethical behavior, individual integrity, participatory learning, and equitable treatment of each person. Expression

of ideas from various perspectives is encouraged and will be respected. I would highly suggest students to be engaged in the class.

Class room cell phone/Laptop Policy:

Students are **not allowed** to use their cell phone in the class. The laptop is only allowed to view the power point slides for that class or slides in the canvas program. Students who fail to follow this rule will be asked to leave the class and **will not** receive attendance and participation points for that class.

Classroom Attendance: Students are required to attend class. If you are not in class 1) you cannot participate, 2) you cannot fully understand the material; 3) you will not hear the information related to the assignments. You will be allowed one absence without penalty. For every subsequent absence, your final grade will drop 10 points.

Student Response System (i>Clicker):

We will use i>Clicker as student response system. i>Clicker is a response system that allows students to respond to questions posed during class, **and students will be graded on their feedback as class performance and their in-class participation**. Students are required to bring their i>Clicker to every class. It is each student's responsibility to come prepared to participate with a functioning i>clicker every day. I>Clicker devices can be purchased or rented through the University bookstore. i>Clicker devices must be registered in Canvas at the beginning of the semester so that each student's device is directly linked to their Canvas account. As an alternative to I>Clicker, students can also opt for the REEF polling software, which allows the use of i>Clicker functions via smartphones. However, students will not be able to register both systems (I>Clicker and REEF polling) or multiple devices. For troubleshooting with i>Clicker/REEF polling, please refer to instructions made available by ITS (<http://its.unl.edu/srs>) or on Canvas. If students have lost or broken their i>Clicker remote, they will have to purchase or rent another one. Please inform the instructor. **Bringing a fellow student's i>Clicker to class is considered cheating. If a student is caught with an i>Clicker other than their own or has votes in a class that they did not attend, they will forfeit all participation and extra credit points and may face additional disciplinary action.**

Diversity Statement: The University of Nebraska-Lincoln is committed to a pluralistic campus community through Affirmative Action and Equal Opportunity. We assure reasonable accommodation under the Americans with Disabilities Act. Students with disabilities are encouraged to contact me for a confidential discussion of their individual needs for academic accommodation. It is the policy of the University of Nebraska-Lincoln to provide flexible and individualized accommodation to students with documented disabilities that may affect their ability to fully participate in course activities or to meet course requirements. To receive accommodation services, the student must be registered with the Services for Students with Disabilities (SSD) office, 132 Canfield Administration, 472-3787 voice or TTY.

Academic Integrity Policy: Academic honesty is essential to the existence and integrity of an academic institution, and any form of academic dishonesty undermines the value of grades for the entire student body. The responsibility for maintaining that integrity is shared by all members of the academic community. Students are expected to be familiar with and adhere to the Student Code of Conduct (<http://stuafs.unl.edu/ja/code/>).

Student Information Card: With the intent to better understand student goals and expectations for taking NUTR 455, all students are asked to fill an information card and submit it via Canvas by **January 10th, 2019, 11:59 pm** (worth 10 points). A card template is available on Canvas in modules, just fill in the blank space and submit by the due date.

Examinations: Five exams will be given during the semester as listed in the course schedule and will be administered during the regularly scheduled class time. The exams will consist of multiple choice and true/false questions. Under no circumstances will make-up exams will be given during the semester—this policy is non-negotiable unless you have a job interview on the exam day.

Quizzes: Eight quizzes will be given throughout the semester. Of the eight quizzes, only **seven best scores** will be used to calculate your grade. Quizzes will be given online via Canvas and will be available after the class 12:00 noon through 11:59 AM until the following day of the quiz. If you are unable to take a quiz during the scheduled time, then the missed quiz will be the one dropped. *Under no circumstances will make-up quizzes be given during the semester—this policy is non-negotiable.*

Assignment (ACE 10 project): The poster presentation is among the most common forms of scientific communication at professional meetings and for delivering health concepts to lay audiences. The poster allows for direct face-to-face discussion between the author and individuals seeking to understand health information. Because the information is presented in a visual format, the poster helps facilitate discussion, understanding, and exchange of ideas in ways that written articles cannot.

