MIGHTEE: Motivational Interaction Group Heart Transplant Exercise and Education, A Pilot Study

Statement of Problem

Orthotopic heart transplant (OHT) is the definitive therapy for children with cardiac disease; approximately 400 pediatric OHT are performed each year in the U.S. But survival after transplant is limited, and research shows that patient quality of life after transplant is less than their healthy peers.

A child's transplanted heart usually works well, pumping blood as well as most healthy hearts, and the American Heart Association (AHA) recommends no specific exercise-related restrictions for heart transplant recipients. However, children with transplanted hearts have impaired exercise performance and do not exercise as much as their peers. This is concerning, as impaired exercise tolerance is associated with reduced survival, diminished health-related quality of life, and depression and anxiety. Therefore, identifying interventions that positively impact physical activity and promote transplant longevity, like individualized exercise programs, should be a priority for post-transplant care.

However, pediatric cardiac rehabilitation programs are limited and distance to rehabilitation centers may be a barrier to receiving services. Those from racial minority backgrounds and with lower socioeconomic status are also associated with less exercise, increased sedentary behaviors, more unhealthy eating patterns, and higher rates of obesity, underscoring the presence of additional barriers to post-transplant physical health for some of our most vulnerable patients.

These findings emphasize the need to develop accessible, effective interventions to help children after transplant develop a culture of activity.

Description

Through Motivational Interaction Group Heart Transplant Exercise and Education (MIGHTEE), we are studying the feasibility and impact of a 16-week group aerobic training program, delivered remotely via video conferencing, on physical activity and psychological well-being in adolescents after heart transplant. Upon enrollment, we give participants a wearable activity monitor that tracks physical activity. This activity monitor also pairs with the *MyHeart* application, which serves as a central information portal for study coordinators, participants and their families. Subjects also meet with a transplant psychologist to discuss barriers and motivations to exercise, and to create an exercise-related goal. These goals could include participation in the transplant Olympics, joining a school sports team, or improvement in exercise or physical activity parameters.

After we collect baseline physical activity data and measures of quality of life, participants meet with a cardiac exercise physiologist with experience and training in the care of children with heart disease, who reviews appropriate aerobic training exercises that maintain patients' heart rates within their target ranges. In groups of 6-10, participants are assigned a 30-minute time frame to meet virtually after school 3 times per week. An

exercise physiologist will attend these sessions to interact, encourage, and instruct participants while they complete their assigned aerobic exercises, which include a series of activities that can be performed at home and with minimal equipment.

Each session will be unique and may have different themes, including “80s music” or “Halloween celebration,” measures intended to encourage subjects’ interest and participation. At 4-week intervals, a study psychologist will have virtual meetings with each participant to review progress and perform motivational interviewing.

At the end of the 16-week intervention, we will evaluate MIGHTEE’s feasibility and impact through a series of metrics, which includes a comparison of the participants’ measures of activity and quality of life to their baseline. We will conduct structured interviews with participants and their families to gain feedback that we will use to refine and improve further iterations of the program.

Next Steps

We hope that this project will offer novel information about the ways in which collaborative methods, wearable technology and virtual platforms can be used to improve the care of pediatric heart transplant recipients. We anticipate that the approach described in this study will increase the accessibility of cardiac rehabilitation programs to traditionally underrepresented patient populations, and will provide the foundation for larger-scale, multi-center studies of heart transplant recipients.

Our ultimate goal is that this methodology can be extended to enhance the care provided to children with a wide range of diseases, both cardiac and otherwise, leveraging the known benefits of physical activity to improve outcomes and quality of life.

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