

Beyond the 1%: A Telemedicine Strategy to Enhance Bariatric Surgery Adoption and Patient Follow-Through

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On my honor as a University Student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments

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Introduction

In the United States, approximately 9.2% of all adults are classified under severe obesity, which is a BMI over 40 (Centers for Disease Control and Prevention [CDC], 2021). Severe obesity can lead to many health conditions like type 2 diabetes, high blood pressure, kidney disease, certain cancers, and potentially death (Health risks of Overweight & obesity – niddk, n.d.). Only 1% of eligible patients receive the life-changing surgery that can change their lives for the better (Chao et al., 2021). Bariatric care is a type of specialty care that refers to any procedures that attempt to manage obesity and related conditions. This is a crucial issue, as bariatric surgery is the most proven way to mitigate the effects of severe obesity, and it is the only method that shows consistent results. I believe telemedicine, which is the use of telecommunications to provide or support healthcare, can be used to increase the percentage of eligible patients that receive care and beneficial outcomes by reducing logistical, systemic, and informational challenges before, during, and after surgery. This leads to the question: How can we best implement telemedicine in bariatric care to make healthcare easier to access and to expand access beyond 1% of eligible patients?

I use the Diffusion of Innovations (Rogers, 1962) theory to analyze how telemedicine is currently being used, and how to best implement a telemedicine outline plan that could immediately improve bariatric surgery rates. This outline will be a combination of various established and new telehealth techniques before and after the surgery process within bariatric care. Using literature review to create a comprehensive understanding of the use of telemedicine in specialty care and then applying it to an action plan is the best method of approaching a possible solution. The Diffusion of Innovations can then be used to possibly predict how well this solution would be diffused and how it would be received. Altogether, telemedicine can

positively impact bariatric care before, during, and after surgery, and a proper plan could lead to wider access to care.

Reducing Logistical and Systemic Barriers

Telemedicine, supported by the Diffusion of Innovations framework (Rogers, 1962), can significantly reduce logistical and systemic barriers in bariatric surgery, particularly in the preoperative phase, by increasing accessibility and patient follow-through. Only 1% of eligible patients receive critical, life-saving bariatric surgery and reducing these barriers in the preoperative phase can greatly increase surgical likelihoods. Imagine a patient in a rural community, hours away from the nearest specialty care center, who has been advised to seek bariatric surgery. The first consultation now requires significant time off, travel expenses, and childcare arrangements, which can all lead to missed appointments or complete disengagement with the surgical process altogether. People from all types of places and backgrounds can be hindered by time, distance, and personal barriers. All these things can lead to a potential patient deeming surgery not an option. Telemedicine can help provide a solution within bariatric care as it can be wielded to help eliminate geographical and logistical barriers that prevent patients from taking the critical first step towards surgery.

Telemedicine has a proven track record of getting patients to receive bariatric consultations. After telehealth implementation, the no-show rates to first time consultations decreased from about 39.3% to 16.6% (Schlottman et al., 2022). This case study of telemedicine shows potential in specialty care and has been in use since 2020. These types of virtual consultations allow patients to connect with specialists from within their own homes to take the first steps. As Schlottman et al. (2022) suggest, these improvements of no-show rates also

directly increase patient follow-through with the surgery. Thus, by improving rates to below 20%, this means that there will be a much higher likelihood of patients going through with the surgery. Other peer-reviewed literature showed that ease of access via meeting with telecommunication methods greatly contributed to overall better outcomes for bariatric patients as well (Brown et al., 2020). This is an example of a much more recent implementation of telemedicine in the bariatric space, with experimental evidence of success. This study mainly looks at how the forced implementation of telehealth due to the COVID-19 pandemic affects the people who use it. Those who did use the telehealth option showed more to consultations, showing how the ease of access directly contributes to more people taking the first step. These are all proven forms of implementation within the bariatric space.

