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April 7, 2020

Diabetic Amputations: How to Improve Post-Surgical Outcomes

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a thesis submitted to the Faculty of Emory College of Arts and Sciences  
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Abstract  
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Diabetic amputations are rising in the United States, most specifically with the younger generation (Caffrey 2018). Post-surgical outcomes of diabetic amputations are poor, with high re-amputation rates (Izumi et al. 2006, 566), and high rates of psychological distress (Coffey et al. 2009, 1065, 1066). However, post-surgical protocol does not emphasize psychological treatment regardless of the trauma associated with an amputation. Between poor outcomes and, what is argued in this thesis, inadequate treatment plans, re-evaluating protocol is necessary. Online health forums are becoming increasingly common, and thus I chose to look into the reddit forum r/amputee in order to further understand diabetic amputee's unfulfilled needs and their lived experiences. 376 posts were coded for on reddit for different topics related to diabetic amputations. This thesis discusses the analysis of these posts through a quality of life lens and explains themes that surfaced relating to socioeconomic and nutrition, mobility, psychological implications, and in the context of current treatment plans and online health communication. Ultimately, this reddit forum indicated a void in the current post-surgical protocol that must be filled, specifically in regards to psychological care. Analysis also demonstrated a willingness to participate in online health communication, and the potential to expand sites like reddit via maintaining peer to peer communication while adding the guidance of healthcare professionals to the site, as an avenue to improve the quality of life for diabetic amputees.

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## 1.0 Introduction

I opened up the zoom call, and patiently awaited my friend to join. She appeared with her bright demeanor and we began chatting. What started off as a casual conversation quickly turned into an intellectual discussion. She mentioned her time as an EMT the previous summer, driving patients to and from a dialysis center. She learned about patients lived experiences, and other health issues besides kidney failure. Knowing that kidney issues are often associated with diabetes, I asked, “Did any of them have diabetic amputations?” To my surprise, she had encountered diabetic amputees, and this sparked a deeper discussion about the healthcare system. She stated,<sup>1</sup>

“There’s an article that I read from my classes and it was called putting the patient back together. And it was talking about how medicine has become so increasingly symptom focused. It kind of started off like, oh let’s treat this sick person now it’s like oh you gotta go all the way down to the cellular level and understand ever little mechanism that’s going on and all that’s great, and we need that, but how do you go from that and looking at every organ system separately to actually putting it back together and realizing everything is interconnected. I think that translates into mental health and positive outcomes.”

She was shocked by the number of patients who also suffered from diabetic amputations, and at times it was really hard for her to witness. She saw patients go to

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<sup>1</sup> I conducted this interview for a methods class last fall. This is an interview for expert opinion and is not subject to IRB approval. However, I received consent to use this information in my thesis from the de-identified individual.

inadequate rehab facilities with wildly underwhelming resources and limited treatment. A predominant cohort of the patients she encountered used Medicare and Medicaid and could not receive adequate care. The patients understood they were getting insufficient services, yet their public health insurance did not cover certain treatments and they could not afford supplemental insurance.

Her experience with these patients illustrates something that is not unique. Mental health resources are hard to come by, and, depending on socioeconomic and insurance status, extra types of care are out of reach for many. Furthermore, there was a lack of basic psychological support for patients on that ambulance rig, specifically those suffering from diabetic amputations. She agreed that mental health is not a priority when it comes to diabetic amputations, and this is a big problem. She explained “A lot of times, they just, you know, cut off a limb and then say, ‘Okay be on your way.’ A lot of people don’t know how to deal with the psychological aspect of physical trauma, and more accessible resources would be really helpful.”<sup>2</sup>

Diabetic amputations are inherently a traumatic event. Diabetic complications can progress rapidly – trauma can lead to infection and subsequent amputation in a short period, giving a lack of adequate time to process what the heck just happened. While perhaps unsurprising, this sequence of events has psychological ramifications. Amputations affect an individual’s biomechanics, their lived experiences, and psychological state. Experts have noted this too. Coffey et al. suggests that those with amputations are at higher risk for psychological distress such as anxiety and depression (1065, 2009), yet

---

<sup>2</sup> This conversation was edited minorly for clarity.

current protocol does not, I argue, offer sufficient emphasis on the psychological aspects of amputation. For example, the Brigham and Women's protocol for lower extremity amputations has great limitations to the emotional support these patients are receiving. While providing extensive information regarding the physical care of the patient after surgery, Brigham and Women's protocol simply suggests providing emotional support and helping patients feel in control (Standard of Care, 20). Not only do these amputees suffer psychological distress related to their illness and surgery, but recovery rates without complications are low (Mandolino 2016, 401, 403). These higher than average rates of psychological distress and high re-amputation rates suggest that more attention should be placed on the psychological consequences of diabetic amputation in order to improve patient outcomes (Caffrey 2018; Coffey 2009, 1065, 1066; Mandolino 2016, 403).

Diabetic amputations are skyrocketing to "pandemic" levels, according to experts (Font-Jimenez et al., 2020, 107). Diabetes currently affects more than one hundred million Americans, which corresponds to around 9.4% of the entire United States population (CDC Press Releases 2016). If improperly managed, diabetes can progress to more serious complications, such as non-healing wounds, which lead to infection, which lead to amputations (Avoiding Amputation). Furthermore, 75% of all lower extremity amputations are due to diabetic complications, (Narres et al. 2017, 2), a statistic that indicates a need for action on this debilitating consequence.

Diabetic prevention, management, and treatment programs are failing individuals. This is especially evident when one looks diabetic amputations statistics, and at the current treatment of conditions that can lead to amputation. Diabetic amputations are rising, especially in the younger population (Caffrey, 2018); and, re-amputation rates (after a

previous amputation) have been shown to be as high as 60.7% (Izumi et al., 2006, 566). This is an alarming statistic, one that is especially not hopeful for the younger generation, suggesting the need for more effective alternatives that could lead to improved quality of life and, I believe, more successful health outcomes overall.

The main purpose of this thesis is to examine the unfulfilled needs of people undergoing diabetic amputations (and their caregivers) in order to improve post-surgical outcomes. The outcomes of diabetic amputations are grim, and thus indicate a need for something that the healthcare system is not offering. The rising rate of diabetes globally certainly plays into increasing rates of amputations, but furthermore, we must look into sociodemographic factors that lead to these complications in the first place. We should also consider, what complications are specifically involved in reduced quality of life after an amputation? And what can we do to fix it?

Diabetes disproportionately effects lower income individuals (Why your Zip Code Matters 2014) which likely make it even more difficult to manage this complication. Individuals in lower income communities may have environmental factors that exacerbate diabetes, such as living in a food desert. Food deserts are areas in which residents have less access to nutritious quality food, and some do not even have a grocery store within a reasonable distance. Furthermore, lower income communities can have inadequate access to healthcare, thus a lack of regular checkups – a combination that can lead to sacrificing a limb (Hilmers 2012, 1651).

But beyond this epidemiological approach, healthcare professionals need to understand how diabetic amputations affect individuals on a more personal level to greater understand these unfulfilled needs. Thus, like other experts, I propose including more

psychological approaches in treatment in order to improve the quality of life of these patients (Lipsky et al., 2012, 138). Lipsky et al. also recognizes that, “Unfortunately, many diabetic patients who undergo a lower extremity amputation have a very poor quality of life and have a 5-year mortality rate similar to that of some of the most deadly cancers” (2012, 137). This in conjunction with the fact that diabetic amputations are the leading cause of hospitalizations for diabetics, and also the leading cause of lower extremity amputations, suggests that more can be done still to improve post-surgical outcomes (Lipsky et al., 2012, 137).

Furthermore, one of the most striking pieces of statistical information I have come across is that after a decrease over the years, diabetic amputations have recently increased in young adults, most likely due to the rising rates of obesity in the younger generation (Caffrey 2018). This rise in diabetes-related amputations makes a re-evaluation of current protocol all the more urgent. Considering the high re-amputation rate and other serious complications post amputation, the younger an amputation patient is, the longer the patient lives with the amputation and the greater the risk of re-amputation and psychological distress, which could potentially lead to earlier death. As studies have shown, rates of re-amputation increase as time goes on: Izumi et al. have found that “cumulative rates of re-amputation per person were 26.7% at 1 year, 48.3% at 3 years, and 60.7% at 5 years” (2006, 566). This pattern is not a hopeful one for the younger generation, suggesting the need for more effective alternatives that could lead to improved quality of life and, I believe, more successful health outcomes overall.

Is there something we are missing? Is there an alternative or an extra step we can take in order to reduce amputation rates and improve the lived experiences of these

patients? Although many things lie outside the control of the physician, we can and should find ways to promote higher success rates for post-amputation diabetics. In my opinion successful medicine is inherently interdisciplinary, and when we ignore certain aspects or disciplines of medicine, such as physical, emotional, or lived experiences, the medical community risks providing inadequate care, as is the case for diabetic amputations. By addressing the concerns and needs of patients, we can reduce post-amputation complications, improve quality of life, and minimize further complications such as re-amputations.

Experts are saying yes, and agree with me that we can do better to treat diabetic amputees (Lipsky et al., 2012, 138). Lipsky et al. suggested that we can certainly do better, and that one factor that has helped in other places such as Denmark and Germany, included the use of a multidisciplinary approach. The multidisciplinary approach suggested included having more physician specialists, but still does not include the psychological and emotional care that I am suggesting these protocols need. While there have been improvements from including these specializations, post-surgical complications including re-amputation rates, which is a good indication of the success of an amputation, can still be high.

In this thesis I intend to examine avenues for improvement of post-surgical outcomes in order to understand what the patient truly needs after an amputation. Because online health communication is becoming more and more common, especially in a time where online communication is vital to a functioning society (thank you Coronavirus), I have decided to turn my head toward online forums as a source of information on the lived experiences of diabetic amputees. I will look at reddit posts on a forum, r/amputee, which

is partly dedicated to diabetic amputations (the remainder of posts include amputations from traumatic events). Through analyzing these, I will learn more about common topics of conversations among diabetic amputees in order to gain a more holistic understanding of what life is like post amputation, and what these individuals need.

By looking at these posts through four main lenses in relation to quality of life, I will further understand how amputees themselves are talking about certain topics I identified as risk factors or common issues associated with diabetic amputations. These topics include, nutrition and socioeconomic issues, mobility complications, psychological implications, and how individuals are getting health information online. After analysis of these topics, I will conclude with a sketch of a non-medical intervention that could improve quality of life. I argue that a therapeutic void in psychological and social support must be filled in order to improve quality of life and overall health outcomes. A potential avenue to fill this void includes expanding a site like reddit to be a more professional online forum, capitalizing on what diabetic amputees have done, and making it a better resource. In this thesis, I will propose that specific needs for these patients are unfulfilled, and suggest that by using an online health communication platform, we can further improve post-surgical protocols especially in regard to psychological treatment.

## 2.0 Methods

In order to conduct this research, I looked at an online reddit forum, r/amputee, found all posts relating to diabetic amputations that were publicly accessible, and coded these 376 posts that have all been posted within the past two years (most within the past year). Emory Institutional review board determined that I was exempt from IRB Review. I coded the 376 posts by varying categories. Posts were included if they discussed diabetic amputations, and all information linking people to posts was de-identified.

### ***2.1 A note about Reddit***

Reddit is a public social media platform that has a variety of forums built into it. Each forum is titled r/topic, and people can join these forums as members, or simply access them without officially joining. People can post inquiries in original posts, and then others can respond to that post. Combined, the original post and responses are called a thread, and it is simply communication between one or more individuals. Reddit is used for many things, and thus has a wide variety of users on the platform. Unlike other social media sites still in existence, I believe reddit centers itself more around interpersonal communication between users, rather than posting with no intentions for response. Furthermore, reddit, especially r/amputee, centers its posts around words rather than pictures, which is another unique aspect to this particular social media site. This structure, allows it to work more as a community support group or online forum than other types of social media including twitter and Instagram. Unlike Facebook, people on reddit are oftentimes more



de-identified because they have usernames that make it challenging to connect to one user in particular. This feature is part of the reason I chose reddit as my social media source as opposed to others. Although all of this information is public, posters can stay anonymous even if their post is associated with their username. But for further precautions, I have deidentified all information.

## ***2.2 Data Collection and Categories***

I choose multiple categories to include when coding this data. I coded the information twice, once for giving and seeking information, and the other for more general topics that were discussed in the posts. Giving and seeking information consisted of three different categories, giving and seeking quality of life (QoL) information, giving and seeking mobility information, and giving and seeking health information. This coding differs from the more general coding I will discuss later, because they suggested ideas and solutions, rather than simply having a general discussion. Giving quality of life advice included suggesting anything that would improve someone's overall wellbeing, and seeking quality of life advice directly asked for suggestions on how to improve overall well-being. Overall well-being includes, general mental health (not relating to specific psychiatric conditions or talking about specific psychiatric medications), and improvements to holistic health. Mobility advice included anyone directly asking for suggestions on improving movement, or giving suggestions on improving movement. This can range from more technical suggestions about physical therapy and prosthetics, to more general suggestions about moving around and what to do and or avoid. Health advice included anything that talked about correlation, such as doing x will cause y, any very specific medical advice that uses

medical terminology not commonly found in everyday language (and goes beyond quality of life advice), specific psychological advice relating to medications or professional treatment, very specific diet advice and how that relates to health markers such as blood sugar or glucose control, sharing facts or statistics about diabetes, and medication and their potential side effects. It is also assumed that if someone is talking about a health related issue, they are posting it because they are looking for answers (this mostly is for the original posts to a specific thread, not the responses to those threads).

Examples of each are listed in this table.

**Table 1: Examples of Seeking and Giving Advice for QoL, Mobility, and Health**

<b>Topic</b>	<b>Example</b>
Seeking QoL Advice	“My 50 Year old Diabetic dad refuses foot amputation. We are distraught. How can we move forward?  “Can anyone who has gone through it give me a rundown of what to expect, or any tips?”  “I want to see the brightside of this, other than it could have been much worse.”
Giving QoL Advice	"You lost a part of your body, and you are grieving. Your feelings are valid! You aren't always going to feel like this, but it takes time. Be gentle with yourself."  “We’re here if you need people to vent to,. Most of us have been there before and know where you're coming from.”  “if you’re not thinking correctly and feel bad now tell your doctors. depression is a real impediment to any recovery. Want to talk?”
Seeking Mobility Advice	“What can we do around the house to help make it easier to get around? Rubber ramps for small steps?”

