

5-5-2015

The Importance of Educating Dental and Dental Hygiene Students on the Correlation between Vitamin D Deficiency and Dental Caries

Sara Brown

Western Kentucky University, sara.brown689@topper.wku.edu

Follow this and additional works at: http://digitalcommons.wku.edu/stu_hon_theses



Part of the [Dental Public Health and Education Commons](#)

Recommended Citation

Brown, Sara, "The Importance of Educating Dental and Dental Hygiene Students on the Correlation between Vitamin D Deficiency and Dental Caries" (2015). *Honors College Capstone Experience/Thesis Projects*. Paper 542.
http://digitalcommons.wku.edu/stu_hon_theses/542

This Thesis is brought to you for free and open access by TopSCHOLAR®. It has been accepted for inclusion in Honors College Capstone Experience/Thesis Projects by an authorized administrator of TopSCHOLAR®. For more information, please contact topscholar@wku.edu.

THE IMPORTANCE OF EDUCATING DENTAL AND DENTAL HYGIENE
STUDENTS ON THE CORRELATION BETWEEN VITAMIN D DEFICIENCY AND
DENTAL CARIES

A Capstone Experience/Thesis Project

Presented in Partial Fulfillment of the Requirements for

the Degree Bachelor of Science with

Honors College Graduate Distinction at Western Kentucky University

By:

Sara Brown

Western Kentucky University
2015

CE/T Committee:

Dr. Terry Dean, Advisor

Professor Becky Tabor

Dr. Karen Furgal

Approved by

Advisor
Department of Allied Health

Copyright by
Sara Brown
2015

ABSTRACT

Recent studies from the U.S. National Library of Medicine have shown that vitamin D deficiency is rapidly increasing among the adult population. Vitamin D deficiency has many effects on the body, such as bone pain and muscle weakness. A strong correlation has been noticed in humans with vitamin D deficiency and decreased exposure to natural sunlight, which is vital to absorb the vitamin D they have ingested. Those suffering from milk allergies or are following a strict vegan diet may also have some implication of a vitamin D deficiency. Recent studies (Hujuel, 2012) have also shown that there is a correlation between vitamin D and dental caries. This project will explore the correlation between vitamin D deficiency and caries and will research if dental and dental hygiene students are being informed about this rising issue regarding the link between caries and vitamin D.

Keywords: Capstone Experience, Thesis, CE/T, Abstract, Dental Hygiene, Dental Caries, Dental, Dentist, Vitamin D Deficiency, Honors College,

Dedicated to

My Lord and Savior Jesus Christ, whose unconditional love and support makes me able
to attain such success and honor.
Along with my family and friends whose support, encouragement, love, and prayers have
molded me into the person I am today.

ACKNOWLEDGEMENTS

This project would not have been possible without the help, knowledge, and support of so many people. I am grateful to Dr. Terry Dean, my CE/T advisor, for his insightful critiques of my work, continual intellectual encouragement and support, and willingness to give so much of his time to push me to be a scholar. Many thanks to the other members of my committee— Becky Tabor and Karen Furgal—for their insight and encouragement.

I would like to thank the dental hygiene faculty for their dedication to teach me dental hygiene practices through constructive criticism and intellectual encouragement.

Finally, I would like to thank my friends and family. Thank you Mom, Dad, Jena, Laura, Olivia, Grandpa and Grandma Tomlinson, Grandma Delaney, and Genny for your love, support, and encouragement throughout my years of schooling. Also to Zac, whose love and support gave me the confidence and perseverance necessary to finish this project and my degree.