Beyond individual patient convenience in the bariatric space, telemedicine plays a systemic role in increasing healthcare access. Due to the COVID-19 pandemic, the Michigan Health System expanded virtual care across 75 ambulatory practices, integrating telehealth into their standard care models (Hirko et al., 2020). The same peer-reviewed journal found that rural patients were also shown to benefit significantly from telehealth, as it helps eliminate any travel burdens (Hirko et al., 2020). This shows how systemic barriers to healthcare, such as rural induced disparities, can be overcome with the help of telemedicine. Taking the best parts of these proven implementations and applying them to specialty care can lead to much better outcomes in the bariatric space. However, telemedicine's adoption in and out of the specialty care space has also been hindered by similar systemic barriers.

The Diffusion of Innovations (Rogers, 1962) framework seeks a way to explain how, why, and at what rates innovation spreads in society. It proposes that there are five main elements in the spread of an idea: innovation, adopters, communication channels, time, and

social system. Innovation is the novel idea in question; adopters are the users, communication channels, time, and social systems are all self-explanatory. Adopters have five main categories: innovators, early adopters, early majority, late majority, and laggards. We are in an interesting position as the adoption and diffusion of telemedicine is still taking place in our society.

Telemedicine has had trouble diffusing through society, as we are still just getting to the point of widespread use, between the early and late majority. As there are changes being made to telecommunications, there will also be constant changes to telehealth. The last 25 years have greatly changed the ways telecommunications have been used and how we perceive it.

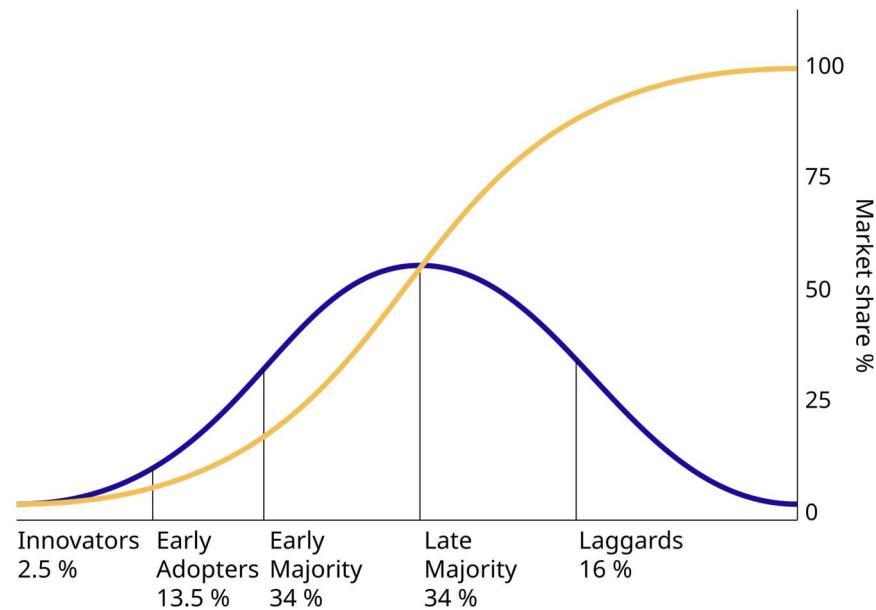
Telehealth is constantly playing catch-up, as it must be safe and private. This is what can lead to the delayed adoption, and what seems to be leaving it in a state of prolonged “early majority.”

I believe that telemedicine’s adoption has been hindered by rapidly changing and advancing telecommunication technology, on top of the general hesitancy that comes with new technologies. I think that this could be due to innovation in telemedicine not being fast enough to keep up with the innovation in new telecommunication technology and not having the same support for innovation as the greater industry does. The adoption of telemedicine has been following the s-curve rate of adoption, shown in yellow in Figure 1, in which diffusion will rise and then plateau over time (Zanaboni & Wootton, 2012).

Figure 1

Diffusion of Ideas

(Rogers, 2012)



Note: This diagram illustrates the diffusion of innovations model from Rogers (1962). The 5 groups of consumers adopting the new technology are in blue and its market share eventually reaching saturation is in yellow. Image is in the public domain and retrieved from Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Diffusion_of_ideas.svg).