	<p>"I hope for the best but am experiencing a high level of anxiety over the loss of my mobility."</p> <p>"Also - any general advice or information about amputation in terms of prosthetics and recovery time (as per your experience) is welcomed as well."</p>
Giving Mobility Advice	<p>"Not too early to look for a good prosthetist and a PT or to start some sort of fitness/strength/balance progression."</p> <p>"Limit walking while it heals, walking on your heel if you do have to walk."</p> <p>"All she would really need is a fiberglass insert in her shoe that would protect the healed spot from any pressures, give her the dynamic push-off she'd miss from not having a big toe, and fill in any significant gap inside her shoe for a comfortable fit."</p>
Seeking Health Advice	<p>"After leg amputation - how long will he need to wait for his stump to heal?"</p> <p>" "Interesting...! Would keto be safe for a diabetic? I always associate it with keto acidosis Thanks!"</p> <p>"My chief concern is that a partial foot amputation will just be delaying things. All of the weight will be concentrated on a substantially smaller area, and my balance will be worse which may/will lead to another amputation, then another, until a BTK. If any of you have been in a similar situation, would you do it again? Would you choose the "whittling" or go straight to a BTK, heal, and learn to live again?"</p> <p>"Also, what warning signs did you miss as things progressed? I'm terrified of the progression I've been reading about"</p>
Giving Health Advice	<p>"I've had a couple toes removed. I would strongly suggest that you request that they remove the toe in its entirety, as the infection may be further than they suspect. It should include part of the metatarsal as well ( bone going up your foot from the toe) as in my experience a total of 10 surgeries chasing the infection and an 11th to amputate the leg LBK. Which finally stopped the infection"</p>

	<p>“I found I knew the best dosage for me and did that. Even cut 5mg oxy in half because 2.5mg with Tylenol was enough to take the edge off. Then I moved to tramadol and eventually cut those in half until Advil was enough to take the edge off. In the end you're your best gauge of pain and what's bearable.”</p> <p>“DO NOT ALLOW YOUR FATHER TO GET anything other than a transtibial amputation if they say they want to amputate higher. Ankle disarticulations are harder to fit for and have less options.”</p>
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The more general categories included the following topics: discussions about mobility, discussions about psychological implications, discussions about prosthetics, discussions about nutrition or diet, discussions about socio economic issues, discussions about appreciation for the community and when a user identified themselves as a caregiver. Mobility discussions included conversations around anything about moving around and the ease/difficulty surrounding that, discussion of mobility aids such as crutches or a wheelchair, or anything describing a person’s situation in regards to their movement. Psychological implications included talking about any psychiatric condition such as depression or anxiety or any other mental health related issues. Coding for prosthetics included anything that talked about prosthetics, prosthesis, or devices related to prosthetics. Nutrition and diet included anything about weight loss, specific diets, blood sugar levels in relation to nutrition, and food in general. Socio economic issues included discussions about insurance, cost of treatment, and any money related issues such as the cost of mobility aids. Appreciation for the community included thanking people for their time, validation of emotions, indications that they have similar lived experiences, , any sort

of empathizing, offering to be private messaged or DM-ed, and any general comments that indicate a sense of gratefulness for the community. If a user indicated that a family member or loved one was the one receiving the amputation or identified themselves as a caregiver, they were coded as a caregiver. I was initially coding for positive feelings about the healthcare system and negative feelings, but there were very few posts about these so I ultimately excluded them from the study due to lack of sample size.

Examples of each are in the following table.

**Table 2: Examples of topics discussed including mobility, psychological issues, prosthetics, nutrition, socioeconomic status, showing appreciation for the community, and identifying as a caregiver**

Topic	Example
Mobility	<p>“Early on, the rehab clinic folks pointed out (the rather obvious) that the more joints you lose in a limb makes for less function.”</p> <p>"I used a doctors/mechanics stool to get around my old house (build before WWII) that was too narrow for a wheelchair and a walker was to awkward at that time"</p> <p>“ I live a very active life, and no one can tell I’ve lost my toes unless I tell them.”</p>
Psychological	<p>“He spoke with me about feeling down or nervous about not having his leg and what the students are gonna think.”</p> <p>“Yet one of the meds the Pain Management Team put me on was an antidepressant (Cymbalta). I had no trouble getting off of ALL of the pain meds within just a very few months. It took almost a year to get off the antidepressant”</p> <p>"He will go through the five stages of grief that most people associate with dealing with death. This is normal, and there are a ton of resources online about helping someone deal with the process.”</p>

	<p>"Is there anything we can do to help ease his amputation-related depression?"</p>
Prosthetics	<p>"I put my leg on in the mornings like you would a shoe, and of course I have my limits."</p> <p>"Prosthetic on my right side, with a nearly fixed ankle with no bending, and a huge clomping boot to my knee on the left foot, non bending ankle"</p> <p>" However, my prosthetic foot works far better than my real foot. When my socket is fitting well and not having any fit issues you can't even tell I have a prosthetic if I have pants on."</p>
Nutrition	<p>"Well <i>of course</i> you gotta do the diligence and educate yourself, but yes, a ketogenic diet is generally safe for diabetics - beneficial even, since it specifically omits foods that require insulin to process."</p> <p>" Very cool! I tried to eat a high protein diet after surgery, it seemed to help and I did shed some weight!"</p> <p>"Yes she also needs to see a nutritionist to learn about eating better - goes hand in hand with sugar under control."</p>
Socioeconomic	<p>"Not sure what my insurance will cover, on heavy, 3-times-a-day antibiotics through a home pic-line. Good luck to you all."</p> <p>"But brands keep changing sadly because insurances keep changing what they'll pay for, developments, etc...."</p> <p>"I've been putting off getting a new pair, in part because of that...and the cost. I was thinking they were about \$100 more a pair than they are. Silly me. That extra cost I was thinking of was the huge amount of money for the custom insert."</p>
Appreciation for Community	<p>"All of the responses have been incredibly helpful, thanks everyone!"</p>

	<p>"If he has questions or wants to vent or share his recovery or anything else he is free to post here if he wants! You and your family are also welcome to post here anytime! That's what we're here for! =)"</p> <p>" If she wants to PM me I would be happy to chat with her. It's not fun, but it's not the end of the world either."</p>
Caregiver	<p>"I've received news today that my dad may have to have his foot amputated due to a diabetic ulcer which went septic - for now they have removed his big toe but if the infection does not improve then they may have to amputate."</p> <p>h "Howdy- girlfriend of a high double amputee and missing a few limbs."</p> <p>"Most of us have been there before and know where you're coming from."</p>

### ***2.3 Data Processing and Results***

After coding for all of these variables, I then processed them. I calculated the percentage each topic was discussed. I then calculated the frequency within each variable that each post was talked about. For example, I calculated how many times when people were discussing mobility, were they also talking about prosthetics. I did this for every variable. I then created a correlation matrix to determine if any variables were related to one another. The results of this processing are below. In analyzing them from an ethnographic perspective, I did some extremely light editing of posts for clarity and grammatical errors.

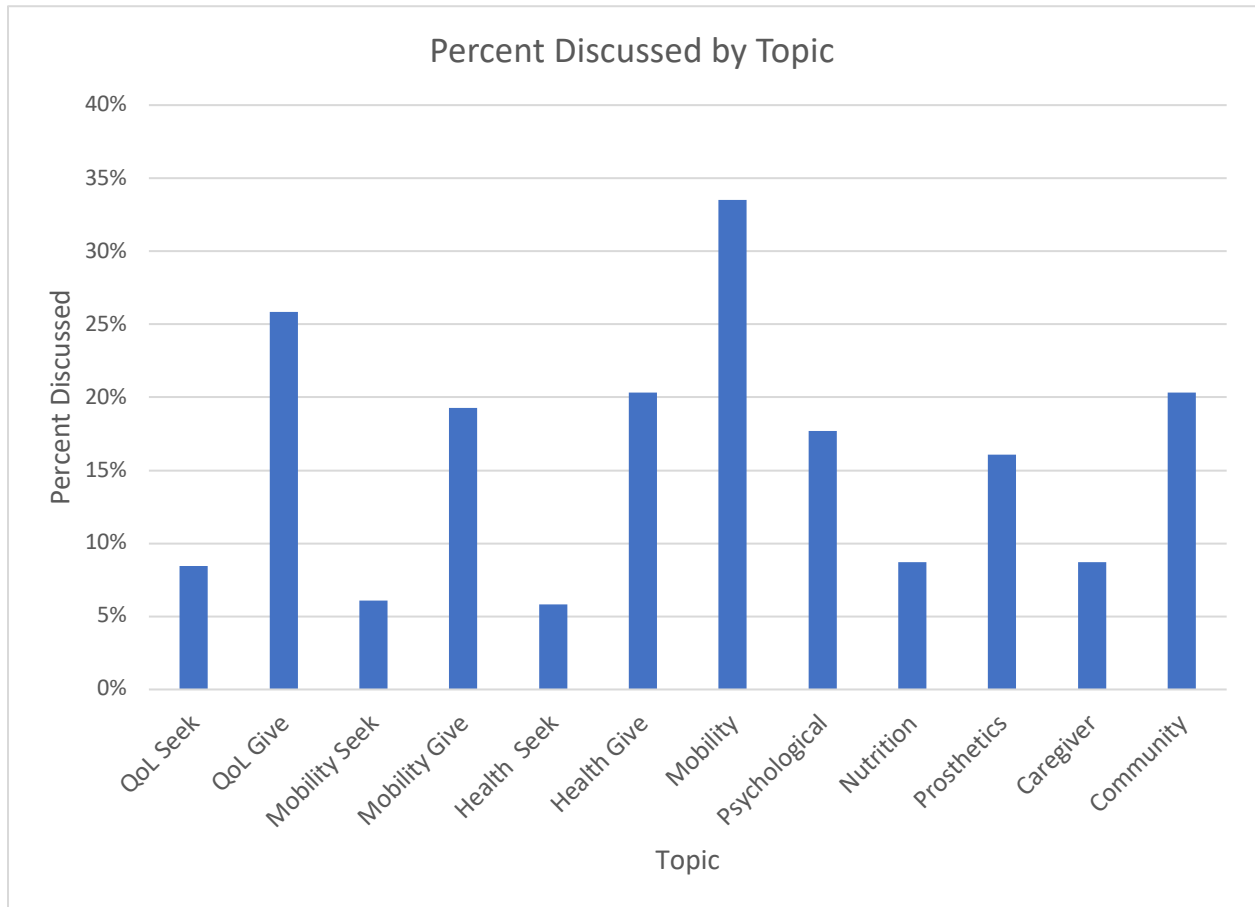


Figure 1: Breakdown of all topics discussed by frequency  
 \*topics are not mutually exclusive thus these percentages add up to larger than 100%.

	QoL Seek	QoL Give	Mobility Seek	Mobility Give	Health Seek	Health Give	Mobility	Psychological	Nutrition	Prosthetics	Caregiver	Community	Socioeconomic
Post													
QoL Seek	1												
QoL Give	-0.1810866	1											
Mobility Seek	0.39941696	-0.1515539	1										
Mobility Give	-0.1497049	-0.0157242	-0.1252901	1									
Health Seek	0.33005489	-0.1480132	0.22007657	-0.1223629	1								
Health Give	-0.1547767	-0.0160513	-0.1295348	0.05082761	-0.1265084	1							
Mobility	0.02401166	-0.0141047	0.26355319	0.4882507	-0.0103229	-0.0279811	1						
Psychological	0.33120673	0.27764948	0.08415053	-0.0352815	0.03197396	-0.0296351	-0.0680426	1					
Nutrition	0.00645022	0.02995341	-0.0007302	-0.0096695	0.08286337	0.19197143	0.03684064	-0.070747	1				
Prosthetics	0.04675569	0.05096158	0.12850013	0.33115168	-0.0482302	0.02695764	0.17383175	0.13441879	-0.0600094	1			
Caregiver	0.47803267	-0.098516	0.15615881	-0.1284845	0.24305169	-0.08753	-0.0625287	0.15031279	0.00344553	0.09296366	1		
Community	0.05779	0.23917205	0.0629754	0.00084196	0.04197033	-0.0125527	0.05562861	0.21147658	-0.0409465	0.02695764	0.0289289	1	
(-) Healthcare	0.06016764	-0.103072	0.08739901	-0.0852099	0.09120411	0.10744262	-0.0238731	-0.0395957	-0.0538468	-0.0763941	0.0019284	-0.009881	
(+) Healthcare	0.03722092	0.02108783	-0.0325051	-0.0088477	0.05868139	-0.0120293	0.08855761	-0.0038351	-0.0394989	0.05910043	0.03550909	-0.0120293	
Socioeconomic	0.00883104	-0.0388732	-0.0620829	0.23198715	-0.0606325	-0.0373254	0.07118604	0.00780785	-0.0345089	0.20712499	0.08828624	0.07747494	1

Figure 2: Correlation Table of all Topics Discussed



## ***2.4 Limitations***

Potential limitations to this project include the subjectivity of coding. Even though I followed a strict pattern, there inherently was some subjectivity in categorizing the posts and topics discussed. In the future it would perhaps be beneficial to have multiple people code for this information and compare and contrast the two in order to come to a less subjective conclusion. Another potential limitation includes potential that not all amputations talked on this forum were related to diabetic amputations. I did filter out any that explicitly stated they were traumatic amputations or otherwise and only included posts where the first post in the thread explicitly or implicitly stated that an amputation was due to diabetic complications, but it is unclear if all posters especially those who responded, had amputations from diabetic complications.

### 3.0 Non-Social-Psychological Factors of Diabetic Amputations

This following chapter will look into the non-social-psychological factors of diabetic amputations including socioeconomics and nutrition. It is important to address sociodemographic factors that can affect diabetic amputations such as economic status. Socioeconomic status and nutrition are tightly correlated, and furthermore, nutrition is arguably the backbone to diabetes management and prevention. To my surprise, these themes were not talked in the detail I imagined on this reddit forum, although mentioned frequently enough to draw some conclusions. Socioeconomic issues were primarily brought up in response to cost of care and mobility devices, especially prosthetics. Nutrition was mentioned in order to emphasize the importance of managing health markers such as blood glucose levels and specific types of diets, both in order to prevent further diabetic complications.

#### ***3.1 Socioeconomics***

To take an epidemiological approach, diabetes disproportionately affects those of lower income, often who lack adequate access to healthcare for their condition (Why Your Zip Code Matters 2014). This is a common theme in the healthcare system: those who have less resources tend to get inadequate care. It may be common, but it is unacceptable. Dr. Carl Stevens, a physician at a safety net hospital (a hospital that takes individuals regardless of their insurance status) in Los Angeles county, noticed this trend and discussed how with proper medical care, these amputations are preventable. In his study, he broke down LA county, highlighting a pattern that wealthier areas have little to no

amputations, and just next door, in areas that are far less affluent, amputations are rampant (Why Your Zip Code Matters 2014).