Your assignment is to prepare a poster regarding current health issues. You can choose the current topic in nutrition. Topics included below are examples

1. Nutrition interventions and Nutrient signaling to prevent health and disease
2. Nutrient intervention to prevent obesity and metabolic syndrome,
3. Non-alcoholic fatty liver disease (NAFLD),
4. Nutrient Signaling and extracellular vesicles,
5. Saturated fatty acids consumption on diabetes and metabolic syndrome
6. Free fatty acid-induced hepatocyte lipoapoptosis and cholangiocyte lipoapoptosis in NAFLD
7. Free fatty acid-induced pancreatic beta-cell lipoapoptosis in NAFLD
8. Vitamin D supplementation and cancer
9. Nutrient intervention to prevent complications of maternal obesity
10. Acute fatty liver of pregnancy
11. Dietary cholesterol and cardiovascular diseases
12. Benefits of Omega-3 fatty acids and their signaling pathways
13. Mitochondrial dysfunction and mitochondrial Fatty acid oxidation defects
14. Maternal obesity and complications
15. Impact of diet, exercise, or other lifestyle choice on cancer
16. Obesity and cancer incidence.

The assignment will demonstrate a comprehensive competence of nutrient metabolism; the scientific method; statistical analysis; evaluation and interpretation; communication and presentation; and delivering a final message to a lay audience.

An example poster and the criteria used to grade posters are available on Canvas. Please note that the example poster may have a different health outcome than your assignment, but it will give you an idea of the scope and detail that is required. When preparing your poster, you must address the following points:

1. Synopsis of each article selected should be submitted as a weekly assignment. Synopsis should be no more than 250 words/article in your sentence (don't copy and paste from article's abstract) Examples of synopsis of the article will be available on the canvas. Synopsis of all five articles should be submitted on or before Feb 28, 2019. Please select article published within last 3 years and include a weblink of this article. Use older articles as a background information. To decrease the workload for students, synopsis of each article is requested to submit weekly. See table for individual due dates.

For Poster see Below:

2. What are the major characteristics of the disease/health outcome you selected? You should provide enough detail for the reader to understand the metabolic basis of the disease. Illustrations can be helpful.
3. The information you provide must be supported by published research, so you need to become familiar with the scientific literature related to your topic. Unsupported opinions are not acceptable.
4. What gaps in knowledge still exist regarding your topic? Please provide at least two aspects that require further research.

Provide research data from the scientific literature that supports your topic and take-home message. The data should be provided as graphs, charts, figures, or other illustrations (Data in the form of tables

are not acceptable). You must provide data from at least five research studies. Legends for each graph, etc., must be included (in your words, no copy and paste).

5. What is the take-home message? This should be a short, simple message that conveys the research findings and should be understood by a lay audience.
6. References for the research results must be provided. Citations must be provided in the “research results” section and must be linked to the references.

Submission of your poster title and 5 articles selection for your topic is **due January 17, 2019**, before 11:59 pm. Synopsis of five articles will be due on **Feb 28th, 2019**. Feedback will be provided regarding the suitability of your chosen topic and for each synopsis. If changes are required, you will be given one additional week to resubmit your poster title and synopsis. No points will be given if you fail to submit your title and synopsis on time.

Submission of your finished poster is due **April 11th, 2019**, before 11:59 pm. Five points will be deducted each day your poster is late. All posters must be submitted as a PDF file. The system used for grading the quality of your work is attached at the end of the syllabus.

Poster Peer Review: Poster assignments will be peer reviewed for feedback using the rubric provided at the end of this syllabus, this same rubric will be used to grade final poster assignment. This means students need to turn in drafts of their poster for peer review on or before **March 15, 2019**. Each student will be assigned two posters to peer review and grades given by the peer will not be included in the final grades. However, The poster peer review will help students to work ahead on the poster assignment and turn in a draft without the pressure of a grade and students will also have time to improve their work based on their peer comments before submitting for a final grade. The draft module poster peer review due is **March 28, 2019**.