This led to a stagnation of adoption throughout the 2010s, as there is far less evidence of telehealth growth during this time. The glaring issue is that there has been a distinct lack of innovation, even since 2012 as the adoption of telemedicine has not really changed. The COVID-19 pandemic served as a new catalyst for the expansion of telemedicine, forcing its use into the mainstream. Since the pandemic there has been a lack of novel implementations in the bariatric

space, but with proper support and planning we can wield telehealth to greatly improve bariatric patient outcomes from where we are right now.

I would consider ourselves at a newer period in telehealth innovation, with the pandemic acting as the turning point. While much of this technology has already been adopted in other forms of care, it has not been robustly used in the bariatric space. Thus, even the telehealth consultations are still in a position of early adoption. The current implementations within the bariatric space as listed above would indicate stakeholders as the early majority in this era of telehealth. I believe expanding the use of online consultations into the standard within bariatric care will be the single most important aspect in reducing logistical barriers to surgery. Possible implementations in the form of educating patients involved that are directly from the specialists can also greatly increase potential patient outreach. The need for physical consultations will also remain, though getting past the first appointment already greatly increases the odds of follow-through so I believe getting patients to this first step is critical (Schlottman et al., 2022).

We are at a point where much of the public is at least aware of telecommunications being used in a medical setting and I believe the idea of making online consultations a standard will diffuse much faster than other potential implementations. The general population is already receptive to the idea of scheduling online and I believe online medical consultations are starting to become a normal idea in general. There are many physical health systems that offer virtual visits, as well as many companies that focus purely on telemedicine. Thus, bringing virtual visits to the specialty care process has been proven effective, and it should be brought on permanently to reduce systemic barriers surrounding many forms of care. Maintaining support for the patient throughout the process could also lead to more beneficial outcomes. Using telehealth is a way to remind patients of appointments can also improve outcomes. In a peer-reviewed literature review

of various telehealth implementations that use electronic reminders, it found that in all cases where reminders were used, patient compliance and follow through improved (Schwebel & Larimer, 2018). Bringing such practices over to the bariatric space should not be a difficult process, and this shows clear benefits to electronic reminders. Bringing many of these other commonplace telehealth implementations to the bariatric space should improve surgical rates, especially in the preoperative phase where patient mental endurance is key.

Combining electronic reminders with preliminary online consultations I believe will be the best solution to reducing logistical and systemic barriers. It will eliminate the need for patients to begin the process in person, allowing patients to choose when and where to start the process. It allows patients to conduct consultations in a more private manner which helps reduce stigma around bariatric surgery. Finally, the electronic reminders will help ensure a patient's ability to remain on schedule and to follow through with the next steps. I believe this system will be easily accepted and diffused through society due to similar innovations already being widely used.

Addressing Patient Hesitation Through Private, Flexible Platforms

Many patients are reluctant to pursue bariatric surgery due to stigma, misinformation, mistrust, and fear (Garcia et al., 2023). Telemedicine offers a private and flexible platform for addressing many of these concerns. Though, as with all forms of technology, telemedicine has the ever-present public hesitancy preventing it from absorbing into aspects of everyday life. Creating trust with patients with telemedicine, generally and specifically within specialty care, is essential for improving bariatric surgery rates.

First, we should explore the difficulties of using telemedicine itself. Many patients believe that in-person visits are better care than telemedicine, and that telemedicine would interrupt the continuity and quality of care received (Adams et al., 2021). This study set out to find the obstacles of telemedicine, especially for new users at the beginning of the COVID-19 pandemic. An important finding was that technology itself was not a large barrier, but privacy and security were highlighted as the largest barriers by older patients (Adams et al., 2021). Other studies in the past suggested otherwise, but now we are at the point where we have enough significant infrastructure to maintain and support telemedicine as an apparatus. However, the most impactful solution suggested by the study is that primary care providers wield significant influence over patients. Thus, it will be important for bariatric care providers to be upfront with their patients over the benefits of telemedicine when it is implemented there. This highlights a provider's ability to bypass the normal time it takes for patients to trust new technology, and this should be leveraged to best impact bariatric care.