Between less access to adequate nutrition, healthcare, and preventative medicine, living in a low income area has many health disadvantages. Impoverished areas not only have higher rates of deaths due to diabetes, but also have more hospitalizations and higher amputation rates via diabetic complications (Amin et al. 2014, 1410). In addition, when physically at a hospital, individuals with diabetic complications that lead to vascular issues such as neuropathy, undergo more amputations than their richer counterparts (Amin et al. 2014, 1411; Why Your Zip Code Matters 2014).

One study conducted by Amin et al., looked into the diabetic amputations amongst Canadians who had universal healthcare. Although conducted in a country with universal health care, these issues can be contextualized to the United States, which would arguably increase negative outcomes. Amin et al., noted that practically everyone, 99% of individuals, in their study subscribed to this universal healthcare; however, they stated preventative healthcare, which is necessary to reduce diabetic amputations, is not covered by this insurance plan (2104, 1411). They noted that even with the same healthcare, “The lowest socio-economic status group had a >30% higher incidence of amputation compared with their counterparts in the highest socio-economic status group” (Amin et al. 2014, 1412). Results from this study indicate issues beyond insurance status, or what I believe is rather an issue with the current healthcare system and their approach to diabetic amputations. Amin et al., indicated that more preventative measures including education need to be taken in order to reduce amputation rates (2014, 1414). I would argue, these issues are magnified when applied to the USA – lower socioeconomic groups have less

access to necessary healthcare among other resources, leading to potentially more severe complications. Something must be done to address the causes of these issues in order to improve outcomes (Amin et al. 2014, 1415).

Although reddit users did not directly address issues including access to healthcare, they discussed insurance status and other economic ramifications. While only 6% of posts discussed socioeconomic issues, certain interesting themes emerged from my analysis. To my surprise and semi-contradictory to the literature, the most common topic discussed in the context of socioeconomic issues was not nutrition, but rather mobility and prosthetics. 48% of the time posts discussed economics they also talked about prosthetics and or mobility. Furthermore, a correlation coefficient of 0.23 existed between socioeconomics and mobility and a correlation coefficient of 0.21 existed between socioeconomic issues and prosthetics. Access to certain medical attention or equipment may have the ability to improve quality of life and this may indicate why more individuals talked about mobility devices on this forum rather than other insurance related issues illustrated in Amin et al.'s study (2014).

In one post, people joined together to talk about how non-amputees try to help by suggesting new and fancy mobility technology that will improve their life. A user responds with,

*I also got a little tired of people sharing pictures of artsy prosthetic legs or telling me to get the fancy new technology they saw on a TED talk... you get whatever your insurance will pay for. That's like me saying I need a new car and you saying "you should get a Bentley!"*

Although a humorous and reasonable way to approach this issue, this post illuminates a sad reality. Users are not always getting the level of treatment necessary

This is a humorous, and reasonable way to approach this issue, although this issue is a sad one. Prosthetics (as I will talk about later), have the ability to improve quality of life, and limitations to what one can get can potentially have larger implications on overall mobility, health and wellbeing.

Furthermore, 33% of the time individuals discussed socioeconomic issues they also showed appreciation for a community in which they can share.

Furthermore, 33% of the time that individuals were discussing socio economic issues, they were also thanking the community and showing appreciation for a forum where they can share. Professional psychological help can be very expensive, and is not always prioritized (Font-Jimenez et al. 2020, 111). However, if one has access to the internet, then the “semi-therapy” one is receiving online is practically free. Reaching out online allows people from all over the world to share their experiences about one topic, and this type of support has the potential to be very meaningful without being economically taxing unlike healthcare for physical and psychological symptoms. Monetary burdens of treatment are illustrated by one reddit user who discussed how his father refused to get a diabetic amputation, in part because of the socioeconomic burden on him and his family,

*He says he doesn't want to be a burden to anybody and that he will be useless. We are already in a lot of debt, my mom works part time and I do too as I'm a college student. Bills are piling up and we are struggling to survive, so he says it will be cheaper to pay for a funeral than all those medical bills.*

This is a deeply disturbing reality this family is forced to face. Either continue to be in debt, or save a fathers life. No individual should have to make this decision, and this situation obviously indicates psychological distress associated with diabetic amputations for not only the patient, but the patient's family as well.

Although this forum addresses issues surrounding socioeconomic status, I expected it to be a more relevant factor especially when considering quality of life. Throughout the entirety of the reddit posts, users discussed cost of certain mobility aids, and prices of useful material goods such as shoes. While there was no explicit indication that these issues related to access to adequate healthcare or psychological treatment, a common topic included themes of saving money as well as good values for items such as wheelchairs, shoes, and other mobility aids that can improve quality of life. Even though socioeconomic status was not at the forefront of discussed issues, money was on the mind of individuals undergoing diabetic amputations, and thus is an important consideration on the quest for better treatment.

### ***3.2 Nutrition***

It is no secret that nutrition is a cornerstone to diabetes prevention and management. What you eat and your health outcomes are closely intertwined, especially in the context of diabetes and its subsequent complications. By addressing nutrition as the backbone to diabetes prevention and management, we most look at sociodemographic implications as well. Addressing issues of food deserts for individuals in lower socioeconomic status as well as looking at individual's food choices, are important markers

in understanding what adequate nutrition should look like, and how to control health markers such as blood glucose which are indicative of diabetic status.

### *3.21 Socioeconomic Factors and Food Deserts*

Lower income areas are disproportionately affected by diabetic amputations (Why Your Zip Code Matters 2014), and I believe this is related to the large amounts of food deserts that are traditionally in these areas. Poor nutrition can accelerate type II diabetes and its numerous complications, and those living in food deserts are often lower income communities and their food choices can be limited to common contributors to diabetes (Presser 2020). Food deserts are areas in which individuals have less access to quality food and produce, and even a general grocery store that offers better nutrition than a typical convenience store (Hilmners et al. 2012, 1651). Food deserts create an avenue in which fast food chains can become primary food choices, leading to increased consumption of simple sugars and unhealthy fats (Presser 2020). Both sugar and fat contribute to obesity (Food and Diet 2012) which contributes to insulin resistance and diabetes (Dedoussis et al. 2007, 14). Poor access to adequate nutrition almost ensures that nutritional status will be suboptimal, because healthier options are simply unavailable.

As evidence by food deserts, nutrition plays a large role in diabetes and sociodemographic issues play a large role in nutrition. Nutrition is arguably central to prevention and management of diabetes, especially to a level that ultimately reduces complications (Hosseini et al. 2019, 1100). However, patient nutrition interventions are not always given adequate attention in order to have successful outcomes. One nurse stated; "You know what I have to do in 10 minutes is not enough because that is the whole

basis of diabetes, when you think about it. It is [a] diet. And if they can't get that right you know it's, you're on a losing battle if you don't spend time" (Gianfrancesco et al. 2019, 266).

Nurses are placed with the role of educating diabetic patients on diet, yet are not given adequate time or information to do so. According to Gianfrancesco et al., both the lack of nutritional training nurses receive and lack of work with a registered dietician are downfalls to diabetes prevention and management through diet (2019, 269).

With proper management, including diet, diabetes can be prevented in its earlier stages (Presser 2020). The best cure to diabetes is prevention, but even once diagnosed with full blow type II diabetes mellitus, there is hope for management via proper nutrition and exercise, as well as routine foot checking for potential diabetic amputations (Presser 2020). Hosseini et al. illustrated a clear direct correlation between access to education surrounding nutrition, lower-income areas, and diabetic amputations (2012, 1102). Yet food deserts persist, and diabetic amputations remain rampant in lower income communities, indicating a dire need for a program or treatment method to prevent amputations and improve post-surgical outcomes.

Although the experts address the interconnectedness of nutrition and socioeconomic status, r/amputee did not emphasize this point. Communication about food deserts or adequate nutrition were non-existent on this forum. Furthermore, there was no discussion about nutrition in the context of socioeconomic status at all. Rather, diet was addressed more generally in a more pragmatic manner that focused on certain fad diets, and individual choice when it comes to managing diabetes



### *3.32 Note about Diet more generally*

Two things need to occur in order to improve nutrition education for patients. First, responsibility and time spent with patients must be better defined, and proper education should be given to these individuals who are chosen responsible for managing this issue. Secondly, nutrition plans need to be more individualized, as no one diet is going to work for everyone (Kloss et al. 2020, 34). The American Diabetes Association currently does not suggest one diet for all diabetics, but rather suggests prioritizing whole foods and limiting refined grains and sugars (Kloss et al. 2020, 34). Although this may seem straightforward, personally navigating this issue can be complex and confusing. Kloss et al. argues that it is up to nurses to figure out where education is necessary on certain topics in order to improve outcomes (2020, 37). However, many nutritionists, not even nurses, lack proper nutritional education (for diabetes) and overall, and in the healthcare system overall – for both patients and professionals – there needs to be more education surrounding this topic (Bisanz et al. 2018, 1312). Even though nutrition is related to quality of life, nurses are struggling to find time to have conversations about psychological status and support, so it is possible nutrition gets swept under the rug as well (Kloss et al. 2020, 37; Font-Jimenez et al. 2020, 111). Other studies, as I argue, emphasized the importance of individualized care, demonstrating specialized treatment is associated with positive outcomes (Bisanz et al., 2018, 1319). Furthermore, nutrition is fundamental not only to cater to patients' needs and help them stick to a plan (Kloss et al. 2020, 33), but, I argue, due to socioeconomic status implications regarding nutrition, diet plans should be more specialized to fit the patient's lifestyle.

As mentioned before, nutrition is fundamental to diabetes care, yet reddit users did not talk about it as much as I initially expected, at least in relation to diabetic amputations. I hypothesize that this is potentially due to more immediate issues caused by diabetic amputations such as reduced mobility and psychological status; however, proper food intake is imperative to keep diabetes in check, and avoid disastrous complications such as amputation. However, after analyzing these posts, it is my understanding that this forums main purpose was not about nutrition (other places on reddit exist for this), but some discussion about diet did creep in.

9% of posts on this forum discussed issues related to nutrition, and a moderately positive correlation existed between giving nutrition advice and giving health information. These two variables are likely correlated because nutrition has the ability to control many health outcomes in regards to diabetes including blood sugar, A1C levels, and other health markers. Like many experts, the majority of reddit users discussed the importance of managing diet in order to control diabetes. Some asked about the effectiveness of different diets as this response to a question about the keto diet illuminated,

*I'm not a dietitian, just a guy with the diabetes. Keto would be dangerous, imo. There's such a thing as going too low. A lot of it is about portion control. We still need some carbs, just not a crap ton of them.*

Interestingly, in the same set of responses others have talked about how keto is really great for diabetics, highlighting the reality of contradictions on this forum that will be discussed more chapter six. However, to contextualize this post, it is probably that they are discussing blood glucose management and the effects certain food and diets have on these health markers. Yet, as mentioned before, no one diet is suggested for diabetics, but rather a

nutrition plan that is balanced and avoids processed sugar (Kloss et al. 2020, 34). Interestingly, this post began with the user explaining how they are not a dietician, indicating that they do not have the credentials to be giving this type of information. As humans we are all guilty of this, giving information in scenarios we are not always qualified for. And although no harm likely intended (especially since this is advice to avoid a certain diet), it is important to recognize that this information is better suited to come from a dietician with specialized training in diabetes nutrition.

Beyond talk about specific diets, posts about nutrition included importance of dietary choices and weight management in the context of reducing diabetic and diabetic amputation complications. One user described what he says to kids when they ask about his amputation, he stated

*I just tell em I what happens when yo don't eat your veggies. :).*

This simple post emphasizes the importance of a balanced diet in diabetes management and prevention of amputations. This user is not the only one who discussed healthy diet and others also added the importance of consulting with a nutritionist. In response to a user explaining that they were emotionally numb regarding their amputation, a user responded,

*Sorry for my tone. I lost my mother to type II ignorance and lack of self care. Take stock of yourself- go read about nutrition or speak with a nutritionist and take 30 days to cleanse yourself and figure out your baseline after really eating right.*

To some degree, individuals with diabetes and diabetic amputations have control over their nutritional choices. Although diabetes management and prevention does not fully rest on nutrition, it is a large part of it. Reddit users urged people to take actionable steps in

order to improve diet and thus improve health outcomes. However, as evident by some posts, nutritional management can be a struggle, and people are quick to blame themselves and others for complications that arise from poor dietary choices. Although it is perhaps naïve to say that no issues regarding diabetes and diabetic amputations in the context of nutrition come down to individual choice, there are other larger health implications at play. Genetics plays a role in developing diabetes, as well as sociodemographic factors. As previously mentioned, socioeconomic status can have a profound effect on access to adequate nutrition, among other issues (Presser 2020). But, the most important steps to take regarding nutrition should include more guidance from healthcare professionals to promote positive outcomes (Gianfrancesco et al. 2019, 266).

### *3.23 Biology of Nutrition and Diabetic Amputations*

Although the nutrition was not discussed in the context of diabetic amputations on r/amputee, I find this relevant information to the importance proper nutrition plays in diabetic amputations as well as more information regarding neuropathy which will be discussed in chapter four.

Diabetic individuals are at risk for neuropathy which accounts for 60 to 70% of foot ulcers - the primary cause of lower extremity amputation not including traumatic injuries (Edwards et al. 2008, 2&5). Neuropathy occurs in patients with diabetes because high blood glucose levels as well as excess fats in the blood can cause nerve damage, leading to reduced sensation in limbs especially in feet (Edwards et al. 2008, 8; What is Diabetic Neuropathy 2018). Neuropathy can have a multitude of effects including, “pain and other forms of discomfort, decreased mobility, and a variety of psychosocial impairment”

(Edwards et al. 2008, 5). Furthermore, Neuropathy is more highly associated with Type 2 diabetes than type 1 (Edwards et al. 2008, 4) indicating nutrition plays a role in its incidence. In the paper by Edwards et al., they discuss the wide variety of ways one can get neuropathy, especially emphasizing the role reactive oxidative species plays in neuropathy (2008, 27). They explain how certain antioxidant vitamins, such as vitamin E, “can prevent chronic disease involving oxidative stress including cancer and diabetes complications” (Edwards et al. 2008, 23). Vitamin E and other antioxidants are commonly found in foods that we eat, such as “red grapes, evening primrose, and cruciferous vegetables,” Edwards et al. stating, that these have the ability to “increase antioxidant status” (2008, 24). These types of foods makeup a healthy diet, one that is often promoted to individuals with type II diabetes. A healthier diet filled with more quality foods and produce, is not only associated with prevention and management for type 2 diabetes, but for management of neuropathy and complications as well (Edwards et al. 2008, 27).