VITA

January 14th, 1993.....Cincinnati, Ohio

2010.....People to People Ambassador
Program/Educational trip to Europe
(Belgium, The Netherlands, France,
England)

2011.....Calvary Christian High School,
Taylor Mill, KY

2013.....The Medallion Honor Society

2013.....National Society of Collegiate Scholars

2013.....Golden Key International Honor Society

2013.....American Dental Hygienists Association

2014.....National Residence Hall Honorary

2015.....Judge for the Science and Engineering
Fair of Northern Kentucky

2015.....Dr. James and Virginia Woodward
Scholarship at WKU

2015.....Bachelor of Science,
Western Kentucky University

FIELDS OF STUDY

Major Field: Dental Hygiene

TABLE OF CONTENTS

	<u>Page</u>
Abstract.....	ii
Dedication.....	iii
Acknowledgements.....	iv
Vita.....	v
Chapters:	
1. Introduction.....	1
2. Literature Review.....	3
3. Methods and Methodology.....	8
4. Results.....	9
5. Conclusion.....	11
References.....	14
Appendix A.....	16
Figure A.1.....	16
Figure A.2.....	17
Appendix B.....	18
Figure B.1.....	18
Figure B.2.....	19
Figure B.3.....	20

CHAPTER 1

INTRODUCTION

Independently, vitamin D deficiency and caries are rising concerns of the dental and dental hygiene community. However, some may not know that there is a correlation between vitamin D deficiency and caries. Is this correlation being taught in dental and dental hygiene schools? Are teachers aware of this correlation? This study will examine all Kentucky, Ohio, and Indiana dental and dental hygiene schools on their knowledge and use of this correlation.

Significance

The results of this study will not only help Kentucky, Ohio, and Indiana schools, but will also allow other dental and dental hygiene schools across the country to know what students are being taught relative to this topic and why they should teach the correlation between vitamin D deficiency and caries.

Definitions

Caries: cavities; chronic or acute decay and breakdown of soft or calcified dental tissue

Controlled clinical trial: a study testing a specific drug or other treatment involving two (or more) groups of patients with the same disease.

DMFT index: decayed, missing, and filled teeth (DMFT) index is one of the most common methods in oral epidemiology for assessing dental caries prevalence as well as dental treatment needs among populations.

Meta-analysis: comprises statistical methods for contrasting and combining results from different studies in the hope of identifying patterns among study results, sources of disagreement among those results, or other interesting relationships that may come to light in the context of multiple studies.

Vitamin D: refers to a group of fat-soluble secosteroids responsible for enhancing intestinal absorption of calcium, iron, magnesium, phosphate, and zinc.

Assumptions

This research is based on the assumption that results from previous research (2001, 2012, 2013, 2014) are accurate. It is assumed that these researchers were diligent and successful in obtaining reliable data.

Limitations

Limitations of this study include valid representation and undocumented teaching. Only Kentucky, Ohio, and Indiana schools were surveyed in this study; so it is not a good predictor of what other schools in the nation include or do not include in their curriculum. Another limitation of this study is undocumented teaching. Surveys were only sent to the deans/program directors of the twenty-six dental and dental hygiene schools. It is not known if the deans/program directors communicated with their faculty members about what is being taught in their classes outside of the curriculum.

The next chapter will be a review of the literature. It will explain current research regarding the correlation between vitamin D deficiency and caries.

CHAPTER 2

LITERATURE REVIEW

Vitamin D deficiency is at a growing rate among adults and children nationwide. According to Harvard's T.H. Chan School of Public Health, worldwide, an estimated 1 billion people have inadequate levels of vitamin D in their blood, ("Vitamin D and Health", n.d., para 2). Harvard further reports that deficiencies can be found in all ethnicities and age groups ("Vitamin D and Health"). This is a concern because vitamin D is now thought to have disease-fighting capabilities. Dental caries, which is considered a worldwide pandemic according to BioMed Central (Edelstein, 2006), is thought to be one of the many diseases in which vitamin D has a healing effect. Hujoel was interested in this correlation and began to research the effect that vitamin D had on caries.