Benefits of Peer review: The students providing feedback have an opportunity to critically review others' work and to learn from how other students have applied concepts in their poster presentation. The students receiving feedback have an opportunity to get new perspectives on their work and to make improvements to their assignments before turning them in for a final grade

Evaluation Criteria and Grading System: Students are expected to attend class and are responsible for all material covered in class. Students are also responsible for taking the exams and completing the assignments *as scheduled* during the semester. Students wishing to have a quiz or exam answer reevaluated must put in writing their rationale in support of their answer. Written rationales must be submitted within one week of receipt of scores.

Possible points earned for exams, quizzes and assignments are as follows:

Class performance and participation (Based on iClicker Questions)	55
Student Card	10
Gregory Gores Talk (April 26, 3-4PM)	10
Five Examinations (100 points each)	500
Seven Quizzes (10 points each)	70
Selection of 5 articles and Poster title	15
Synopsis of 5 articles (each 10 points)	50
Completed poster	100

Grades will be assigned according to the percentage of total points earned during the semester as follows:

Percentage required	Grade	UNL grade points
95.0	A+	4.00
92.0	A	4.00
90.0	A–	3.67
88.0	B+	3.33

82.0	B	3.00
80.0	B–	2.67
78.0	C+	2.33
72.0	C	2.00
70.0	C–	1.67
68.0	D+	1.33
62.0	D	1.00
60.0	D–	0.67
< 60.0	F	0.00

Total points will be rounded to the nearest *tenth* for calculating grades, and students must earn at least the minimum percentage listed above to earn the corresponding grade. For example:

- 81.54 will be rounded to 81.5
- 81.55 will be rounded to 81.6
- An overall percentage of 89.9 is a *B+*
- An overall percentage of 90.0 is an *A–*

Students taking the course as “Pass/No Pass” must earn an equivalent grade of “C” or above to receive a passing grade (P). An “Incomplete” grade (I) will be given in this course only when extenuating circumstances warrant such action, as determined by the instructor. Students who do not complete the course work within the semester—and who have not arranged for an incomplete grade to be assigned—will receive a letter grade corresponding to the total points earned as described above. A “Withdrawal” grade (W) will be assigned to students who are unable to complete the course and withdraw no later than **April 5, 2019**.

Review Session:

Students are encouraged to attend review session for this class. Review sessions will usually in **Filley Hall or Food Industry Complex Room #42 (Auditorium) at 6 PM**. This is apart from the class schedule. Review session is to clarify doubts on the exam portion and will include peer discussion on specific topics for the upcoming exam. Please mark your calendar to maximize your learning from the class.

Exam 1 review session: Jan 24, 2019

Exam 2 review session: Feb 12, 2019

Exam 3 review session: Mar 5, 2019

Exam 4 review session: Apr 2, 2019

Exam 5 review session: Apr 25, 2019

Syllabus changes:

Please note that this syllabus and the schedule are subject to change. All changes will be announced during class, and revised versions of the syllabus and schedule will be uploaded to Canvas.

Course Schedule

Wk	Date	Topic	Chapter	Due Dates
1	Jan 8	Introduction; Nutrition research		
	Jan 10	Cell structure and proteins	1	Student Card
2	Jan 15	Energy metabolism	1	
	Jan 17	Digestive tract; Accessory organs	2	Submit your poster title and 5 articles
3	Jan 22	Regulation of digestion and absorption	2	Quiz 1
	Jan 24	Digestive disorders, probiotics and gut health	2	Synopsis of first article due and Review session at 6 PM
4	Jan 29	●●● Exam 1 ●●●		
	Jan 31	Carbohydrate structure; intake patterns	3	