Neuropathy leads to reduced sensation in the foot, which puts individuals at risk for injuries they do not feel, leading to open wounds that become infected (What is diabetic Neuropathy, 2018). Those with diabetes have impaired wound healing, and nutrition has been shown to have influences on wound healing in patients with diabetes, and open wounds lead to infections, which lead to amputations (Seitz et al. 2010, 1). When someone with diabetes suffers from an unrelated wound, they have a poor healing response that can lead to infection and sepsis leading to necessary limb amputation (Brem and Tomic-Canic. 2007, 1219). High adipose (fat) levels that are often associated with diabetes, lead to insulin resistance which can lower macrophages in wound sites which leads to poor healing and ultimately leads to lower vascular endothelial growth factor which has an

effect on wound healing (Brem and Tonic-Canic 2007, 1220; Seitz et al. 2010, 4). In the Seitz et al study, mice were fed high fat diets and thus had diet induced diabetes, which ultimately affected wound healing (2010, 8). One particular way these mice were affected was their vascular endothelial growth factor response (VEGF) (Seitz et al. 2010, 8). In Seitz et al., they attributed lower VEGF to slower closure time of wounds which would lead to more opportunity for infection (Brem and Tonic-Canic 2007, 1219; Seitz et al. 2010, 1). As seen in the image diagram, this was the case in Brem and Tonic-Canic's study, and lower levels of VEGF from lower levels of macrophages could ultimately lead to an improper inflammatory response. VEGF in this case improperly activates eNOS (endothelial Nitrous Oxide Synthase) in bone marrow to help with said infection. This leads to decreased NOS (Nitrous oxide synthase) levels, and therefore epithelial cells that are supposed to help with wound closure are limited (Brem and Tonic-Canic 2007, 1220). VEGF normally activates epithelial cells in the bone marrow in order to help close the wound, but as noted in the diagram below and in Seitz et al, those with diabetes have slower wound closure (1). These impairments were only shown in mice who were fed a high fat diet, or who were obese and had diabetes, and not noted in the control group indicating a correlation between high fat diets and obesity and slower wound closure which leads to a higher probability of diabetic amputation (Brem and Tonic-Canic 2007, 1220; Seitz et al. 2010, 4).

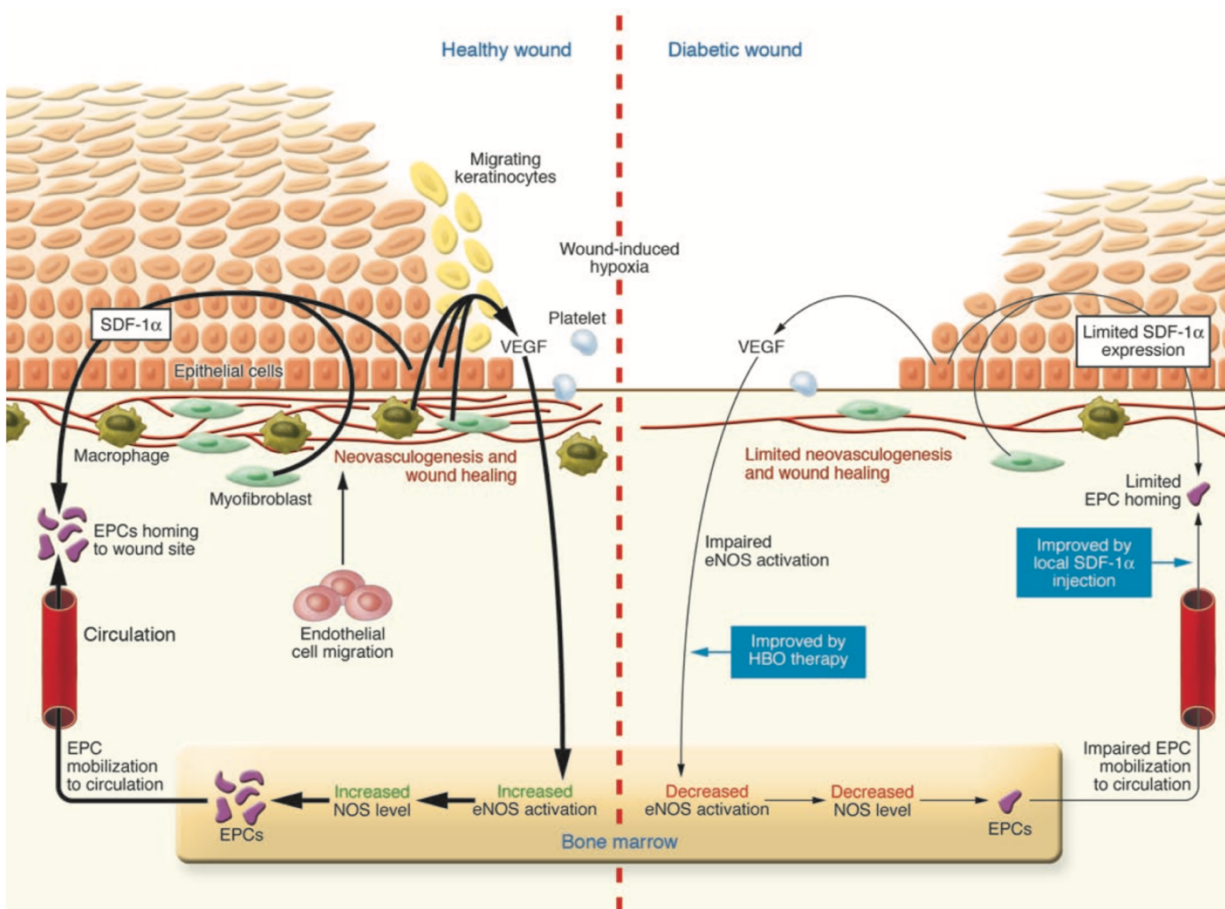


Figure 3: “Mechanisms of wound healing in healthy people versus people with diabetes”

(Brem and Tomic-Canic, 2007, 1220)

### 3.4 Conclusion

Although not discussed as much as other categories, socioeconomic and nutritional issues can have broad implications on diabetic amputation and post-surgical outcomes. Nutrition is key to diabetes management and prevention, and users on reddit agree. By discussing the importance of maintaining a healthy diet, reddit users illustrate the consequences that can come with improper diet management. Even though this reddit source was not the main platform to learn about nutritional information, many users suggested other reddit platforms like r/keto to learn more about specific diets. By

suggesting alternative platforms, users are indicating that they are searching for nutritional guidance, even though it is not at the forefront of r/amputee specifically. Considering how important proper diet is for managing diabetes, we should work toward creating treatment that emphasizes proper nutrition as way to manage diabetes and diabetic amputations.



## 4.0 Diabetic Amputation Mobility Ramifications

For some, mobility is central to wellbeing, for diabetic amputees activity surrounding mobility concerns on r/amputee indicated that this may be true to them as well. Mobility was the most frequently discussed topic on this forum. Conversations centered around how to cope with reduced mobility and gave advice on prosthetics and mobility aids. Both experts and r/amputee users agree, mobility can have large implications on quality of life. Reduced mobility can occur through a variety of avenues, via surgery or precursors to diabetic amputations. I will explore this topic in this chapter.

### ***4.1 Neuropathy and Precursors to Amputation and their Effect on Mobility***

Prior to amputation, mobility can be greatly affected due to diabetic complications which are often precursors to amputation. Specifically, biomechanics of an individual can be altered due to diabetic neuropathy (Alam et al. 2017, 1; Fernando et al. 2015, 2). Diabetic peripheral neuropathy is the leading cause of ulcers, and affects around 50% of individuals with diabetes (Alam et al. 2017, 2). Neuropathy can lead to altered walking mechanics, which ultimately can influence quality of life as the ability to efficiently walk is critical to everyday life, and an inability to do so may have psychological implications (Alam et al. 2017, 2).

One outcome of neuropathy is a reduced sensation in the foot which can affect coordination and has structural implications such as Charcot foot (Alam et al. 2017, 7). Via inflammation from neuropathy, Charcot foot can cause structural deformities. Furthermore, neuropathy can lead to muscle deterioration, which ultimately affects normal

motion of an individual with diabetes (Alam et al. 2017, 6). Even though it is a seemingly specific condition, reddit users frequently discussed Charcot foot and neuropathy. One user explained their neuropathic progression,

*I now have a form of advanced diabetic neuropathy known as Charcot arthropathy. The bones in my foot dislocate and suffer microfractures, and there's been a lot of muscle atrophy. So my remaining foot is pretty worthless.*

Although unsurprising that this condition lead to reduce mobility, it is important to note that this user believed her foot is worthless. Worthlessness of a limb indicates clear mobility consequences as well as potential issues with quality of life, as free movement is associated with greater independence (Alam et al. 2017, 4).

Structural deformities from Charcot's foot and neuropathy cause issues with one's walking gait which can ultimately affect plantar pressure, a measure strongly correlated with foot ulcers – the leading cause of non-traumatic amputation (Alam et al. 2017, 6; DiLiberto et al. 2016, 377). The plantar part of the foot, or the sole of one's feet, is sensitive to pressure and is a common place for ulcers to occur (DiLiberto et al. 2016, 376). Both too much and too little pressure on the sole of one's feet can contribute to ulcer formation which can lead to amputation, and rigorous attention must be taken in order to reduce deleterious effects (DiLiberto et al. 2016, 377).

In a multitude of studies other gait variables have been shown to affect individuals who have diabetic peripheral neuropathy (Alam et al. 2017, 3; DiLiberto et al. 2016, 378-379; Fernando et al. 2015, 2). Fernando et al. stated, "Biomechanical factors associated with DFUs include reduced temporal spatial parameters, such as speed of walking and stride length; restricted kinematics (movement patterns); delayed muscle activations; and

altered forces (kinetics), which may contribute to elevated plantar pressures during gait” (2015, 2). All of this affects the way an individual moves and can affect how an ulcer on the foot heals (Fernando et al. 2015, 9). This is not the only study that has noted these differences in individuals with diabetic peripheral neuropathy. DiLiberto et al. discussed how altered kinetics can actually cause physical changes in the shape of the foot, which has an effect on how pressure is distributed on the bottom of the foot (2016, 379). They also stated that those with peripheral neuropathy can have abnormal accumulations of fat in the foot that affect one’s ability to lift their heel off the ground, something fundamental to normal walking gait (DiLiberto et al 2017, 380). Alam et al. also noted the importance of walking speed, noting that slower walking has been associated with negative outcomes as walking quickly is a biological advantage (2017, 4). Moving independently is usurpingly associated with a more self-reliant lifestyle (Alam et al. 2017, 4), which is likely correlated with a higher quality of life. Even prior to amputation individuals’ gaits are negatively impacted, and amputation only causes more biomechanical disadvantages.

Echoing the talk of experts, individuals on reddit discussed neuropathy and its effects. Although experts touch on the connection between mobility and quality of life, these posts illustrate the strong connection between these two variables. Through personal narrative, reddit users explained how mobility can impact mental health and overall wellbeing. One example includes a user who explained their shame around receiving a diabetic amputation. He believes it was his fault, and discloses the negative quality of life implications about neuropathy. Rather than dwelling on mistakes this user reached out to r/amputee to avoid continuously dwelling on past mistakes, and to learn how to move forward. Another user responded, in part, with this,

*Second, the funny thing about foot infections with diabetes is that no one realizes it was as bad as it was. Neuropathy had likely set in over years and you never realized how little feeling you had.... probably just thought your feet were just cold all the time. There's no need to be ashamed.*

By both sympathizing and objectively explaining the situation, this user provides support to an individual in need reminding him to let go of the guilt. Neuropathy is a common precursor to amputations, and as illustrated by these posts, can affect how one perceives oneself, and quality of life.

Reddit users also discuss neuropathy in the context of protection. Emphasis on foot protection in order to prevent trauma, indicates an understanding that trauma which can lead to non-healing wounds, infection and amputation, was an important conversation. The following posts complements expert opinion about the importance of equal pressure distribution to avoid amputation.

*Shoes make a HUGE difference.*

*I'm about 6 months out from amputation. The first set of shoes I used were some running shoes I had. They were pretty soft. Apparently the heel was so squishy, that I just had no "communication" of where my foot was landing.*

*I switched to some trainer shoes. They're flat bottomed, and have a stiffer heel. The difference is night and day.*

Furthermore, other reddit users highlight a more general importance about proper footwear to reduce mobility and neuropathic issues. In one post, a user discussed an upcoming amputation, and concerns with finding information about mobility. Another user responded to this post with this part of their response,

*I also had peripheral neuropathy (now my right foot only) so this made suitable footwear at ALL times essential and constant inspection for cuts, bruises or other issues and massive diligence with my blood sugars. Each time I had an issue it was made exponentially worse because of poor BSL management and my own complacency. Find a good podiatrist as well, they will be a critical part of your team...and you should have a team...not just a GP. Every time for me things blew up in a 24 hour period and it was too late to save the toes...and I was lucky to walk away (so to speak) with just losing a leg last month...a few more hours and I would have been pushing up daisies. Serious & scary shit!!!*

Through explaining issues that can arise with neuropathy, she highlights how it is indeed, “*Serious & scary shit!!!*” Although I would imagine a doctor or podiatrist should have this conversation with a patient, via her experiences, this user explains the consequences of improperly cared for feet. As both health and mobility advice, this post gives advice which could improve quality of life and mobility.

Without sensation in the foot, neuropathy can cause internal or external trauma to go unnoticed, until the situation escalates. One user explained how they broke their foot three times, and it was not until they received an x-ray that they knew. Without a diagnosis, this individual would literally not have known if their foot was broken. Although a broken foot is a more extreme case, this scenario illustrates the importance of foot checking and regular checkups with healthcare professionals. These issues can certainly feed into quality of life, as this same user explained how crippling depression has impacted their life, but by overcoming these conditions and persevering, this user got better.

#### ***4.2 General Mobility Ramifications***

Post-amputation, an individual still has neuropathy and the conditions accompanied by this complication. For obvious reasons, however, mobility ramifications are larger after an amputation. A decrease in mobility is related to the degree your limb is amputated. Amputations range from basic toe amputations, to above the knee amputations and everything in-between. At any severity, diabetic amputations affect biomechanics and this can impact people's quality of life (Aprile et al. 2018, 49-50). Specifically, when someone has an amputation, their walking gait is altered as they have lost part of their original supportive structure that originally helped them move (Alam et al. 2017, 4). This, I argue, exacerbates any quality of life issues previously associated with mobility due to increased movement challenges post-operation. Due to the variety of changes that can have negative impacts, steps should be taken to teach individuals how to improve their ability to move freely, independently, and as efficiently as possible.