In 2012, Hujoel examined 24 controlled clinical trials (CCTs) worldwide encompassing 2,827 male and female children aged 2-16 using the current techniques of meta-analysis (Hujoel, 2012). The 24 trials that were used met the following criteria: reported incident caries and follow-up time, inclusion of a concurrent control group, administration of vitamin D for the purpose of prevention, and use of a prospective trial design, not retrospective. Eleven independent investigator teams conducted 24 CCTs and reported a total of 38 vitamin D efficacy estimates: 17 used D₃ (median dose 800 IU/day), 15 used D₂ (median dose 3,750 IU/day), and 6 used UV radiation therapy (pg. 90 and 92). For the various treatment methods, Hujoel found a 74% reduction in caries in UV trials, a

49% reduction in caries in vitamin D₃ trials, and a 36% reduction in caries in vitamin D₂ trials. Overall, there was a 47% reduced risk in getting caries in the vitamin D groups than in the control groups. Hujoel concludes his meta-analysis:

In summary, this systematic review of CCTs suggests that vitamin D exposures in early life may play a role in caries prevention. This promising evidence base may be relevant to current challenges in improving health as vitamin D levels in the population are decreasing and dental caries among U.S. children is increasing.

Hujoel's meta-analysis opened the doors for more research to be conducted regarding the correlation between vitamin D and caries.

Also interested in the correlation between vitamin D and caries was William Grant. Grant reviewed a history of studies of dental caries with regards to vitamin D, geographical location, and available solar UVB doses. Several studies were done in the 1920s and 1930s regarding vitamin D and caries. May Mellanby (1920) and coworkers in Sheffield, England, conducted studies, with the first of these experiments done using dogs (Grant, 2001, pg. 193). The results of those studies found that vitamin D stimulated the calcification of teeth. Additional studies, using children, were conducted in New York that measured dental caries with respect to season, artificial UVB irradiance, and oral intake of vitamin D. The results of these studies concluded that one would need an intake of 800 IU/day to prevent caries effectively (pg. 193). A cross sectional study conducted in 1933-1934 by Bion East found that dental caries was inversely related to mean hours of sunlight/year. Those living in the sunny west (3,000 hour of sunlight/year) had half as many carious lesions as those in the much less sunny northeast (<2,200 hours of sunlight/year); rates in areas with intermediate annual hours of sunlight fell between

those for the extremes of sun exposure (pg. 194). Several studies conducted in Oregon in the 1950s found that dental caries prevalence was lower in the sunnier parts of the state due to vitamin D and its effects on calcium metabolism (pg. 194). Grant's literature review brought together past studies that support the theory that vitamin D can reduce the risk of dental caries.

Literature reviews done by both Hujuel (2012) and Grant (2001) set the basis for further research. Using the information from past research along with more current methodologies, studies can now be conducted to validate that vitamin D has a healing effect on caries.

Schroth, Levi, Sellers, Friel, Kliewer, and Moffatt (2013) investigated the vitamin D status of children with severe early childhood caries (S-ECC). This was a case-control study conducted from 2009 to 2011 in the city of Winnipeg, Manitoba, Canada. Preschool children (n = 44) with S-ECC were selected from a local health center on the day they were to have dental surgery under general anesthetic. As controls for the study, 122 caries-free preschool children from the community were selected. A blood draw was taken from the children to check vitamin D, calcium, parathyroid hormone, and albumin levels. Parents were also interviewed and completed a questionnaire regarding the child's nutritional habits, oral health, and family demographics.

The results of this study revealed that children with S-ECC had significantly lower mean levels of vitamin D, calcium, and albumin, and significantly higher levels of parathyroid hormone than caries-free children. Analyses of questionnaires revealed that S-ECC, infrequent milk consumption, and winter season were significantly associated with lower vitamin D levels. Low vitamin D levels, low household income, and poorer

ratings of the child's general health were significantly associated with S-ECC (pg. 175-177). In conclusion of this study the author writes:

As a result of these findings, it may be advantageous for primary care providers (including dentists and physicians) to consider serum vitamin D status when assessing the child's overall health. Specifically, recommending vitamin D supplementation for children at risk of dental caries may result in a decrease in the overall prevalence of S-ECC... (pg. 180).

The findings of this study demonstrated a clear relationship between vitamin D and caries. Using the information from this study and other research, health care professionals, specifically dentists and dental hygienists, can educate patients on the effects that vitamin D has on caries.

