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Vitamin Basics and Relaying Information to Patients

Introduction

“I just don’t know what’s happened to my body over the years.” I have frequently heard these words from my elders, their stresses about their weakening bodies not uncommon. However, I hadn’t paid much mind to their grumbling until interning at a pharmacy. While the pharmacy I found myself interning at specializes in compounded medication, vitamins and supplements have always been the head pharmacist’s biggest recommendation for patients. Many patients are aware that vitamins are a necessity, but don’t connect their ailments such as high blood pressure or aching bones to vitamin deficiency. Throughout my experience I would hear patients come in with their list of ailments, try out supplements and, much later, come back with beaming faces as they gush about their results. Through the suggestion of my mentor and these experiences, I started researching which vitamins become deficient at various stages of life and what effects these deficiencies can cause.

Once at the age of fifty, the body has trouble absorbing nutrition and vitamins due to the lack of stomach acid (Bouffis). This can lead to a list of symptoms, along with the possibility of one’s condition worsening if not treated properly. Take vitamin D for example, many doctors stressing how it can be essential to supplement your body’s production by changing diets or living habits (Jacobsen). A lack of this vitamin can cause an increase in the fatality risk of a



cardiovascular disease, impair cognitive skills in adults, offset severe asthma in children and even play a role in cancer. While most bodies are able to sustain a healthy medium of producing vitamin D through the supplement of food intake, there are others that require medication to supply enough for the body. There are also vitamins that cannot be produced by the body naturally, such as vitamin B12, which helps create your DNA and the makeup of your red blood cells (Khatri). This vitamin can only be supplied through animal based products and supplements. There are hospitals and clinics that now offer B12 injections to help patients who have difficulty maintain enough through their diets. These are only a couple of examples from the long list of vitamins the human body requires to keep healthy and functioning.

In order to help patients better understand what vitamins do for the body and which vitamins they should be considering to supplement, I decided to create a catalog of various vitamins within the body along with suggestions of how to keep a good balance of the listed vitamins. In order to keep this convenient for the patients, I have decided to split my research into two catalogs, one for each sex and organize it from vitamins usually lacking in infants to the elderly. I hope to be able to answer the question, *what vitamins should most patients supplement and how can that be best conveyed to these patients?*

Background

Welcare Pharmacy is an independent pharmacy specializing in compounding hormone replacement therapy medication. Compounding is the process of creating individualized medication for patients, either because the medication the doctor requires for the patients is not available in a certain form or because unavailable in a certain dosage. Due to new regulations, the number of compounding pharmacies in America have lowered, especially those that create



hormone replacement therapy medication, as a clean room is required. It was here that I completed my internship, my tasks similar to a technician's daily duties. Here, I was introduced to the importance and effects of vitamins.

Vitamins are organic compounds which support the functionality, growth and development of the human body (Wax). Over time, the body changes and the vitamins that are naturally needed and created by the body also changes. Without supplementing these needs, a variety of symptoms can occur, depending on which vitamin is depleted within the body. Children grow up needed to supplement vitamin A, vitamin B, vitamin C, vitamin D, calcium and iron (Benaroch). While seniors should continue to supplement these vitamins, whether through a healthy diet or medication, they should also take care to intake vitamin B12 and Omega 3. As stated earlier, the body cannot create vitamin B12 naturally and seniors have difficulty extracting this vitamin from foods due to a lack of stomach acid. Similar problems arise with other vitamins as one ages, and if a body has not been properly minded, symptoms can arise earlier during one's life. Deficiencies can cause small problems such as appetite loss to an increased risk of fatal diseases.