Beyond basic mobility frustrations, amputation changes and individuals body and how one looks effecting mental health (Kizilikurt et al. 2020, 117). Negative feelings towards an amputation can lead to social isolation, which in turn lead to more negative cognitive perceptions (Kizilikurt et al. 2020, 115). Movement efficiency is a key factor when considering the livelihood of diabetic amputees, and reduced freedom of mobility can lead to diminished feelings of independence and a lower sense of autonomy (Kizilikurt et al. 2020, 116). Being able to move freely, experts argue, is one of the most important factors when considering quality of life – less movement is associated with higher rates of depression and anxiety post amputation (Pedras et al. 2020, 48). An amputation alters one's ability to walk, and thus has biomechanical ramifications. Even before amputation,

individuals with peripheral neuropathy (the leading precursor to amputation in diabetes) can have altered biomechanics. Both structural changes in an individual's foot and previous amputation increase the risk of another potential infection which can lead to amputation (Wu et al. 2007, 69). Due to the likelihood of a re-amputation, (Izumi et al., 2006, 566), it is evident that something A) must be done to prevent amputations in the first place, and B) better care needs to be taken on the physical level to reduce psychological ramifications after an amputation

Mobility is integral to quality of life, and users on reddit emulated this sentiment. One user, User B, responded to a post from User A in which he explained his anxiety around receiving amputation primarily in response to the loss of mobility that accompanies it,

*Unchecked diabetes has put me in this position. It started back in 2012 when I had my first of 3 procedures to partially amputate my left foot. Since then, I've been dealing with blister prone feet and an almost annual hospitalization because of ulcers that develop. My last hospitalization back in July was due to a bone infection. Now, after developing another Osteomyelitis situation, the doctor is recommending a below the knee amputation of the left foot. I'm semi freaked out but it's mostly from the 4 to 8 week recovery time. I'm fiercely independent even through my past physical issues and rely on myself but facing this new situation has me concerned. I'm one hell of a hobbler, getting around on my stumpy left foot but I guess that's why I'm in the current state. I hope for the best but am experiencing a high level of anxiety over the loss of my mobility.*

From this post, it is evident User A was battling receiving an amputation for a while, as he mentioned his multiple hospitalizations and close calls with amputations prior to the

one he was expected to receive. His fear about relying on others to recover speaks to the autonomy diabetic amputees desire. In the context of mobility, regaining agency is a repeated topic discussed on r/amputee as evident in the post quoted above. People want to be able to do things themselves, and live a life unassisted by others. It is important to honor this, as a sense of independence has positive implications on quality of life (Kizilikurt et al. 2020, 116). Addressing diabetic amputations and mobility ramifications in the context of quality of life and well-being is of the utmost importance, and User B demonstrated this sentiment in his 40response,

*It's natural to be anxious, and no lie, it's gonna be a big change for you. Having a leg that no longer goes all the way to the ground is going to be new and kinda irritating for a while.*

*Look on the bright side – this surgery is going to take away a lot of bad flesh and bone that's been hampering your health. You should get a nice healthy residual limb that'll take a prosthesis that should give you better mobility and less pain than you've had. And it'll happen faster than you think. You've been coming in this direction for eight years – what's a couple more months to get back some real quality of life?*

User B responded with compassion, and indicated that one must think about an amputation as something bad leaving. User B also emphasized that in the long run User A will gain more mobility because the surrounding tissue will be healthier, and if User A was to remain in an un-amputated state that part of his body could not support his way of life. Although there is sacrifice associated with amputation, as user B mentions, amputation is necessary in order to earn more mobility and improve quality of life in the future. User B's holistic approach gives back agency to User A. By receiving an amputation, User A is acting



productively and can have a better recovery. Although this is a lovely sentiment and support is critical for diabetic amputees, recovery rates post operation are poor as re-amputation rates can be incredibly high (Izumi et al., 2006, 566). Furthermore, recovery requires hard work and dedication in order to regain efficient mobility that would enhance quality of life. But, as previously mentioned, these resources are not always available to people and physical therapy can be expensive. This is all the more reason to continue diabetic amputee research to continue to come up with creative solutions to this complex problem.

Taking a step back and looking at the study as a whole, mobility was the most frequently talked about subject for the reddit posts in question. About 127 out of 376 posts, or 34% of the posts discussed mobility in one form or another. In addition people readily gave mobility advice on reddit 19% of the time and sought mobility advice 6% of the time. Logically, more individuals gave mobility advice in their responses, while original posts which were less frequent, sought out said advice. The figure below indicates what other people were talking about in their posts, when they were already discussing mobility.

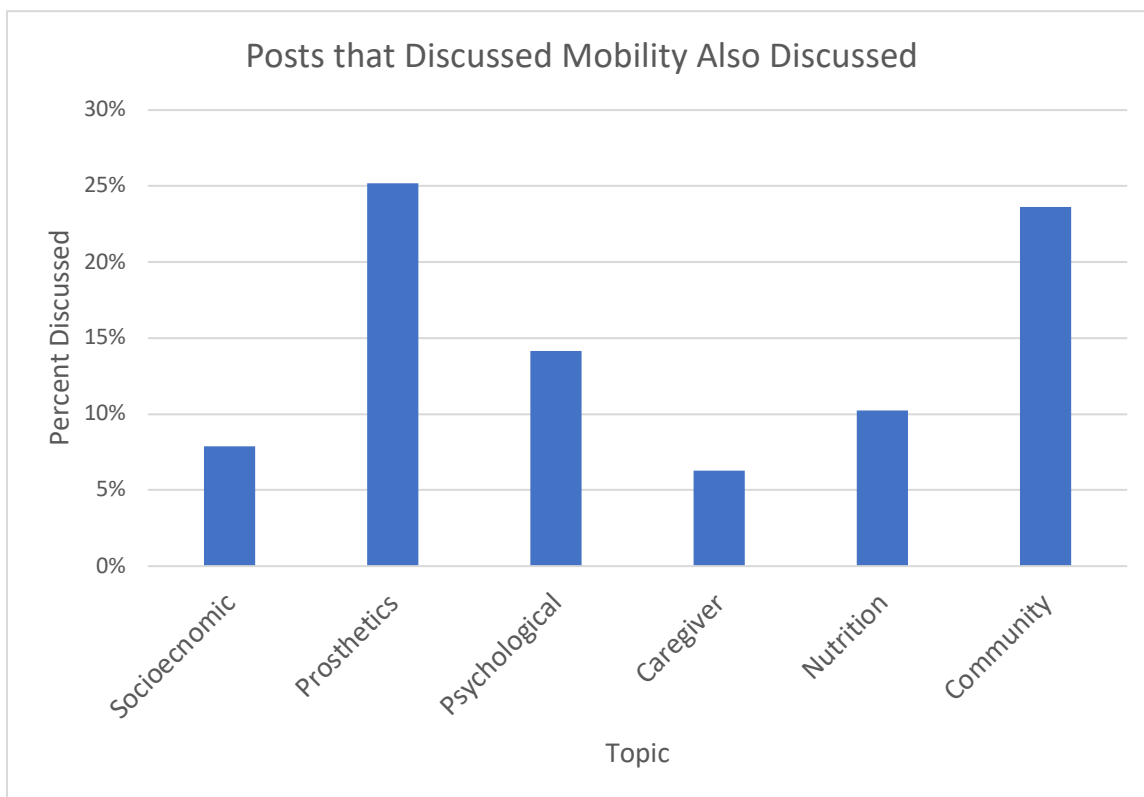


Figure 4: Posts that discussed mobility also discussed these topics organized by percent

Unsurprisingly, many users frequently discussed mobility and prosthetics in the same post, with a correlation variable of 0.18. In addition, individuals frequently thanked the community whilst talking about mobility, indicating a potential connection between support/quality of life and movement. Essentially, users are receiving mobility support whilst empathizing with others in the context of mobility ramifications of an amputation. In addition to the connection between community support and mobility, seeking quality of life advice and mobility information was one of the strongest correlations in the entire study. With a correlation coefficient of 0.4 between these two variables, 52% of the time

individuals sought out mobility advice, they also desired quality of life advice indicating a strong relationship between the two.

Both reddit users and experts believed in a connection between mobility and quality of life. An ability to move freely can have serious implications overall wellbeing. One story told by a user illustrated the struggles associated with reduced mobility. This post described a typical night and was titled "My Version of Hell,"

*When I die, if I go to hell I'm pretty sure that my eternal torture will be the following.*

*I will lay on my perfect bed, tossing and turning for hours. Finally fall into a blissful sleep and begin a wonderful dream. Then, suddenly, I wake up. I need to pee.*

*I fumble in the semi-dark room to find my liner, sock, and leg. I get them on and can't get the pin to lock. I have to split my concentration between getting my leg on and not peeing on myself. I get my leg on and my stump is tender, making walking uncomfortable. I make it to the bathroom just in time. Whew! I get back to bed and take off my leg, sock, and liner. I get comfortable, ready to fall back to sleep. Nope! The phantom pain starts. The big toe that is no longer there is burning. It feels as if someone is beating the bottom of my foot. Cramps in my calf. I take my gabapentin and after more hours of tossing and turning, I fall asleep again.*

*Only to be woke up again, needing to pee*

*Repeat.*

The severity of reduced mobility in this case has been correlated to literal hell. Relatively simple tasks for able bodies, such as using the restroom in the night, became a whole endeavor for this user which must affect quality of life. Stress and strain put on an individual from both a biomechanical and psychological perspective can be severe, and this attitude was not unique to just this user as another responded with,

*That ain't hell that 2020.*

Besides this comedic response, other users on this thread discussed ideas on how to ease the burden in the middle of the night. One suggestion included using mobility aids like crutches or a wheelchair, but the original poster deemed these unviable options as she struggles to move with crutches. Discourse between these users demonstrate the mental debilitation that comes with struggling to move and completing simple tasks that perhaps once were easy.

### ***4.3 Prosthetics and Mobility Aids***

Just as the previous user was simply trying to go to the restroom in the middle of the night, other users explained the importance of handicapped friendly living spaces alongside the struggles that come with reduced mobility. Discussion about mobility aids such as wheelchairs, crutches, and prosthetics, highlighted the importance of accessible spaces and mobility issues. For example, one user reached out to the community to seek advice on his father's mobility post-amputation. Through explaining his father's already reduced movement capabilities, he sought out suggestions on how to make his house more accessible. Responses from multiple people featured the importance of a variety of mobility

aids including ramps and handle bars that can assist movement, as well as reducing sharp edges that are easily bumped into. One user responded,

*Edges on the doors can get a little annoying. Also, you may need to add handle bars on the bathroom for his transferring from chair to toilet. And spaces in his house will need to be wider, if that's possible to do. But the most important, he needs to be encouraged to tell you what he needs. Feel no shame about it.*

Simultaneously, this user provided practical solutions to a mobility problem while prioritizing the support and encouragement of others, indicating the importance of quality of life when battling side effects of amputation. While users may go to reddit for answers about mobility, they receive both resolutions to their qualms and support.

Prosthetics are important in the rehabilitation process, and proper fit and function are associated with improved quality of life (Webster et al., 2012, 1493). There are multiple factors that account for improved quality of life. First, there is the simple functionality of prosthetics. The more time someone uses a prosthetic that fits properly, the more likely they are to feel a sense of independence and thus have improved psychological outcomes (Webster et al., 2012, 1494). Improved psychological states are associated with better self-efficacy and self-esteem which both have profound implications for quality of life (Webster et al., 2012, 1494). According to Webster et al., things that promote prosthetic use include social support, and things that discourage prosthetic use most prominently include depression (2012, 1500). Webster et al., goes as far to claim that, "Because of the strong and consistent association between depression and prosthetic outcome observed in our study, it is critical that rehabilitation healthcare providers be vigilant for these symptoms and perhaps specifically quantify depressive symptomatology at regular intervals so that

appropriate treatment plans can be initiated to help ensure optimum outcome” (2012, 1501). Furthermore, other experts have argued this connection as well, Pedras et al. going as far as to say, “Functionality levels (impaired mobility) and their impact on activities of daily life are one of the factors that most contribute to a marked decrease in HRQoL [Health Related Quality of Life], along with depression and anxiety symptoms” (2020, 48). However, as mentioned previously, psychological support is not prioritized, even though better mental health has been shown to consistently improve outcomes and promote lifestyle choices that improve quality of life (Font-Jimenez et al., 2020, 111).

Reddit users reinforced expert findings about the relationship between prosthetics and quality of life. Individuals on forums such as r/amputee explained struggles in finding well-fitting prosthetics like the ones that are supported to improve mental wellbeing. Take this story as an example: One individual explained how a family member’s prosthetic broke, and that the blame was being placed on the manufacturer, not on the weight this individual had gained in response to diabetes. Replies indicated mixed reviews, some agreed that it could potentially be due to weight gain, but others indicated that it could be a poor fit. However, many seemed to have some distaste for the healthcare system in the context of mobility aids. Users discussed that although fancy, more comfortable, prosthetic technology exists your insurance ultimately decides what and how frequently you get a (new) prosthetic device (continually receiving new devices ensures ideal fit and thus function). Although this was previously quoted in section 3.1, this quote best illustrated frustrations surrounding prosthetics,

*I also got a little tired of people sharing pictures of artsy prosthetic legs or telling me to get the fancy new technology they saw on a TED talk... you get whatever your*

*insurance will pay for. That's like me saying I need a new car and you saying "you should get a Bentley!*

Again, we see a healthcare system treatment that falls short for diabetic amputees. Reddit users are searching for more, either due to a lack of information or materials from professionals, or looking for information that the healthcare system cannot provide.

In a similar vein, reddit users highlighted the necessity of receiving prosthetics efficiently in order to obtain more positive outcomes. One caregiver on r/amputee explained how the immediacy of receiving a prosthetic was integral to his recovery,

*My husband had his 1st amputation in 2012 I believe.*

*The thing that helped him most after having the amputation between knee and ankle.*

*(He had toes then part of his foot amputated prior to BKA -Below Knee Amputation)*

*what helped most was the hospital set up an appt with a prosthetist almost*

*immediately. They had him in a prosthetic as soon as the staples came out! Just less*

*than a month. Being able to have the hope he would walk again and not rely on*

*crutches or wheelchair encouraged him greatly.*

By emphasizing the importance of receiving a prosthetic, we can again understand how vital access to mobility aids are. Not only did this user insinuate that prosthetics helped her husband, but rather claimed it, was “*the thing that helped him most.*” Thus, access to prosthetics is vital to increase mobility and an important considering when looking at treatment methods for diabetic amputees.