Also interested by the correlation between vitamin D and caries were Antonenko, Bryk, Brito, Pellegrini, and Zeni (2014). These researchers conducted a cross-sectional study regarding the oral health in young women having low calcium and vitamin D nutritional status. A total of 106 women, age range 20 to 30 years, participated in the study. All subjects participated in the following: lifestyle questionnaire, anthropometrical analysis, nutrient analysis, clinical assessment, biochemical analysis, and statistical analysis. The lifestyle questionnaire included questions about outdoor activities, smoking habits, occupation, childbearing, contraception use, and family history of fractures. Anthropometrical analysis consisted of height and body weight which was then used to calculate body mass index (BMI). The nutrient analysis consisted of the subjects' daily food consumption. Patients' dental and medical records were completed during the clinical assessment. The clinical assessment also consisted of an examination using the

decayed (D), missing (M), and filled (F) teeth (DMFT) index which describes the severity of dental caries in an individual. The plaque index (PI) was used to assess the accumulation of plaque and caries risk was assessed based on the frequency of sugar intake (SI). Biochemical analysis included fasting blood and urine samples. During the statistical analysis, data taken during the study were analyzed and the results were significant ($p = 0.05$).

The results of this cross-sectional study showed that low calcium and vitamin D deficiency does affect the oral health of young adult women. Analyses of dental parameters according to vitamin D levels showed that an inadequacy or deficiency of vitamin D was associated with higher cariogenic risk and high PI, as compared to vitamin D sufficiency (pg. 3-4).

Researchers are continuing to explore the relationship between vitamin D and caries. Dental professionals need to be aware and prepared to discuss this important correlation with their patients as needed. In consideration of this need, are institutions aware of the correlation between vitamin D and caries, and if so are they teaching it to their dental and dental hygiene students? This study will attempt to answer these questions by surveying all dental and dental hygiene schools in the Kentucky, Ohio, and Indiana region on their knowledge and use of this correlation. The next chapter will describe the methodology used to conduct this study.

CHAPTER 3

METHODS AND METHODOLOGY

This project will research if dental and dental hygiene students are being informed about the link between caries and vitamin D. The results of this study will not only help Kentucky, Ohio, and Indiana schools, but will also allow other dental and dental hygiene schools across the country to know what they are teaching their students and why they should teach about the correlation between vitamin D deficiency and caries. This chapter will include the methods used to obtain results and the methodology used to arrive at a conclusion.

This will be a descriptive study using a survey to obtain results (Appendix A, Figure A.2). The survey will consist of four 'Yes' or 'No' questions and an area for comments. The survey will be sent out to all twenty-six dental and dental hygiene schools in Kentucky, Ohio, and Indiana. Surveys will be sent through e-mail and respondents will be given one week to complete the survey. After the close of the survey, results will be analyzed and a conclusion will be made. Based on the results of the survey, a conclusion will be made using the highest percentage of 'Yes' or 'No' questions answered.

The following chapter details the analysis of the survey conducted. It will analyze whether dental and dental hygiene schools in Kentucky, Ohio, and Indian are including the correlation between vitamin D deficiency and caries in their curriculum.

CHAPTER 4

RESULTS

This chapter will examine the results from the surveys that were sent out to twenty-six dental and dental hygiene schools. The survey was used to examine which dental and dental hygiene schools are teaching the correlation between vitamin D deficiency and caries. The surveys were sent to the deans or program directors of each dental and dental hygiene program in the Kentucky, Ohio, and Indiana region. Out of the possible twenty-six dental and dental hygiene schools, thirteen responded. The results are reviewed in the next paragraph as well as visually represented in Appendix B.