Most patients are aware of the fact that vitamins support the body, but fail to research deeper into what can be done to keep their bodies maintained. In fact, an article American Nurse Today states, "... their use remains largely unregulated, underscoring the need for better consumer education." Due to this, most supplements are self prescribed by patients. If their self diagnosis is incorrect, there is a risk of overdosing increasing the possibility of a plethora of symptoms to occur (Heinlein). Many patients don't realize that there is a chance of overdosing on vitamins, which can lead to dangerous situations for patients who self prescribe themselves



supplements. This has sparked many in the medical field to advocate for bettering patient understanding on vitamins. A survey conducted in Aga Khan University hospital has revealed that despite 98 percent of respondents claim that they are aware of vitamin supplements, “a majority of the population was unaware of the indications for use of vitamin supplements.” Other questions revealed that patients lack information of specific vitamins and their values, which concluded the study with the view that there is a need to continue educating the public about vitamins (Qidwai 120).

Patients have learned to educate themselves through doctor visits and articles, as well as hearing rumors through the word of others. The latter of the three can be dangerous as the information can be distorted over time or simply inaccurate. This method is the most common and can encourage patients to take the initiative to educate themselves through thorough research. Making adjustments to lifestyles, however, is a much harder topic. Changes cannot be too large or sudden or it may cause a strain in a patient’s life (Mannheim). Being realistic with adjusted changes to plans according to each patient is also important. These are hard to keep in mind for patients who are trying to adjust their habits for a healthier change without the advice and counseling of a medical profession. While each patient is best taught according to the person, it is generally accepted that patients should discuss such matters with experienced medical staff.

Methods

In order to compile data on what information would be most useful for Welcare Pharmacy to relay to their patients, an interview was conducted with the manager, which resulted in a need for more information on Vitamins. While the pharmacy’s specialization lies in



compounded medication, this can only be prescribed by doctors and would not benefit as many patients. Thus, more research was compiled on vitamins and their effects through articles and assorted resources. While most research was done online, Welcare Pharmacy also provided journals and documents. An archive from a PCCA (Professional Compounding Center of America) training was also provided, which entailed basics of the human body. The research was focused on finding what vitamins are most needed to be supplemented based on age groups and sex.

While this data was being gathered, a survey comparing two catalog designs was created for patients in order to find what format would best engage their interest. Design A used focused on smaller paragraphs which allowed more information to be portrayed while supported a more compact look and utilized few simple photos. Design B had bullet points to relay information and was generally spaced out, however, seemed to have more text. This format compromised how much detail would be relayed. It also used a variety of clipart-like images. In order to get a larger variety of ages to respond to this survey, it was sent to a pediatric clinic in San Diego. There were a total of 50 respondents.

In order to better help patients easily find what they are searching for, the catalog was separated into two, one for each sex. The data was presented from the youngest age group, children and adolescents to adults to seniors.

Analysis

Today, there are a great number of patients that are uninformed about vitamins and supplements. A survey conducted by Wolters Kluwer Health sent out to physicians claimed that 53% of the surveyed practitioners reported that misinformed patients has been a large issue in



their line of work (Lowes). Misinformation is not the only problem, as a lack of information can also cause patients to suffer ailments. When asked what patients may not know, a pharmacy technician from Welcare Pharmacy replied, “ ... lot of medication can deplete the natural vitamins in your body. Not only that but as you go throughout life, you’re likely to lose and gain a lot of different vitamins and hormones (Appendix A).”

In order to best inform patients, knowing the most commonly deficient vitamins is essential. Iron deficiency affects over 25% of the American population, the percentage rising to 47% in young children (McLean). Women are also greatly affected by a lack of iron (Clark), 30% of women on their menstrual cycle and 42% of young women going through pregnancy having an inadequate amount of iron in their systems. The diets of patients also greatly affect the iron in their system, vegans and vegetarians suffering the most in the amount of iron being digested without vitamins or supplements. A lack in iron can cause fatigue, stress, a weakened immune system, and most commonly, anemia. Without enough iron within the body, the number of red blood cells declines, leading to a decreased amount of oxygen circulating throughout the body. Studies also show that amount of iodine within patients are insufficient; in fact, almost an entire a third of the world population was found to be affected by iodine deficiency (Pearce, Zimmermann). Iodine deficiencies may cause increased heart rates, shortness of breath as well as weight gain (Kapil). Most commonly, inadequate iodine will create a goiter, an enlarged thyroid gland. A severe deficiency risks mental retardation and developmental abnormalities in young children and infants.