There are a few barriers common to telemedicine both in and out of specialty care. Previously mentioned security and privacy issues, unfamiliarity, and reimbursement or insurance factors tend to be the most prevalent issues overlapping telemedicine in general and specialty care (Moulaei et al., 2023). Ironically, there are possible telecommunication-based solutions for most of these issues. Firstly, providers should use and have the technology available to attempt to educate potential patients while using online methods. Providing online education and preparation yields many of the benefits that were mentioned in the pre-operative care section. This allows patients the ability to learn more about potential options, especially telemedicine implementations, and how they can involve themselves in the process. Educating patients will also serve as background for quelling security concerns, as many of the common security

uncertainties can be met with a concise, online platform. This would help greatly increase the rate of diffusion within society, and the idea that this is not already standard speaks to the general mishandling that has occurred since the COVID-19 pandemic.

There are many implementations that highlight the strengths of telemedicine in the bariatric space that I would take inspiration for using in the greater outline. There is also a notion that tailored approaches can lead to more awareness and trust in patient populations when promoting telemedicine (Moulaei et al., 2023). This must be considered when preparing larger implementation plans. Understanding this problem and targeting what makes bariatric surgery difficult is important in moving forward with the proposed encompassing implementation outline. Virtual peer support and counseling has been proven to improve patient understanding, as well as increase awareness. Educational telehealth sessions reduce anxiety and clarify misconceptions about bariatric procedures (Coldebella et al., 2018). Combining the trust that patients already have with providers and educational telehealth sessions can lead to positive outcomes. This should become the standard operating method of approaching patients to increase bariatric surgical rates.

One study finds that patients, when given a specialized telemedicine process, were positive about the bariatric process (Poljo, 2024). This is even with a sudden shift between in-person to online consultations, showing that if the telehealth process is well supported, then its diffusion should be easier. It is important to note that when creating a telehealth implementation plan, that it is made to benefit the patients and not hinder them. Empowering patients to make their own decisions about the type of care is important but increasing access to patients by providing types of in-person and online care is the aim of telemedicine. Thus, combining all the

aspects of customization and patient needs is what providers are capable of already distributing, and expanding this should lead to greater access to bariatric surgery.

Outside of provider-based telehealth, there are some great benefits to other forms of online based networks. Providers are not always the first step potential patients take when making observations about their conditions. Patients that were frequent participants of online support groups were found to have improved early weight loss outcomes. These groups also serve as public educational services where patients can encourage and support their peers at any phase of the bariatric surgery process (Athanasiadis et al., 2021). Especially highlighted was the idea that social support is an invaluable part of the weight loss process after the operation takes place. Telemedicine allows patients to connect to one another without the need to travel to physical support groups. Social support groups supported by providers given to bariatric patients were shown to significantly improve outcomes (Athanasiadis et al., 2022). Online communities outside of primary care providers can provide easy access to first steps, however creating a network with the providers connected will significantly improve patient outcomes.

Creating an implementation plan that will be beneficial to everyone involved is impossible. It will be important to have providers support a standard approach that is tailored specifically for bariatric care. Telehealth should also be distributed along each part of the care process, allowing options for as many affected people as possible, and to best increase outcomes across the board. Leveraging patient trust via providers and peer social groups should allow for better education and a decrease in mistrust in telemedicine. This would allow for the best diffusion into society to become a commonplace technological process, and I believe that we are ready to move forward to create an outline that would significantly increase ease of access and the rate of surgeries above 1%, which in turn improves the health outcomes for patients affected.