Wearing a prosthetic fundamentally changes how someone looks, and while fit is important for biomechanical issues, style is important when considering psychological ramifications of amputation. Considering style is important in order to curb negative

effects of unfavorable view of one's body image. Studies have shown that ideal prosthetic fit and feel are associated with improved quality of life (Kizilikurt et al. 2020, 116). However, as previously mentioned, this is not always possible. Diabetes disproportionately affects individuals in lower income communities (Why your Zip Code Matters), and their health insurance may limit their options. These are not conducive circumstances to have a top of the line prosthetic that fits the person and their aesthetic.

Reddit users illustrated the effects of prosthetics on body image. A user posted, indicating how his father was getting a prosthetic and the conflict that was causing,

*Need some help or advice. My father has had bad diabetes and had to get his left foot amputated. ( middle of lower leg) He has been out of work at a local school where he teaches. Now he has yet to get his prosthetics made just waiting on a referral. Now the school has said he has to be back to work this coming monday Dec 1st. He spoke with me about feeling down or nervous about not having his leg and what the students are gona think. Now my question is where could i get something that would help cover or maybe sumthing that well look close and make him feel better until he gets his real prosthetics? Or where could i start looking? im pretty lost at this point...*

His father was hesitant about returning to work due to his physical image. For fear of not looking like he used to, his father worried how others would perceive him. Through asking what his father could do to hide this condition to the world, I learned that reddit users were willing to embrace their condition, rather than visually mute it. Responses suggested using humor to accept his new look, rather than trying to run from what has already happened. Although this type of mindset contains power, not everyone has the ability to cope completely through humor. Positive outlooks and humor can be great tools, but we must



address that after trauma, it can be extremely challenging to will oneself better. Thus, we must offer more therapy and psychological support to help patients in not only their comfort in transitioning back to 'regular' life after surgery, but also to support overall better mental health and wellbeing.

#### ***4.4 Conclusion***

Both the literature and reddit posts highlight the connection between quality of life and mobility. Users are turning to reddit to for both mobility and quality of life advice, indicating that even with something as pragmatic as mobility, peer to peer communication online still holds value. By sharing similar lived experiences, users can empathize with one another about the loss of mobility and offer tips and tricks to improve quality of life while physically disabled. Throughout these reddit posts, mobility issues often insinuated psychological issues as well. Living a life of reduced mobility is bound to have implications on an individual's mental health, and it is thus important to address the issues of diabetic amputations from a holistic perspective.

## 5.0 Social-Psychological Implications of Diabetic Amputation

An amputation is a big deal, and should be treated like one. Not only are there higher rates of psychological distress with amputees (Coffey 2009, 1065), but psychological conditions that are unique to those who have lost their limbs exist, such as phantom limb pain. Furthermore, there is also a need to address the role of a caregiver, and how to best support them through an amputation. Reduced mobility makes life more difficult, and thus I would imagine individuals often rely on others for support especially in the beginning. In addition, individuals using this site are showing large amount of community appreciation, which can certainly effect someone's quality of life and mental wellbeing. Feeling as if you are a part of something has a positive impact. These are some topics I will explore in the following section.

### ***5.1 Phantom Limb Pain***

Phantom limb pain commonly occurs with amputation. There are both psychological and physical explanations for phantom pain, which is pain from the area where the removed limb used to be (Mayo Clinic Phantom Limb pain). Essentially, even though the limb is no longer there, the brain and spinal cord send improper signals that are as if they came from the old limb, leading to pain in a body part that no longer exists (Mayo Clinic Phantom Limb Pain). Even though there are both psychological and physiological aspects to phantom limb pain, Font-Jimenez et al., stated that this should be dealt with in a psychological manner (2020, 112), and Mayo clinic explains that a common treatment is anti-depressants, indicating psychiatric solutions to this condition (Phantom Pain). Nurses

in Font-Jimenez et al. study indicated that this was an area where psychological help could be really helpful to a patient, but they went on to explain how that type of support was not always prioritized (2020, 111-112). Another place phantom pain negatively affects quality of life is when patients go about getting a prosthetic. Webster et al., explained that phantom pain leads to reduced prosthetic use, and prosthetic use was associated with better outcomes (2012, 1494). Thus it is imperative that if necessary, phantom pain is addressed psychologically in order to have broad positive effects on quality of life.

One user on reddit talked about his experience with phantom limb pain and his use of mirror therapy to deal with it. Mirror therapy is a common psychiatric treatment for phantom limb pain, and works to trick the brain to reduce discomfort in the area patients have phantom limb pain (Darnall, 2010). In this post, this user first explained how this community was helpful in his healing process, and how people need to talk about their pain in order to get better. He then went into how he was in pain, and he had to perform mirror therapy to reduce said discomfort. In this post he explained that there are more than just physical issues involved in amputation, specifically including psychological ramifications,

*“As I have said earlier, I do experience phantom pain from both limbs. This “phantom” pain is very real to me. What makes it “phantom pain” is because my toes are spreading apart or my foot is cramping and obviously I have neither toes or foot. Sometimes I sit in front of a full length mirror so I can see that I have stumps (pc term; residual limbs) and I place my hands at the end of the stumps. This exercise is to help convince the brain that the pain I am experiencing is “phantom”. More times than not this does not lessen the pain. Sometimes this pain is very intense. I can't say unbearable because I am still here, but boy it hurts.”*

This post explained how phantom limb pain in it of itself was traumatic. This is another example illustrating how amputations are not just a change of the body, but how the mind must cope as well, and how there needs to be treatment in order to reduce mental suffering associated with it.

### ***5.2 Psychological Implications of Amputation***

When someone undergoes a diabetic amputation, there can be psychological consequences. By definition, amputations are traumatic events, but there are more psychological ramifications associated with diabetic amputations besides the trauma of the surgery.

Beyond basic psychological distress, amputations and diabetic wounds are very intrusive and have the ability to alter life plans, which ultimately can affect quality of life. For example, this is explained in a case study surrounding what has been dubbed “Diabetic Holiday Foot Syndrome.” This saying was coined because of the increase in foot injuries during holiday time. When people go on vacation or stray out of their norm, they are more likely to pay less attention to their feet, and thus are more prone to wounds and infection -- which can result in amputation (Beshyah 2020, 59). This logically affects quality of life, as individuals, especially with neuropathy, must employ extra caution when changing their routine. One individual described in the study left his vacation early because his feet got burned on sand. Since diabetics have slower than average rates of healing, he had to return home in order to ensure a proper and full recovery (Beshyah 2020, 58). This takes a toll on an individual's wellbeing, and can lead to social isolation which has been

documented to reduce quality of life in individuals with amputations (Kizilkurt et al. 2020, 115).

Like the incidence with “Diabetic Holiday Foot Syndrome,” people on reddit explained how challenging it can be to do regular things that others can do with ease, or that they used to be able to do. Regardless of this sentiment, diabetic amputees can still live fulfilling lives. However, one user, reached out to the community to explain his frustrations with the changes that have happened since his amputation:

*I try to stay positive because they say that helps with healing. But I really just want to say that this really, really f\*cking sucks. It f\*cking sucks. I want my f\*cking toes back. I want to not have to people ask to gawk at my foot. I want to not have to worry about being at the lake this summer and wearing sandals and showing off my nasty foot. I want to be able to eat pizza again. Or have a burger, or a beer. Or even just a regular Dr Pepper or a peanut butter and jelly sandwich. I want to have people not ask me how quitting smoking is going, because you know what? It's going f\*cking horribly.*

A reader can feel the frustration through the screen. Between the vulgar language, and desire to return to what he once was, it is clear that this person wishes that this situation had not occurred or turned out differently. But, the amazing part were the responses that flooded this thread with supportive words, positive outlooks, and silver linings. This user was in distress, and through responses such as the following, he may have been able to cope better by seeing people in similar situations living fulfilling lives. One response noted,

*Be extra kind to yourself because there's a rollercoaster of emotions you're feeling and every single one is valid, normal, and worthy of expression. PM [private message] me if you wanna talk or hear what helped me. Take care!*

This user responded with both general information, and offered to discuss more privately with the individual about issues associated with diabetic amputations. This is an incredible feature of the internet, and one that must not be overlooked. People are not only seeking out, but willing to engage in peer to peer communication publicly and privately. This reddit forum is offering great positivity and connecting people to supportive individuals who have similar lived experiences.

More psychological issues can arise due to diabetic amputation and can effect quality of life. Mood is a good indicator of someone's livelihood, and individuals who have undergone amputation have higher rates of psychological distress, such as anxiety and depression, compared to the general population (Coffey 2009, 1065). Higher rates of psychological distress are consistent with poor outcomes. One study also noted that a positive outlook, which is more difficult when suffering from depression or anxiety, was associated with improved outcomes (Font-Jimenez et al. 2020, 112). This again leads back to the lack of psychological support amputees receive whilst undergoing an amputation. As mentioned previously, psychological support is not emphasized in protocol (Brigham and Women's), yet expert nurses spoke on how important emotional and psychological support are for improving post-surgical outcomes (Font-Jimenez et al. 2020, 113). Research is continually indicating the importance of emotional support post amputation, but as of now there is no formal program to support individuals in this condition even though experts have called for this (Pedras et al. 2020, 53).

Rather than turning to their doctors for support, individuals are turning to the internet to find support groups to help them deal with psychological trauma of a diabetic amputation. In fact, 59% of the time that individuals sought out quality of life advice, they

brought up psychological implications as well. In addition, seeking Quality of life information had a correlation coefficient with psychological issues of 0.33 indicating a moderately strong positive correlation.

On r/amputee, users illustrated psychological ramifications of diabetic amputations, and how they affected quality of life. In the following post, one person explained her mental state after both receiving the news about needing and subsequently undergoing a diabetic amputation,

*I was emotionally numb for a few days after the amputation. I didn't want to talk about it, just wanted to sleep a lot. But having the people I love sitting next to me while I slept was perfect.*

This illustrates the stress associated with diabetic amputation, and this user was not the only one who felt these psychological implications. Others commented on this same topic indicating that there was not only a physical aspect to amputation, but a psychological one as well,

*I think there is both a psychological and physical reaction that is involved with amputations. I had feet for 60 years and now I don't, that must weigh heavy on the mind.*

They recognized and honored the pain that comes with amputation, and how it can affect one's mental state and general wellbeing.

In addition, some people may be using reddit as a form of therapy in order to get through difficult times. One example is as follows -- this user talked about his experience undergoing diabetic amputation, and stated,

*Yes I have worked hard on my recovery. I wrote this because the only help I got for the psychological trauma was what I got through groups like this.*

This individual credited this reddit forum for his ability to overcome the psychological ramifications of amputation, and he was not the only one. Other users on reddit emulated this same sentiment, a desire to use the forum as a coping mechanism. 18% of the time in this group people spoke specifically about psychological implications of amputation. They said things such as,

*Yea some things will be different even difficult at times but I have a great support system with my family friends my loving husband my poochie and all of you. Thank you all so much.*

Again this forum serves as a community for not only advice, but emotional support. As previously mentioned, experts are talking about how beneficial this type of support can be (Kizilikurt et al. 2020, 115), and although healthcare professionals may not be able to allocate resources and time to this issue (Font-Jimenez, 2020, 111-112), individuals in the diabetic amputation community are still seeking it out, and one avenue appears to be through online forums.

Furthermore, sometimes users were even more explicit about psychological illness and the need to talk to someone about an amputation. One user responded to someone seeking support with,

*If you're not thinking correctly and feel bad now tell your doctors. depression is a real impediment to any recovery. Want to talk?*

Not only was this individual validating the original posters feelings and emotions, but he offered support as well. That is very similar to what formal therapy does. It serves to make



the person feel comfortable with their emotions, and work to help them through tough times. It is understandable that there is an adjustment period after any sort of traumatic event like an amputation, and it is also understandable that individuals would want to seek out help, ideally professional help, but when that is not available, they can and are turning to the internet.

As mentioned before, amputations are traumatic events, it is fundamentally a loss, and individuals on reddit have discussed ways to grieve this loss. Many people have talked about the 5 stages of grief, and how patients undergoing amputation can go through this just as those who perhaps have lost a loved one. As one user so eloquently put it,

*You've had a huge shock and loss and you need to grieve. You won't be this sad forever.*

The literature I found did not discuss this issue specifically, but I do think it is an interesting psychological topic to consider as grieving can come in many forms.

An interesting aspect of grief is the role ritual plays in mourning the loss of a limb. One individual reached out to the community to ask what they should do since they were getting an amputation soon. Many people replied with their stories about what they did, their families did for them, and what their friends did. One caregiver brought a box of sand to their friend so they could walk on the beach before their foot was removed. Another person held a wake for their foot. And a doctor commented that many of their patients cremate their limbs in order to take them home – I always thought that getting an amputation was a major life event, but I did not fully understand the degree to which people became ritualistic about it. It gives it another sort of meaning, one that is greater than simply removing a leg. These ceremonies seem to act as a symbolic celebration of

something bad going away rather than a simple loss. Many people discussed the dissipation of their pain after their amputation, because many times the limbs desperately need to be removed. Clearly these posts about ritual are a way to mourn and cope, and these users turned to reddit to find their answers. Based on the positive responses, this seems like a productive way to mourn their loss and is indicative of the strength that online forums can have in helping people through hard times.

Although experts are not explicitly talking about grief, they do discuss the importance (although not the execution) of mental health support after an amputation. Font-Jimenez et al. described the importance of psychological care, but they argued that fast turnover times between patients limited the quality of care given to individuals with diabetic amputations (2020, 111). Other examples on r/amputee illuminated the issues of psychological care post amputation. A reddit user reached out to the community, sharing her story of double amputations on both the left leg and right foot due to diabetic complications. They praised the community and offered personal support if needed, because,

*The emotional part is the bigger problem.*

Another individual discussed how it's more than just the amputation an individual has to deal with post-surgery. There is so much that goes into proper care in order to prevent a negative outcomes, like a re-amputation, and sometimes it is still inevitable. One reddit user explained how 20 years after their first amputation, they needed to get a second one, and users on reddit responded in borderline awe of the fact she was able to postpone an amputation for that long. In fact, this is remarkable that this person was able to wait for a

second amputation 20 years after getting their first one, as re-amputation rates have been noted as high as 60% within 5 years of the first procedure (Izumi et al., 2006, 566).

People seem to go to this page for support, and support they cannot necessarily get from their healthcare professionals. On this page, they are allowed to read first hand experiences, and get anecdotal—if sometimes conflicting—advice. Although everyone had good intentions on this page, they are not medical professionals, yet users still chose to get their information from reddit, rather than from a certified source, such as a doctor or Physical Therapist. That is not to say that all individuals with a diabetic amputations are unable to get support from the medical community, but those who remain active on this page are getting something that traditional medicine is not offering them. There is something to be said about support groups and getting non-professional assistance that can be very helpful, but this is again indicative of a problem with current treatment protocol specifically suggesting patients remain with unfulfilled needs.