The results of the surveys show that six out of the responding thirteen schools (46.15%) do teach the relationship between vitamin D deficiency and caries; however, seven out of the thirteen schools (53.85%) do not teach this relationship. Another interesting piece of data found was that nine out of the thirteen schools (69.23%) are aware of the correlation between vitamin D deficiency and caries. However, only six of these nine schools (66.67%) teach it in their curriculum and the other three schools (33.33%) do not teach it at all. As stated earlier, six out of the thirteen schools (46.15%) do teach the relationship between vitamin D deficiency and caries and seven out of the thirteen schools (52.63%) do not teach this relationship. Out of the seven schools that marked they do not teach the correlation in their curriculum, three of the seven schools (42.86%) marked that they were aware of the correlation; this means that only six of the

nine schools (66.67%) that are aware of the correlation between vitamin D deficiency and caries actually teach it. The results show that even when schools are aware of the correlation between vitamin D deficiency and caries, it does not necessarily mean that it is taught in their curriculum. The results also show that over half of the dental and dental hygiene schools in the Kentucky, Ohio, and Indiana region do not teach about the correlation between vitamin D deficiency and caries in their curriculum. The next chapter will discuss the importance of this study, what further research is needed, and any posing questions.

CHAPTER 5

CONCLUSION

The previous chapters have discussed what the correlation between vitamin D deficiency and caries is as well as analyzed results based on the data presented in a survey sent out to local dental and dental hygiene schools. Dental caries, which is considered a worldwide pandemic according to BioMed Central (Edelstein, 2006), and vitamin D deficiency are at a growing rate among adults and children nationwide. These increasing rates require a greater importance for patients with a vitamin D deficiency, caries, or both to understand the correlation between these conditions. It is up to both dentists and dental hygienists to teach this correlation to their affected patients. The question remains, is this correlation being taught in the curriculum at dental and dental hygiene schools in Kentucky, Ohio, and Indiana? After analysis of the data collected, less than half of the schools that responded teach this correlation. If students are not being taught this correlation in school, then how are they to properly teach their patients about his/her oral condition? As a rising concern of the community, dental and dental hygiene schools should consider reevaluating their curriculum to make room for teaching the correlation between vitamin D deficiency and caries.

As stated earlier, limitations of this study include valid representation and undocumented teaching. Only Kentucky, Ohio, and Indiana schools were surveyed in this study; so it is not a good predictor of what other schools in the nation include or do not

include in their curriculum. Another limitation of this study is undocumented teaching. Surveys were only sent to the deans/program directors of the twenty-six dental and dental hygiene schools. It is not known if the deans/program directors communicated with their faculty members about what is being taught in their classes outside of the curriculum.

Further research in this field is needed. According to a comment placed in the survey, one dental/dental hygiene school thinks that the evidence is inconclusive, and for this reason they do not teach it in their curriculum. This school stated that they would like to see the scientific evidence for the correlation before they would add it to their curriculum. If there were more evidence concerning the correlation between vitamin D deficiency and caries, then possibly more schools would be teaching it. Further research is needed in order to gain a better understanding if dental and dental hygiene schools nationwide are teaching the correlation between vitamin D deficiency and caries in their curriculum.

Posing questions for new research include: are dentists and dental hygienists in the office aware of this correlation, and are they teaching this correlation to their affected patients? This new research would show what dental and dental hygiene schools are teaching and would also evaluate if current dentists and dental hygienists are up to date on current research. Vitamin D deficiency and caries are both on the rise and education of the correlation between the two is not at the level it should be. In order to give proper care to patients, dental professionals should be able to evaluate and educate the patient on their risks for a decrease in oral health. If both the dental team and the patient are

properly educated on the correlation between vitamin D deficiency and caries, it will allow for optimal oral care to be given to the patient and possibly a reduction in dental caries.