Implementation Plan for Improving Beyond 1%

All the previous outlined implementations of telemedicine can lead to a possible implementation plan that could improve beyond the 1%. A balance between patient engagement and technological implementation across different stages of the bariatric care process is critical for allowing these improvements. Creating the option for both in-person and online consultations is the essential first step in this plan. This will allow many potential patients, who may be hampered by long-distance travel or the inability to leave their home, to start the bariatric surgery process. Just beginning the process itself leads to more beneficial outcomes, and building strong communication between the patient and the doctor is another immensely important aspect (Ferriera and Carvalho, 2025). It should be a standard used across all specialty medicine as we currently have the infrastructure already in place to support online consultations, and online communication could be used to create online meetings and education presentations to further improve trust in bariatric surgery. An ideal implementation would be to have flexibly scheduled online consultation meetings, which leads to the necessary in-person consultations. Combining this with set reminders to further encourage attendance all the way up to the surgery itself could show massive improvements in surgical rates. Hybrid telehealth models will also lead to reduced healthcare costs, which helps break down other systemic barriers involved in hindering potential surgeries (Ezeamii et al., 2024). This initial step also helps to break down various systemic barriers (economic and social) that could hinder patients as well and will lead them to getting the surgery and its health benefits.

Regular public information meetings online every few weeks should also be implemented because they further the trust between healthcare providers and potential patients. The next part

would be provider-backed online support post-surgery. Providers could create online communities for those who have received or are going through the process of surgery to support one another. We know social support can greatly improve outcomes at each stage of the process, as seeing the experiences of others can ease questions that may impact your decision away from getting the surgery. These will be places where people can share positive results, help others learn about the process, and continue to support each other after surgery to ensure the best results.

Creating this tandem of telemedicine opportunities before and after surgery will prove to be the most effective method of improving bariatric surgery beyond 1%. Some might believe such a wide scale plan using technology may be unattainable, which is untrue. The medical space actually adopts innovations at the same rate as other fields, and we already have much of the infrastructure needed to support this change. One such study found that there was no difference in the adoption of new technology in the medical field than outside the medical field, but the respective, singular technologies will result in varying rates of adoption (Russell, 1977). I believe that telecommunications technology itself has been holding back telemedicine, rather than the medical field it is being applied to. The rapid changes of telecommunications technology outpace support for new telemedicine innovations, which leads to telemedicine constantly being a few steps behind. The COVID-19 pandemic proved that once we put it into action, it will lead to beneficial outcomes (Hirko et al., 2020).

Historically, Electronic Health Records (EHRs) can be a useful comparison. American diffusion of EHRs also follow the S-curve rate of adoption synonymous with the Diffusion of Innovations (Esdar et al., 2019). This is where an initial hesitancy is followed by a rapid rate of adoption after its efficacy is proven, followed by a plateau as the final stragglers adopt the

technology. I believe that there are many similarities between these EHRs and my telemedicine implementation outline. Both were based on technology that was generally adopted outside of the medical realm before they were fully adopted for clinical use. Both had similar hesitancy revolving around concerns about security, training, and costs, but EHRs gradually became standard due to improved efficiency, data tracking, and patient outcomes. Telemedicine in the bariatric space can lead to the same, if not more beneficial, outcomes for the patients involved. Overall, EHRs show that the Diffusion of Innovations supports the adoption of telemedicine technology in the medical space, and that a proper outline with the right support can lead to massively better outcomes for patients involved.

Conclusion

Telemedicine can address many barriers at all stages of bariatric care from pre-surgical consultations to post-surgical support by allowing easier access to information and support. Combining existing telehealth solutions with experimental approaches offers significant potential for improving surgery rates. Peer-reviewed literature shows that potential improvement has already been shown (Hlavin, 2023), though it does not state a clear path forward. The outlined plan provides a viable approach for health systems to address barriers in bariatric care, with potential adaptations for other medical specialties. The healthcare technology landscape is a constantly changing environment, with breakthroughs in new various technologies faster than we can apply them to medicine. The future of telemedicine in specialized care lies in our ability to adapt new technology, like potentially artificial intelligence, to the medical space at a speed equal to general technological progress. Acting now and implementing a plan will almost

guarantee an improvement of patient health and improve surgery rates to far greater than 1% of eligible patients and hopefully lead to more positive outcomes.

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