Thus this reddit forum in itself may have the ability to improve quality of life in a way that the healthcare system cannot. Through a website such as reddit, one is able to reach so many people who have similar conditions or have undergone similar situations. An online community has the power to be a place where people can go to heal, and it could potentially be an effective one. We cannot follow up with these individuals and inquire about their current quality of life, but the activity on the reddit site is indicative that an online forum has the potential to be a place where people can mourn, grow, heal, and feel a part of something greater than their condition.

### ***5.3 Role of a Caregiver***

One thing I did not consider in my original hypothesis and the literature I looked at did not discuss, is the role of the caregiver and the support they need. I have argued that there needs to be more psychological support for amputees, because as indicated a support system is one way individuals have better outcomes (Kizilikurt et al. 2020, 115). Thus it is important to take care of those who are taking care of the amputees in order to preserve that support and have better outcomes for both the amputee and the caregiver. To my surprise, many users on reddit were not amputees themselves, but rather caregivers who used the forum as a way to ask and answer questions, and to seek ways to improve the lives of the ones they are caring for.

In fact, almost 10% of the overall posts explicitly mentioned that they were a caregiver, and gave advice or sought out advice from that perspective. The most commonly talked about situation from a caregiver was seeking out quality of life advice, around 52% of the caregivers sought out this information. Below is a figure indicating the distribution of what these individuals were talking about after being identified as a caregiver.

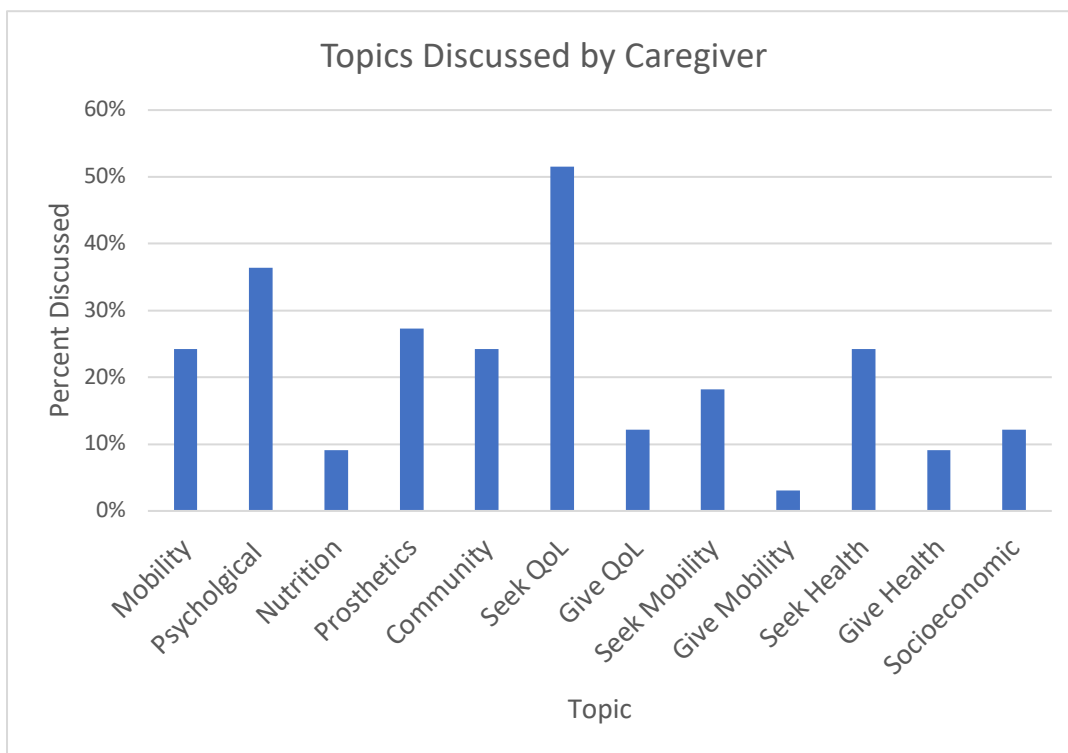


Figure 5: Topics discussed by caregiver broken down by percent

Not only is the frequency of times caregivers sought out quality of life advice high, but this was the highest correlation of any two variables in the whole study, at 0.48.

Caregivers also talked a decent amount about psychological issues and the struggles that individuals faced in overcoming their diabetic amputations. One user, titled his post

*My Dad is now an amputee -- what can I do to help him as best as I can?*

From the start, this person set up a scenario in which he was seeking out information for his dad in order to better support him. Before explaining the more nitty gritty of the situation his father is in, he stated,

*I hope this is the best place to put this! I'm feeling a little bit lost. Sorry if some details are fuzzy, I'm not especially good with medical stuff or terminology, and honestly the last few weeks have felt like a weird fever dream.*

Not only was this caregiver reaching out for his father, but was also reaching out for himself. Having a relative who undergoes a diabetic amputation has the potential to be a large burden on not only the amputee, but those involved in their recovery. Thus, this reddit forum serves as a place where individuals can reach out to the community in order to find advice from a large variety of people who have watched a family member undergo an amputation before. Another user, posted something in a similar vein,

*Hi all, My dad is getting an amputation tomorrow below the knee in one legs. He has diabetes and a foot infection that has spread. He was under general anesthesia today and doesn't yet know this news. How do I comfort him. I'm really scared.*

Again this user sought out help for both himself and his father. The responses yet again illustrated how supportive a community like reddit can be, one user explained,

*Tell him you love him. Focus on the fact he will soon feel better. If he has a humorous side ( I do) you can do fun things like make his protector look like a minion. Talk about the recovery time and set up a calendar so he has something to track his progress. You might seek a little professional help on how to address it ( by yourself) or even with him if he is willing. That sort of stuff Just my 2 cents. Prayers for both of you!*

Not only did this user give support and let the original poster know he was thinking about him, but also gave him practical advice on how to approach the situation for himself and his father vis-à-vis therapy or psychological help. It illustrates how people go to reddit for advice yes, and how to make life better, but also how there are questions asked and

answered regarding health and wellness, that one would think better belong to a physician or healthcare professional – something I will address in the following chapter.

One of the largest topics people discussed on reddit was regaining agency for themselves or for others. Most posts regarding diabetic amputations began with an introduction of the situation and many individuals posted a mini biography about their situation. It was also common for family members and loved ones to post about how to help those with amputations. One user posted about how his grandfather was going through an amputation, and how he did not know how to support him. He asked r/amputee for support and suggestions on what to do, specifically regarding his amputated related depression. Many users responded to this post in support, and indicated that the best way to approach this issue was through humor and resilience. Other users who are family members of amputees talked about how it can be hard, but ultimately it was all ok and the person the amputee was before, was still the same person. Users responded with this sentiment exactly, explaining how although somethings can be annoying and frustrating, having the loved one alive was most important. This type of positive interaction has to be good for people and the loved ones of people undergoing amputation, as in other cases optimism did promote better quality of life (Font-Jimenez et al. 2020, 112).

Caregivers too are looking for something that the healthcare system is not providing them or their loved ones. But, more professional support may not exist for caregivers in general in how to support those they know undergoing a diabetic amputation. This opens a new dimension of care that I had not previously thought about. Those taking care of amputees need help too. And this forum seems to be a place where those individuals can ask, and find what they need. The internet is a powerful tool, and can be used as a form of

therapy for those directly and indirectly afflicted by a cause, such as is the case with this forum.

#### ***5.4 Community Appreciation***

A sense of belonging, I believe, has an important role in overall wellbeing and psychological status. It can offer a sense of worth and gratitude that hard to achieve without being a part of a community, and experts have noted that reduced social isolation is associated with more positive outcomes (Kizilikurt et al. 2020, 115). But what about an online community? Individuals on this forum continuously exhibited a sense of appreciation illuminating positive benefits of an online forum.

People constantly thanked the community on reddit. Between thanking the community for simply existing, displaying gratitude, or acknowledging users for their time – community appreciation weaved its way through all 376 posts. 20% of the time, people exhibited a sense of appreciation. This percentage not only included individuals seeking advice, but also those who responded to or gave said advice. In fact, there was a correlation coefficient of about 0.24 between users who gave quality of life advice, and those exhibiting community appreciation. In addition, 37% of posts people gave quality of life advice also demonstrated a sense of gratitude for the forum. Appreciation came in many forms, and was different when people gave or sought out advice. In many posts, people ended their paragraphs and questions with a short,

*“Thank you in advance for the help! And everyone please have a lovely day.”*

Some began their posts by showing appreciation such as,



*"Hi all- First, thanks for being a part of this support group. It took some digging to find a community that could perhaps help us out, and I sincerely appreciate your taking the time to provide support and admire your willingness to seek support."*

Others more directly responded to individuals to thank them. No matter the avenue users took, this reddit forum is one over overwhelping positivity and support. Very few negative comments were present on this site, and people do appear to positively benefit from this advice and help.

In another example, users asked individuals for advice on how to convince a relative that needed an amputation due to diabetic complications. This user stated that no matter what they tried to do, they could not convince this relative that an amputation was the right choice. R/amputee flooded this post with responses, some ominous, but many simply stressed the importance of removing the toe in order to avoid further complications. The thread concluded with this post from the user who originated this thread,

*"Hey Guys, thank you everyone, at last she accepted to remove it, told everyone's story, which made her accept it. Love you guys."*

Beyond basic appreciation of this community, this individual exclaimed how he loves all those involved on this forum. This is a fascinating sentiment. Someone can love others who they cannot see, hear, or touch – reddit provides a community where this can exist.

Furthermore, this emotional appreciation indicates a potential to reduce loneliness via the internet. By empathizing with others or being empathized with, people can feel connected in a way that is unique to online platforms.

Community support like the examples previously discussed is unique to an online forum, which I will discuss in the following chapter. Due to its overwhelmingly positive

energy, online health communication should be considered as a future course of treatment for diabetic amputees.

### ***5.5 Conclusion***

Psychological support is not thoroughly emphasized in post-surgical protocol, and should be in order to obtain more positive health outcomes post-amputation. Analysis of reddit posts indicated the use of online platforms as a coping and healing strategy. Through serving as a semi-structured form of therapy, this forum created a communal location where users can share lived experiences who want to, and need to hear them. High activity specifically regarding posts around quality of life, indicate that individuals are looking for more or something different that traditional medicine cannot or has not offered. Although the healthcare system as we know it does not foster a formal online group for individuals with diabetic amputations, I believe that this a an important new treatment method that should be considered. I will explore this concept in the conclusion as a way to move forward when considering psychological treatment for amputees. Current reddit users may be fulfilling their mental health needs on their own, and we should acknowledge the positive impact this forum has on the community and recognize it as a viable platform that people continuously come back to.

## 6.0 Current Educational Programs and Non-Traditional Methods of Treatment

Current treatments, specifically preventative treatments, exist today in order to reduce the effects of diabetes and its complications. However, the effectiveness of treatments are variable, and many have insufficient outcomes. First, I will look at current educational programs, and potential issues surrounding the efficacy of this course of treatment. I then will transition into discussing the pros and cons of online health communication. My research thus far has indicated online health communication as a potential avenue for further support, and I intend to propose an online forum in the final chapter that promotes the benefits and minimizes the risk of online health communication.

### ***6.1 Educational Programs***

Poor outcomes and lingering complications for diabetic amputations indicates a need to consider more educational programming and consistency within the healthcare field on how to approach this issue. However although some programming does exist, it currently does not exist for complications such as foot ulcers which often precede amputation (McInnes et al. 2011, 162). Not only is there a lack of consistency between programs, but there is conflicting evidence on the success of these educational programs. (McInnes et al. 2011, 164). Current research indicates successful educational programs are those that are very intense and provide constant support (Adiewere et al. 2018, 16).

However, looking at the current mode of operation for the healthcare system, highly supervised programs currently feel unattainable. Certain researchers have called for large teams of doctors to support patients with foot ulcers, explaining the wide variety of professionals that should be included in a treatment plan. They stated the necessity of, “a primary care physician with appropriate referral to an endocrinologist, ophthalmologist, nephrologist, vascular surgeon, podiatrist, physical therapist, nutritionist, and diabetic education to help ensure adequate care” (Wu et al. 2007, 66). While this may lead to better outcomes, those with less access to any type of healthcare, specifically individuals of lower socioeconomic status, are unlikely to get a team of highly specialized and qualified doctors – and these are the people who arguable need such a high level of care the most.

Educational programs that are less intense, while beneficial in the short term, overall have no long term consistent impact (Adiewere et al. 2018, 15; Perrin et al. 2009, 2).

Two important ways educational programs potentially fail those with diabetic amputations is their content and delivery. Although educational programs empathize things such as foot checking and physical symptom checking, they do not address psychological issues, that when dealt with, are associated with positive outcomes. (Perrin et al. 2009, 2). Also, current delivery of information is not digestible to an average individual. It should be altered to cater to specific individuals and their health literacy level (McInnes et al. 2011, 165). Everyone who has diabetes does not have the same health literacy level, ability to read and understand health information, or the ability to understand information regarding their condition. Experts have noted that lower health literacy correlates with negative diabetic amputation outcomes (Ishikawa et al. 2008, 878). Not only do patients need to be able to literally understand the information delivered to

them, but also need to explain it in a digestible context, and have the means to analyze it for a deeper understanding (Ishikawa et al. 2008, 878).

Although some responsibility lies on the healthcare provider, studies have indicated that patient engagement is critical for positive outcomes (Ishikawa, et al. 2008, 874). However, this engagement must go both ways in order to achieve success. (McInnes et al. 2011, 165). Communication between caregivers and patients is imperative for positive outcomes as patients with negative outcomes, “may feel let down by healthcare professionals for the lack of adequate foot care advice during the early years following their diagnosis” (McInnes et al. 2011, 163). Healthcare providers must understand that most patients and most people do not understand complex medical jargon, and need to meet patients where they are, because higher rates of diabetic amputations correspond to areas of lower income, lower education, and lower health literacy (Ishikawa et al. 2008, 878).

Successful educational programs rely on continual open communication, (McInnes et al. 2011, 165; Wu et al. 2007, 74), but as discussed in chapter three, this is not always possible due to limited staff in underserved areas. Rather than expecting the healthcare system to make grand structural changes to these educational programs that have continuously varying outcomes, we should look to a new form of treatment that is perhaps less traditional than what classic medicine offers.

The variability of success for these educational programs lead me to believe another form of treatment is a more viable option. Even though experts are calling for more education and preventative measures (Amin et al. 2014, 1414), these programs are unproductive insinuating a need for an alternative method. As our world has increasingly

become online, I have tuned my head to online health communication as a means to address issues diabetic amputees currently have, that these educational programs aimed to, but failed to successfully address.