Calcium has also risen to become a frequently deficient vitamin within patients. According to a study done in 2010 about vitamin intake in the U.S, “One survey found that in the



US, less than 15% of teenage girls and less than 10% of women over 50 met the recommended calcium intake.” This same study has found that more than 88% of teenage boys and adult men do not meet the calcium requirement (Bailey). Patients risk osteoporosis, a condition where the bones become weak and brittle, and osteomalacia, the softening of the bones (Aggarwal).

Magnesium is another generally lacking vitamin within patients, specifically hospitalized patients. A study surveying hospitalized patients have found that the number of patients showing symptoms of magnesium deficiency ranges from 9–65% (Wong). Another study conducted from 2005-2006 showed patients that approximately half of the U.S population had less than the required amount of magnesium within their bodies (Rosanoff). The list of possible symptoms are long and include abnormal heart rhythm, muscle cramps, restless leg syndrome, fatigue and migraines. More serious symptoms include insulin resistance and high blood pressure.

While this data was collected, a survey was being conducted to find what format best engaged patients into learning more about vitamins and possible methods of supplementing (Appendix B). There were a total of 50 surveys passed out, 25 to group A and 25 to group B. The survey showed that patients from group A, who ranged from the ages of 0 - 17, preferred design A with 68% (17 people) for design A and 32 (8 people) voting against it. Some noted that this design provided enough information for them to become engaged. Another note was that Design B was easy to skim but didn't provide enough information for them to inquire their doctor about. Group B, patients who were 18 or older, showed a more evened out result, although there was still a majority vote on design A. The survey showed 52% (13 people) of group B preferred design A over design B which had a 48% (12 people) vote.



Action Plan

This information was gathered to put together in an informative booklet for patients to browse. Pharmacies such as Welcare Pharmacy may benefit from providing patients this information in the waiting room where patients can peruse through facts about vitamins that may benefit them. This could also spark a conversation between patients and pharmacists to better the communication between medical practitioners and their patients. Clinics and other medical offices may also share similar benefits. However, with the current booklet created, there is still a large amount of information that can be added to better benefit medical facilities and patients.

If this research were to continue, information regarding supplementing two vitamins together would be a good topic to include. A staff member from Welcare Pharmacy stated, “Selenium Q10, selenium, iodine. Why would we supplement them both ... Why would you put rusberitole in a capsule along with circocalamin, for example.” Being able to provide information such as what vitamins are typically depleted from by what factors such as diet or medications would also be something to research and include. If possible, information regarded what vitamins are affected by aging would also be helpful and bring more relevance to more patience.

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Appendix A

Nguyen, Lizbeth. Personal Interview. 13 October 2017.

Interviewer: Okay, so I'm going to ask you some questions regarding compounding and pharmacy in general. Is that okay?

Lizbeth Nguyen: Yeah, go ahead.

Interviewer: Okay, so what kind of compounds are you guys most frequently asked to make?

Lizbeth Nguyen: Well, we tend to do hormone replacement therapy: progesterone oral capsules, progesterone topical cream, estrogen topical cream, estrogen-progesterone capsules, testosterone cream. Some with have DHEA, so for creams and for most of our compounds, that is a big one and a lot of people tend to get hormone replacement therapy and they prefer a compound because the hormones we use are bioidentical rather than the synthetic hormones.

Interviewer: So, obviously a lot of people come to Welcare for their compounds. What is something patients don't think about when taking these compounds?

Lizbeth Nguyen: Well, this isn't just with compounds, but a lot of medication can deplete the natural vitamins in your body. Not only that but as you go throughout life, you're likely to lose and gain a lot of different vitamins and hormones.

Interviewer: So would it be helpful if there was a simple booklet designed to aim towards patients that informed them about supplementing the body?