REFERENCES

- Antoneko, O., Bryk, G., Brito, G., Pellegrini, G., & Zeni, S. (2014). Oral health in young women having a low calcium and vitamin D nutritional status. *Clinical Oral Investigations*. Retrieved February 20, 2015, from MEDLINE.
- Cebulla, B. (2012, November 20). Information on the latest vitamin D news and research. Retrieved February 20, 2015, from <https://www.vitamincouncil.org/blog/systematic-review-supports-vitamin-d-deficiency-dental-caries-link/>
- Create Surveys, Get Answers. (n.d.) Retrieved March 20, 2015, from <https://www.surveymonkey.com/>
- Edelstein, B. (2006, June 15). The Dental Caries Pandemic and Disparities Problem. Retrieved February 20, 2015, from <http://www.biomedcentral.com/1472-6831/6/S1/S2>
- Grant, W. (2011). A review of the role of solar ultraviolet-B irradiance and vitamin D in reducing risk of dental caries. *PubMed*, 3(3), 193-198. Retrieved February 20, 2015, from PubMed.
- Grant, W. (2011, September 27). Information on the latest vitamin D news and research. Retrieved February 20, 2015, from <http://www.vitamincouncil.org/blog/ultraviolet-b-and-vitamin-d-reduce-risk-of-dental-caries/#>

- Harvard University. (2015). Vitamin D and Health. (n.d.). Retrieved February 20, 2015, from <http://www.hsph.harvard.edu/nutritionsource/vitamin-d/>
- Hujoel, P. (2012). Vitamin D and dental caries in controlled clinical trials: Systematic review and meta-analysis. *Nutrition Reviews*, 71(2), 88-97. Retrieved February 20, 2015, from CINAHL with Full Text.
- Information on the latest vitamin D news and research. (2014, September 1). Retrieved February 20, 2015, from <https://www.vitamincouncil.org/health-conditions/dental-caries/#>
- Mientka, M. (2014, April 20). Toddler's Cavities May Be Thanks To Mother's Low Vitamin D. Retrieved February 20, 2015, from <http://www.medicaldaily.com/low-vitamin-d-levels-during-pregnancy-linked-toddlers-cavities-278286>
- Schroth, R., Levi, J., Sellers, E., Friel, J., Kliwer, E., & Moffatt, M. (2013). Vitamin D status of children with severe early childhood caries: A case-control study. *BMC Pediatrics*, 13, 174-174. Retrieved February 20, 2015, from MEDLINE.
- University of Washington. (2012, November 27). Vitamin D linked to lower rates of tooth decay. ScienceDaily. Retrieved February 20, 2015 from www.sciencedaily.com/releases/2012/11/121127130321.htm

APPENDIX A

Figure A.1 – Informed Consent Document

INFORMED CONSENT DOCUMENT

Project Title: The Importance Of Educating Dental And Dental Hygiene Students
On The Correlation Between Vitamin D Deficiency And Dental Caries

Investigator: Sara Brown, Allied Health, 270-745-2427

You are being asked to participate in a project conducted through Western Kentucky University. The University requires that you give your agreement to participate in this project.

The investigator will explain to you in detail the purpose of the project, the procedures to be used, and the potential benefits and possible risks of participation. You may ask any questions you have to help you understand the project. A basic explanation of the project is written below. Please read this explanation and discuss with the researcher any questions you may have. You should keep a copy of this form for your records.

- Nature and Purpose of the Project:** As an undergraduate student in the Department of Allied Health and under the supervision of Dr. Dean in the Department of Allied Health at Western Kentucky University, I am conducting research for a required class project on the importance of educating dental and dental hygiene students on the correlation between vitamin d deficiency and dental caries. The purpose of this survey is to help the researcher study the correlation between vitamin D deficiency and dental caries and will research how educated dental professions and dental students are about this rising issue.
- Explanation of Procedures:** Surveys should only take a maximum of 5 minutes of the respondents' time. All surveys will be conducted online.
- Discomfort and Risks:** There are no foreseeable risks associated with this research project and the probability and magnitude of harm or discomfort anticipated in the research is very minimal.
- Benefits:** While you may not benefit directly from participation in this study, it is hoped that the knowledge gained through your participation will help others at a later time. This project will hopefully help Kentucky, Ohio, and Indiana dental and dental hygiene schools know what they are teaching to their students and why they should be teaching the correlation between vitamin D deficiency and dental caries.
- Confidentiality:** The results will be kept confidential using a database that keeps respondents' answers protected from knowing who submitted each answer.
- Refusal/Withdrawal:** Refusal to participate in this study will have no effect on any future services you may be entitled to from the University. Anyone who agrees to participate in this study is free to withdraw from the study at any time with no penalty.