## ***6.2 Online Health Communication***

In recent years, online communication platforms have exploded. Rather than looking to fix old educational programs, we should look into expanding online forums as a viable option for post-surgical treatment.

As internet use has expanded, it unsurprising that online health communication has increased - as Tonsaker et al. went as far to state, "The flow of information has fundamentally changed and physicians have less control over health information relayed to patients" (2014, 407). Furthermore, Tonsaker et al. explained how the internet, rather than physicians, are the first point of contact for health related questions and health needs. (2014, 407). In 2006, McMullan stated that "53% of Americans search the Internet for health information" (25), and due to the recent increase in internet usage, it likely has skyrocketed in the last 15 years. Zhao and Zhang also noted that seeking health information online is one of the most popular uses of the internet in general (2017, 269). Specifically, the number of internet users who look for health information is much higher among the chronically ill, such as those with a chronic condition like diabetes (2017, 274).

Benefits and drawbacks exist within this newfound health communication phenomena. In the context of this study, there are clear positive benefits associated with using a reddit support forum, specifically when it comes to sharing lived experiences with people in similar situations. Harvey and Koteyko Argue, "Although clinical studies are yet

to demonstrate pronounced health effects, there is a growing acknowledgement in the literature of such factors as the impact of writing and storytelling, expressions of emotions, self-disclosure and intimacy, collecting information and thereby improving understanding and knowledge.” (2013, 166). What Harvey and Koteyko argue is a fundamental reason activity is so high on r/amputee. Users used this platform to share their stories and empathize with others and to have other empathize with them. Zhao and Zhang shared similar sentiments to Harvey and Koteyko, explaining that social media is a channel in which individuals can not only give and get practical advice, but also serves as an avenue to connect with a community that would not exist without the internet (2017, 278). Creating a community and transcending physical barriers creates a large group of people who can come together under a common cause (Harvey and Koteyko 2013, 166). This could prove to be quite beneficial, and users on reddit agree. Section 5.4 of this thesis demonstrated the continual community appreciation for r/amputee.

Users on reddit not only sought out quality of life advice, but also gave and desired specific health advice related to their condition. 20% of the time, individuals gave health advice, and 6% of the time they sought it out. Zhao and Zhang argue that social media, in particular, as a health resource could have big advantages for individuals between ages 18-30 (2017, 273). This is a critical age group for diabetic amputees, as amputations are rising in the younger generation, which is exactly the generation that can benefit from online support (Caffrey, 2018). Due to high frequencies of discussing health information, it is critical to understand that whether healthcare providers like it or not, the internet is a defined avenue for receiving health information.

However, other reasons exist as to why users continually turn to the internet for answers. Experts explained that individuals online may feel more comfortable to ask more personal questions, as well as feel a greater sense of anonymity (Tonsaker et al. 2014, 407). However, this is not always necessarily true because public health information is accessible to anyone with internet access and an electronic device. Experts also argued that online communities serve as a source of common locality for individuals who would otherwise do not have access to this information, if for example, they are physically constrained (Tonsaker et al. 2014, 407). Tonsaker et al. continued to argue that online forums may house unique information, they stated “Furthermore, through emerging patient-centered websites, blogs, and support communities, patients can share their personal health and illness experiences; they can offer special insights and reflections from the lived experiences of their specific health conditions, which physicians might not be able to provide” (2104, 407). I argue this exactly. People seek online outlets because they are unable to receive that type of information through traditional medicine via healthcare professionals. Physicians who have not undergone the trauma of diabetic amputation may inherently be less equipped to provide support for those who have. Thus, it is beneficial to reach out to those with similar lived experiences, although this is not without risk.

Regardless of the multitude of positive outcomes that derive from online health communication, there are important drawbacks to consider, specifically regarding receiving specific health information on the internet one would imagine should come from a professional. Online health information can be very challenging to regulate, and furthermore, “Patients might trust misleading information or might make important health decisions based on sensationalized or emotionally charged stories that are not relevant to



their health context” (Tonsaker et al. 2014, 407). Tonsaker et al. then stated “Patients are often in a vulnerable position, and many are willing to accept information that provides a sense of hope and control” (2014, 407). Analysis of the reddit posts illuminated these risks. One user discussed how she was unsure whether or not to receive an amputation. Her doctor suggested she proceed with the procedure, but she remained unsure. In order to deal with this predicament, she reached out to reddit. Responses flooded this thread, and explained the benefits that come with an amputation and ways to overcome harder parts, the original user then posted,

*“Thank you everyone for your kind words and all of the information you guys have helped me with, it really helped me make my decision to go ahead with the amputation. I know it's not going to be an easy road but I think I would have a better chance at a better life this way. Yea some things will be different even difficult at times but I have a great support system with my family friends my loving husband my poochie and all of you. Thank you all so much.”*

Interactions on reddit literally inspired this user to receive a life changing operation. Regardless of whether or not it was the correct decision for her health, this is a potentially problematic way of deciding major health decisions. While the anonymity the internet provides may be beneficial to some, those that gave her responses have unknown credentials. This situation creates a lot of room for risk. Although these types of forums are beneficial especially when it comes to quality of life advice, direct health suggestions become dangerous when credentials of the individual are unknown, and when the evidence to support said advice is undetermined (Zhao and Zhang 2017, 277).

Potential lack of accredited information brings up another important consideration, what do you do with contradicting advice? I previously mentioned that some information online can be misleading and factually incorrect, but reddit users, within the same post, have given conflicting advice on very specific issues related to diabetic amputations. Let's examine one example in which two users, User A and User B, gave polar opposite advice on how to navigate the use of mobility aids post amputation. User A stated,

*For now, the most important physical therapy he can do is practice bending his knee. Start slow and low range of motion, especially because wound vac = the wound is still open and could pull apart. Ideally, he should keep his knee straight any time he's not working on it, but 2-3 times per day, he needs to practice bending it. It's going to be really painful and hard to do, but if he puts the work in now, it'll be a lot easier to get moving on a prosthetic.*

After reading this I was not suspicious at all, it is convincing and seems like perfectly reasonable advice. It logically did not claim anything so extreme that a reader would immediately be skeptical, but a couple of posts down caused an increase in my attention to detail because User B contradicted with,

*The biggest piece of advice I got was to avoid a knee contracture - keep the amputated limb as straight as possible and don't let it hang down with the knee bent when in the wheelchair or just sitting around. Contractures are painful to undo and limit range of motion.*

User A states to bend the knee with reason, while User B not only claims but exclaims that not moving the knee was *the biggest piece of advice* he got and could give. At the point in

the thread, it would be critical to get an expert opinion in order to avoid further complications, as relying on the internet alone could be harmful, and confusing.

Even though reddit is considered a casual platform, individuals consistently gave and sought out health advice. More specifically, due to the nature of the platform I was surprised and found it inconsistent with the frequency of use of specific medical terminology. However, people are using it as a source for more formal health information. The efficiency and convenience of the internet is fantastic: it does not waste physicians time, and provides those seeking information with quick answers (McMullan 2006, 26). ). Not only is efficiency a concern, but the content as well. Social media provides a lot of information and individuals can discover exactly what they are looking for (Zhao and Zhang 2014, 276). Specificity and unique information cause social media to stand out and experts found and I have argued that, "Participants emphasized that they used social media sources for health information especially 'because a lot of the [other users] are having the same problem I am'" (Zhao and Zhang 2014, 276). If expanded and used correctly, I argue that online platforms similar to social media sites, could be an effective treatment model to improve the quality of life for individuals undergoing diabetic amputations and recovery.

### ***6.3 Conclusion***

Although the benefits do not undeniably outweigh the potential risks of social media as an avenue for online health communication, I do believe that those risks can be mitigated to create an overwhelmingly positive treatment opportunity for amputees. As evidenced by my research, individuals are already using this reddit forum as more than just a place for general unmeaningful conversation. By seeking out health advice, users are

indicating that they are willing to interact with an online platform as a way to receive advice for both mental and physical health. Diabetic amputees are demonstrating that they do not need to, and are not, always turning directly to their specific healthcare professionals for their needs. Although there are some discrepancies and misinformation, a more tightly regulated platform could better mitigate these risks, while enhancing the positive benefits that come from peer to peer communication.

## 7.0 Conclusion and Non-Medical Treatment Intervention

Although social media may have some harmful effects when used as a health source, I believe there are ways to maximize positive benefits while minimizing potential consequences. Using a more tightly regulated online platform could accomplish this goal. I propose using a platform moderated by healthcare professionals that caters to individuals with diabetic amputations. Not only would this platform allow online access to healthcare professionals by both private messaging and availability for telehealth appointments, but it would also maintain the peer to peer communication that is so valuable from online forums such as reddit. As seen in this study, reddit has the ability to bring people together under a common issue, without physically gathering – something incredibly powerful and unique to the internet.

This forum would have 3 main purposes. The first will be to continue to offer peer to peer communication that reddit provides. One section of this forum will essentially be what reddit is – a place where community members can post about their experiences, inquiries, and whatever they may choose to share. The differentiating factor between this forum and reddit would include healthcare professionals contribute to this section of the site. Healthcare professionals will weigh in only when deemed necessary such as correcting

misinformation, or highlighting an important part of an issue that has not already been discussed, but would be valuable for the community.

The peer to peer communication reddit provides is simply unattainable in a traditional healthcare setting. During a consultation, patients look to their doctors for advice, rather than people who share similar lived experiences. The reddit forum I analyzed in this thesis indicates a reality where preservation of peer to peer communication is vital to an effective support group. This type of interaction must be maintained in any forum moving forward, in order to maintain and build off of the supportive community already created. We saw on this reddit forum that peer to peer communication is vital, especially in section 5.4 that discusses the high frequency of community appreciation. However, by incorporating more credited healthcare professionals, we can reduce some risk associated with online health communication. As mentioned in section 6.2, sometimes people give health advice that can be contradictory and, ideally, having credited professionals present on the forum will reduce misinformation allowing users to receive more accurate health advice to improve their wellbeing

The second section of this forum would include an avenue for direct communication to a variety of healthcare professionals. These moderators would include: physicians, surgeons who perform diabetic amputations, prosthesis, nutritionists, psychiatrists and psychologists. By having a wide range of experts addressing varying needs, we can ensure a more holistic approach to care that individually these professionals could not achieve. Furthermore, they would be responding to direct inquiries, and personal questions just as one would in a consultation, allowing for personal and specialized care, which as discussed in chapter one and chapter six, experts are calling for. Short response times from

healthcare professionals would allow for patients to receive more immediate information, capitalizing on the internet's ability to offer a world of information at the click of a button. Considering the frequency that citizens use the internet to locate health information (discussed in chapter 6.2), maintaining the efficiency that Google, for example, has is fundamental to the main purpose of this forum. Rather than getting general information, these users can have specialized suggestions at a speed and convenience traditional medicine does not offer. This would promote positive outcomes associated with the ability to gain credited factual information quickly. By having a messaging feature, this forum would allow for personal interaction between patient and provider, regardless of whether or not they are face to face.

The third, and final, part of this forum would include a channel for telehealth communication. Patients could set up online appointments with healthcare professionals free of charge, and independent of insurance status. By creating a free accessible resource, we can avoid issues discussed in section 2.2 regarding insurance status and ability to receive care. Furthermore, telehealth communication offers an even more personal connection than the messaging section of this forum does. Convenient access to a variety of healthcare professionals on the internet is especially important to diabetic amputees. As discussed in chapter 4, reduction of mobility is a common issue for diabetic amputees as well as individuals at risk for this complication. Through use of the internet, we eliminate the need for individuals to potentially rely on others to get to appointments, or encounter mobility issues along the way to those who are less agile than the once were (Harvey and Koteyko 2013, 166), giving back a sense of agency to the patient. This site allows users to take actionable steps for themselves and requires no additional assistance.

A major potential asset of this site would be that it could provide a type of therapy and a wildly reduced, if not free, cost. Access to an electronic device and the internet are the only costs associated with patients using this forum. Those active the reddit forum already demonstrate access to these two necessities, indicating this as a feasible treatment possibility. Like reddit, users could empathize over similar lived experiences, seek advice and conversation that reduces loneliness and social isolation, and create a community of supportive individuals with similar life experiences. As discussed in in chapter 5, reducing social isolation and belonging to a supportive community have sincere positive impacts.

Although the focus of this forum is to fill the psychological treatment void that exists in diabetic amputation protocol, it will not be the only complication discussed on this forum. My research has indicated the importance of other complications as well, and access to healthcare professionals such as doctors, nutritionists, and prosthesis would allow informational availability on a wide range of issues. Nutritionists could discuss the importance of a healthy diet and maintaining normal blood sugar levels. Doctors can answer any and all health questions. And prosthetist can speak about issues surrounding prosthesis and advice on how to improve mobility. Access to these professionals allow patients to receive accredited information for questions that they may have forgotten or chose not to ask in a typical consultation. Amputations are traumatic events, in when in shock, it is common to forget questions you intended to ask. Thus this forum comes in to alleviate the stress of unanswered questions in a timely manner.

Ideally this platform would improve quality of life for individuals with diabetic amputations, and I think it would. With this structure, patients are given autonomy on this forum to explicitly state what they need from healthcare professionals, provide specific



examples, and ask directly for what they need that the current healthcare system is not providing them in person. Not all diabetic amputees receive inadequate care for their conditions, but high rates of psychological distress combined with low surgical success rates indicates alongside high activity on this reddit forum indicates that more can and should be done to improve outcomes. The internet offers a channel to improve treatment through nontraditional methods. After analyzing this forum, my main conclusion is that these individuals want more. They want more guidance, more opportunities to discuss their health needs with professionals, and even more so, they want a space where they can connect with others, grieve losses of limbs, heal and live their lives to the fullest.

Perhaps there is more that can be done in a clinical setting to improve quality of life, but sometimes going to the clinic is not an option. Rather than running away from a new form of health communication, we should embrace it, and use it to our advantage. The connections made on this reddit forum re visibly meaningful, satisfying, and currently not found elsewhere outside of specific internet platforms. A more structured, formal community could create an opportunity to give patients more support, while having access to accredited professionals who can provide evidence based information to improve the state of their conditions.

It is not impossible to improve post-surgical outcomes of diabetic amputations, we just have to be willing to accept alternative methods in order to accomplish that goal. Diabetic amputees are not a hopeless group of individuals, and in fact are far from it. Even without professional guidance, individuals have gathered online and created a community filled with kindness, empathy, and support. Rather than trying to build something that may or may not work, we cand and should capitalize on what has been done by diabetic

amputees thus far, improving it to be a better resource, which ultimately helps people heal and thrive.

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