Lizbeth Nguyen: Yeah! With the hormones and stuff, that pharmacist should already know but what we don't really have is a lot of information is about supplements, like what's turmeric good for? What is curumin good for? Selenium Q10, selenium, iodine. Why would we supplement



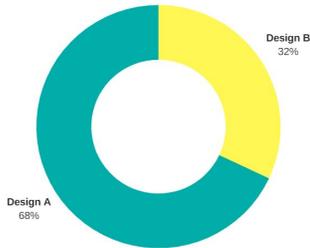
them both because [the owner] likes to focus on supplements and we have made supplement capsules in the past. Why would you put rusberitole in a capsule along with circocalamin, for example. I think that would be really cool: if we had a list of natural ingredients we use sometime and how they're useful.



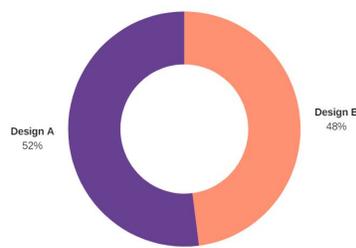
Appendix B

Survey Results

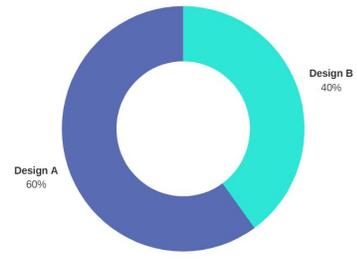
Which Design Better Engages Your Interest
Ages 0 - 17



Which Design Better Engages Your Interest
Ages 18+



Which Design Better Engages Your Interest

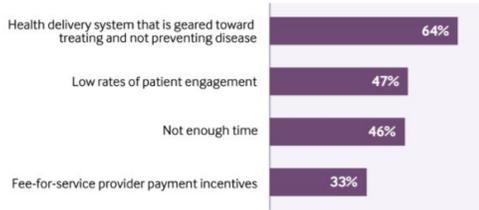


For this survey, the population was split into two groups, one being between the ages of 0 and 17 while the other consisted of people 18 or older. The first group showed that 68% (17 people) voted that design A better engaged them while 32% (8 people) voted design B promoted better engagement. The second group had 52% (13 people) agreed that design A was better at engaging them while the other 48% (12 people) agreed that design B was better. The collected consensus of both groups found that 60% (30 people) agreed on design A while the other 40% (20 people) agreed on design B.

Appendix C

Web Analytics

Biggest Challenges in Improving Patient Health Outcomes



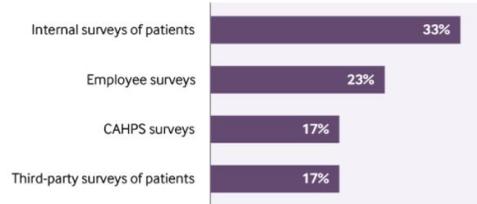
What are your organization's biggest challenges in improving health outcomes for your patients?

Sample size = 340, Multi-response

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Effectiveness of Various Approaches

Completely Effective or Mostly Effective

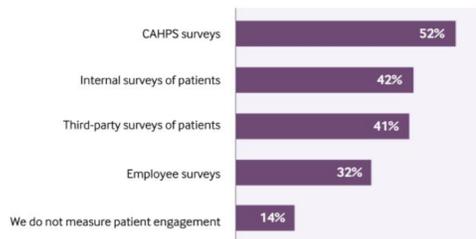


How effective do you find each of the following approaches?

Sample size = 340

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Patient Engagement Measurement and Tracking

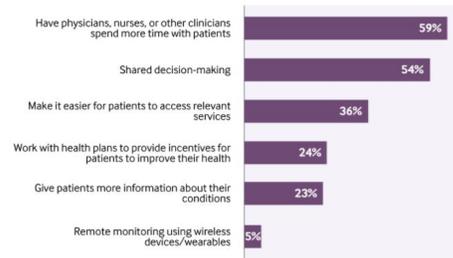


How does your organization measure and track patient engagement?

Sample size = 340, Multi-response

NEJM Catalyst (catalyst.nejm.org) © Massachusetts Medical Society

Most Effective Patient Engagement Initiatives



What are the top two initiatives that are most effective at improving patient engagement?

Sample size = 340, Multi-response

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