You understand also that it is not possible to identify all potential risks in an experimental procedure, and you believe that reasonable safeguards have been taken to minimize both the known and potential but unknown risks.



Your continued cooperation with the following research implies your consent.

THIS PROJECT HAS BEEN REVIEWED AND APPROVED BY
THE WESTERN KENTUCKY UNIVERSITY INSTITUTIONAL REVIEW BOARD
Paul Mooney, Human Protections Administrator
TELEPHONE: (270) 745-2129

WKU IRB# 15-400
Approval - 4/22/2015
End Date - 5/31/2015
Expedited
Original - 4/22/2015

Figure A.2 – Institutional Survey for Dental and Dental Hygiene Educators

Institutional Survey for Dental and Dental Hygiene Educators.

1. Are you aware that there is a correlation between Vitamin D deficiency and caries?
(Please circle your answer)

YES or NO

2. Do you think that a correlation between Vitamin D deficiency and caries is important enough to be taught in the curriculum for dental and dental hygiene students?

YES or NO

3. Is the correlation between Vitamin D deficiency and caries taught in the curriculum at your institution?
(Please circle your answer)

YES or NO

If you answered YES, please skip question 4 and go to question 5

If you answered NO, please go to question 4

4. If you answered NO to item 3, would you consider including this correlation between Vitamin D deficiency and caries in the curriculum at your institution?
(Please circle your answer)

YES or NO

5. Any additional comments:

APPENDIX B

Figure B.1 – Data Entry Table

RESPONDENT	Q1: Are you aware?	Q2: Do you think it is important?	Q3: Is it taught in your curriculum?	Q4: If NO to Q3, would you consider including it in your curriculum?
1	YES	YES	NO	YES
2	YES	YES	YES	N/A
3	YES	YES	NO	YES
4	NO	NO	NO	YES
5	YES	YES	NO	YES
6	NO	YES	NO	YES
7	NO	NO	NO	NO
8	YES	YES	YES	N/A
9	NO	YES	NO	YES
10	YES	YES	YES	N/A
11	YES	YES	YES	N/A
12	YES	YES	YES	N/A
13	YES	YES	YES	N/A

