

CLINICAL COMMENTARY

Music, Kidneys and Medicine: Raising Awareness and Clinical Applications

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Figure 1. Image of world renowned musicians with kidney dysfunction before death Ludwig Beethoven (left) and Wolfgang Amadeus Mozart (right).¹

Introduction

Music has been a constant part of human culture since the start of civilization. The purposes of music range from aesthetic pleasure, religious or ceremonial purposes, and as a product in society. More recently, the use of music as a form of therapy is becoming recognized.

Studies have shown positive effects of music on measured hemodynamic functioning including respiratory rate, heart rate, blood pressure and neurological function.^{2,3} Although studies have proposed that music therapy has an effect on patients with chronic kidney disease (CKD) and patients on dialysis there is limited evidence of its utility on kidney disease.

History of Music and Health

The therapeutic relationship between music and medicine dates back to the dawn of civilization. For example, mothers used humming to console their crying babies, and medicine women and shamans treated ill members through maneuvers with incantations.⁴ Hippocrates, the founding father of rational medicine, and Plato, supported using music for disturbed patients.⁵ The Persian philosopher Abu Nasr al-Farabi, or Alfarabius, wrote about the therapeutic effects of music in his essay, *Meanings of the Intellect*. He writes, “music promotes good mood, moral education, emotional steadiness and spiritual development. It is useful for physical health. When the soul is not healthy, the body is also ill. Good music, which cures the soul, restores the body to good health”.⁵⁻⁷ When Western medicine was revived in the Renaissance, the connection

between music and human physiology was recognized. As Francis Bacon said, “...the poets did well to conjoin Music and Medicine in Apollo, because the office of medicine is but to tune this curious harp of man's body and to reduce it to harmony”.⁸

Famous Musicians with Kidney Disease

Musician, Country	Kidney Disease
Wolfgang Amadeus Mozart <i>Austria</i>	Post-infectious Glomerulonephritis
Ludwig Beethoven <i>Germany</i>	Papillary Necrosis
Giovanni Gabrieli <i>Italy</i>	Nephrolithiasis
Antonin Dvorak <i>Czech Republic</i>	Chronic Kidney Disease
Arthur Sullivan <i>United Kingdom</i>	Nephrolithiasis
Isaac Albeniz <i>Spain</i>	Chronic Kidney Disease
Oscar E. Peterson <i>Canada</i>	Chronic Kidney Disease
Natalie Cole <i>United States</i>	Membranoproliferative glomerulonephritis
Dayna Stephens <i>United States</i>	Focal Segmental Glomerulosclerosis

Table 1. Famous Musicians with Kidney Disease.

Several famous composers have suffered from kidney disease, including Ludwig Beethoven, Wolfgang Amadeus Mozart, and Antonin Dvorak (Table 1). The recognition of kidney diseases in these celebrities has increased public awareness and support for kidney disease research.

Ludwig Beethoven. Beethoven's body was autopsied within 24 hours of his death, revealing detailed evidence of undiagnosed kidney disease: “Both kidneys were invested by a cellular membrane of an inch thick, and infiltrated with a brown turbid fluid; their tissue was pale-red and opened out”.⁹ This has been interpreted as a description of renal papillary necrosis (RPN).

Wolfgang Amadeus Mozart. Mozart is not only a world-renown composer, but the circumstances to his early death were of particular interest to many. Although forensics was not able to confirm the cause of his death, many suspect the cause to be due to kidney disease. He died after a brief illness of 2 weeks, which has been postulated to be due to a rapidly progressive postinfectious glomerulonephritis.⁴ The “taste of death” he described is thought to be the foul taste of uremia.¹⁰ Moreover, the presence of edema suggests nephrotic syndrome, increasing the chance for glomerulopathy or volume overload.¹⁰

Antonin Dvorak. Dvorak died from Bright’s disease diagnosed by urinalysis. Although the cause of his kidney failure is not well explored, it is postulated to be due to urinary tract obstruction and pyelonephritis.^{11,12}

Dayna Stephens. Stephens continued to perform while on hemodialysis and received a kidney transplant in October 2015.¹³

Music and Clinical Applications

Music may be a useful clinical treatment for CKD and dialysis patients. There is limited data impact of music therapy on different psychological and physiological measures parameters, which are suggestive of benefits that may improve health outcomes. However, the varying methodologies make it difficult to combine studies into a meta-analysis or systematic review.

Music may enhance patient education regarding disease management and lifestyle modifications, improving retention. For dialysis patients, music therapy is directed for quality of life (QOL) improvement, anxiety and pain management, support with emotional wellbeing, and as well as optimization of hemodynamic measures, like blood pressure and heart rate.

A recent UCLA study demonstrated that as little as 30 minutes of listening to live music can decrease stress levels. This project included 331 individuals, largely student who compose 80% of the participants, that tend to have higher basal levels of stress.¹⁴ This cited prior studies demonstrating potential of music therapy to improve the health outcomes in a variety of populations, geographical regions, and methodologies. Consistent methodologies and larger sample sizes are needed to address the quantitative and qualitative impacts of music therapy on health outcomes. Differences in socioeconomic demographics, race, and gender, may also be important when interpreting study findings.

There are few studies of music therapy in chronic kidney disease, although high quality research is limited, there are many programs involving multiple departments examining effects of music on human health. Centers already exist in few academic institutions, including the Medical University of Vienna, (Austria), Mount Sinai, University of Colorado and Johns Hopkins. These programs combine music with different disciplines of medicine, to enhance healing, outreach, education and research.

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