5	Feb 5	Carbohydrates digestion and absorption	3	Synopsis of 2 nd article due
	Feb 7	Carbohydrate metabolism	3	Quiz 2
6	Feb 12	Fiber: definitions and structure	4	Review session at 6 PM
	Feb 14	●●● Exam 2 ●●●		
	Feb 15	Friday-no class day		Synopsis of 3 rd article due
7	Feb 19	Lipid categories and digestion	5	Quiz 3
	Feb 21	Lipid transport/metabolism	5	Synopsis of 4 th article due
8	Feb 26	Atherosclerosis and heart disease		Quiz 4
	Feb 28	Protein digestion and absorption	6	Synopsis of all 5 articles due
9	Mar 5	Amino acid metabolism	6	Review session at 6 PM
	Mar 7	●●● Exam 3 ●●●		
10	Mar 12	How to make a good poster?		
	Mar 14	Integration of metabolism; Fed/fasting states	7	Quiz 5
	Mar 15	Friday-no class day		Draft module poster due
11	Mar 19	Spring Break		
	Mar 21	Spring Break		
12	Mar 26	Diabetes; Metabolic syndrome	7	
	Mar 28	Energy sources during physical activity; Body weight and BMI	7 8	Draft module poster peer review due
13	Apr 2	Body composition; Energy expenditure	8	Quiz 6 and Review session at 6PM
	Apr 4	●●● Exam 4 ●●●		
14	Apr 9	Water-soluble vitamins	9	
	Apr 11	Vitamins A and D	10	Final poster Due
15	Apr 16	Vitamins E and K	10	Quiz 7
	Apr 18	Major minerals; osteoporosis	11	Quiz 8
16	Apr 23	Fluid balance; electrolytes	12	
	Apr 25	pH balance, Hypertension, and Trace minerals	12, 13 14	Review session at 6 PM
	May 2	●●● Final Exam●●● (Thursday. 3:30-5:30 PM)		

ACE 10 Project Grading Standards

Component	Excellent	Good	Mediocre	Unacceptable	Possible points
Main characteristics of disease or health outcome you chose	Explanation of disease characteristics is accurate, complete and concise; draws upon relevant scientific literature	Explanation of disease characteristics is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of disease characteristics is somewhat accurate and complete; somewhat verbose	Explanation of disease characteristics is mostly inaccurate or incomplete; lacks scientific validity	20
Impact of nutrient, dietary pattern, physical	Explanation of impact is accurate, complete and	Explanation of impact is mostly accurate and complete; mostly	Explanation of impact is somewhat accurate and	Explanation of impact is mostly inaccurate or	20

activity, or other lifestyle factor	concise; draws upon relevant scientific literature	draws upon relevant scientific literature	complete; somewhat verbose	incomplete; lacks scientific validity	
Gaps in knowledge	Explanation of knowledge gaps is accurate, complete and concise; draws upon relevant scientific literature	Explanation of knowledge gaps is mostly accurate and complete; mostly draws upon relevant scientific literature	Explanation of knowledge gaps is somewhat accurate and complete; somewhat verbose	Explanation of knowledge gaps is mostly inaccurate or incomplete; lacks scientific validity	20
Presentation of research data	Charts/graphs/figures are accurate, easily interpreted, and uncluttered and included all five articles	Charts/graphs/figures are mostly accurate and can be interpreted and included data from 4 articles	Charts/graphs/figures are somewhat accurate, but may be difficult to interpret and included data from 3 articles	Charts/graphs/figures are mostly inaccurate and difficult to interpret; legends and/or citations are absent	20
Take-home message	Message is concise and supported by scientific evidence; easily understood by a layperson	Message is supported by scientific evidence; generally understood by a layperson	Message is somewhat supported by scientific evidence; generally understood by a layperson; somewhat verbose	Message is poorly supported by scientific evidence; difficult to understand; verbose	10
References and citations	References are accurate; citations are accurate and directly link to the research data presented	References are mostly accurate; citations are mostly accurate and directly link to the research data presented	References are somewhat accurate; citations are somewhat accurate, but may not directly link to the research data presented	References are inaccurate; citations are inaccurate and are not linked to the research data presented	10
Total					100