Figure B.2 – Summary of Individual Responses

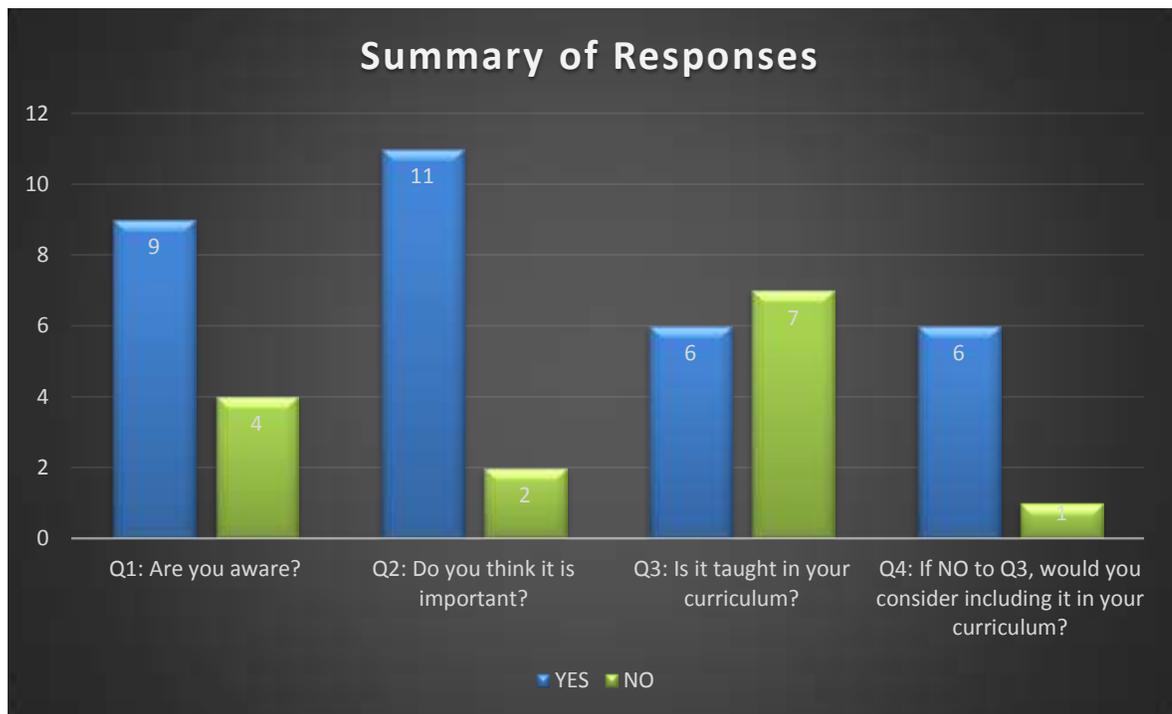
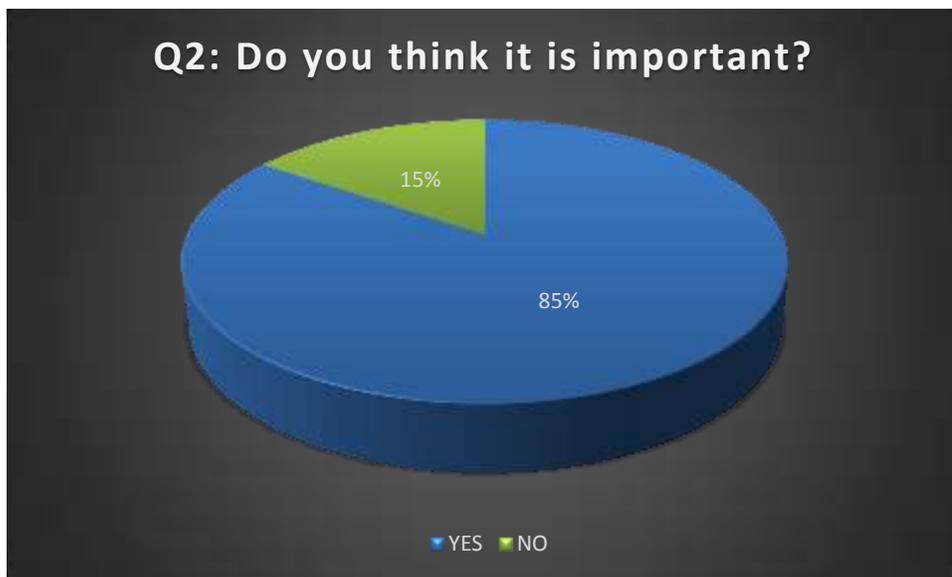
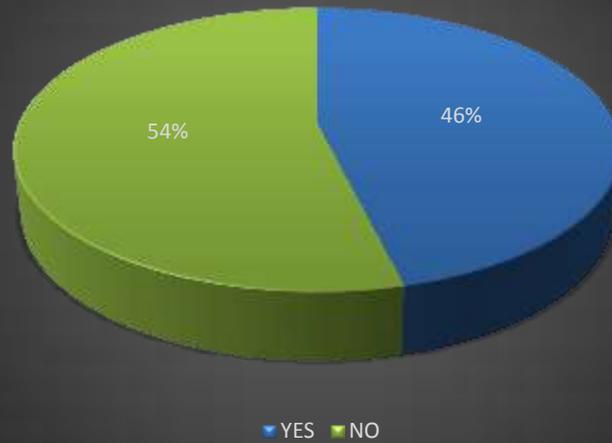


Figure B.3 – Percentage of Individual Responses



Q3: Is it taught in your curriculum?



Q4: If NO to Q3, would you consider including it in your curriculum?

